7451

HE HARMSWORTH
CYCLOPÆDIA

verybody's Book of Reference

Vol I.

ntaining 50,000 *Articles, profusely illustrated*

LONDON:
E AMALGAMATED PRESS, LTD., CARMELITE HOUSE, E.C.
AND
OMAS NELSON AND SONS, 35 PATERNOSTER ROW, E.C
1907

THE
HARMSWORTH
ENCYCLOPÆDIA

Vol. I. A—Boëtius

PUBLISHERS' PREFACE.

THE publishing firms associated in this enterprise have aimed at producing a complete, up-to-date, and scholarly Encyclopædia in a moderate compass, and, above all, at a price which puts it within the reach of Everybody.

In the allocation of space to the various topics, THE HARMSWORTH ENCYCLOPÆDIA differs considerably from its predecessors. It is essentially a modern book. While subjects of classical or antiquarian interest are not neglected, a new and special emphasis has been laid on subjects which are of living interest to-day, such as biographies of living persons, recent developments in science, and the progress of modern invention.

By judicious condensation, and by recognizing the needs of modern life, the publishers have succeeded in presenting a greater amount of practical information in a larger number of articles than has ever before been brought within the same compass.

Within the limits of the available space, the publishers have endeavoured to ensure four things :—

(1.) *Accuracy.*—This applies to the brief summaries as much as to the longer articles.

(2.) *Completeness.*—Every topic is treated so as to present all the facts which the ordinary reader is likely to require.

(3.) *Clearness.*—Even the most technical subjects are discussed in language intelligible to the ordinary reader.

(4.) *Guidance for Students.*—A full and carefully-selected bibliography is appended to each important article, to guide readers to the best sources for further study. This feature of the work places it in the front rank as a work of reference.

The result is that THE HARMSWORTH ENCYCLOPÆDIA contains all that the modern well-informed man needs to know, together with the guidance that a student requires. It is, in fact, a *Complete Library of Reference.*

In the illustration of the work, the publishers have considered utility rather than mere ornament. Technical and scientific illustrations are introduced to elucidate the text; artistic reproductions to give some idea of the art of different ages and schools, or the character of scenery in different lands. Portraits, which, owing to their human interest, are the most attractive of all illustrations, have been freely inserted.

The whole work has been prepared and printed by Messrs. Thomas Nelson and Sons. The general editorship has been in the hands of Mr. George Sandeman, M.A., assisted by numerous well-qualified sub-editors.

The articles are unsigned. THE HARMSWORTH ENCYCLOPÆDIA rests upon its own merits of plan and execution. For its successful completion no efforts have been spared to obtain the services of scholars and men of letters who are not only masters of their subjects but are able to expound them in simple language.

The publishers believe that there are thousands of men and women who would gladly place a good Encyclopædia on their shelves, if it could be procured at a cost within their moderate means. The Encyclopædias of real value hitherto published are placed far beyond the reach of such persons by their high price. THE HARMSWORTH ENCYCLOPÆDIA is a work which will meet *Every need of Everybody at a price which Everybody can afford.*

THE AMALGAMATED PRESS, LTD.
THOMAS NELSON & SONS.

LIST OF CONTRACTIONS USED IN THIS WORK.

ac., acres.
agric., agricultural.
alt., altitude.
anc., ancient.
ann., annual.
Ar., Arabic.
Aram., Aramaic.
arr., arrondissement.
A.S., Anglo-Saxon.
aver., average.
bor., borough.
bur., burgh.
c. (circa), about.
cap., capital.
cf., compare.
co., county.
Com., Commission.
comm., commune.
cub. ft., cubic feet.
Dan., Danish.
dep., department.
dist., district.
div., division.
Du., Dutch.
E., east.
eccles., ecclesiastical.
ed., edition ; edited.
e g., for example.
Eng., English.
episc., episcopal.
et seq., and the following.
F., Fahrenheit.
fort. tn., fortified town.
Fr., French.
ft., feet.
Ger., German.
gov., government.
Gr., Greek.
Heb., Hebrew.
I., **isl.**, island.
ibid., the same.
i.e., that is.
in., inches.
Ital., Italian.
Lat., Latin.
lat., latitude.
l. bk., left bank.
lit., literally.
long., longitude.
m., miles.
mrkt. tn., market-town.
Mt., **mts.**, mount, mountain, -s.
munic., municipal.
N., north.
N.T., New Testament.
O.T., Old Testament.
par., parish.
parl., paliamentary.
Per., Persian.
pop., population.
Port., Portuguese.
prov., province.
q.v., which see.
R., **riv.**, river.
r. bk., right bank.
R.V., Revised Version.
ry., railway.
ry. jn., railway junction.
S., south.
Sans., Sanskrit.
seapt., seaport.
Sp., Spanish.
sp. gr., specific gravity.
sq. m., square miles.
stn., station.
s.v., under the word.
Syr., Syriac.
temp., temperature.
terr, territory.
trans., translated.
trib, tributary.
U.S.A., United States of America.
vil., village.
vol., volume.
W., west.
wat.-pl., watering-place.
yds., yards.

Railways—**C.R.**, Caledonian Railway; **C.P.R.**, Canadian Pacific Railway; **G.E.R.**, Great Eastern Railway; **G. & S.W.R.**, Glasgow and South-Western Railway; **L. & N.E.R.**, London and North-Eastern Railway; **N.B.R.**, North British Railway, etc., etc.

Bibliography—**Biog. Dict.**, Biographical Dictionary; **Encyc. Brit.**, Encyclopædia Britannica; **Proc. Royal Geog. Soc.**, Proceedings of the Royal Geographical Society; **Jour.**, Journal; **Hist.**, History; **Mag.**, Magazine, etc., etc.

THE HARMSWORTH ENCYCLOPÆDIA.

vol I.

A

A. The original sound in English of the letter A was, of course, that which it had in the Greek and Latin alphabets. In most European languages it has retained this value (French, German, Welsh, etc.), and occasionally also in English words (*e.g.* psalm). This should always be its value in scientific notation (so Murray's *Dictionary*); it is phonetically described as the back 'wide' vowel. Of the other values which A has now acquired in English, that in the word man is a characteristic English sound which is altogether wanting in French and German (symbolized by Murray as æ). The 'rounding' into å (Murray, ǫ), as in 'tall' and 'water,' has many parallels (Gaelic, Hebrew). But quite unnecessary confusion has been caused by allowing A to assume the value of its modern name (ē in Murray), which properly belongs to the symbol e (which see). In the early Semitic alphabet A had a slight consonantal sound which is known as the glottal stop. It is sometimes pronounced in German before vowels, especially at the beginning of a word. In the Semitic languages it shows a marked tendency to become silent. Its choice by the Greeks to denote a perhaps implies some previous association with that vowel. A is the standard Greek form transmitted to the Latin alphabet. The Greek uncial ᴀ is no doubt a modification of this, although more like the old Semitic form 𐤀: a is its Latin representative; written cursively, it becomes *a*. It may be noted that forms like u occur in the national alphabets, and that the Greek uncial is apt to be confused with Δ. The early Semitic form has changed more in the Semitic than in the European alphabets. The horns in Hebrew א are the remains of the two cross strokes; Arabic ا has lost even these. The name *aleph*, Greek *alpha*, means an 'ox.' Some think that the original sign represents a head and horns.

A as a symbol in logic is the universal affirmative. A is in musical notation the sixth note of the natural diatonic scale of C, and the first note of the relative minor scale; called *la* in Italy, France, and Spain. In concert pitch, A has about 900 vibrations per second, or a multiple of that number. Continental tuning-forks are set to this note. Every stringed instrument has a string tuned to it, which in the violin is the second string, in the viola and violoncello the first, and in the contrabasso generally the third. It is the note given by the oboe, or organ, for tuning the orchestra. The key of A major has three sharps. A was the first or lowest note on the staff up to the 10th century. As a symbol of order or eminence, A denotes the first of a series, or the chief of a class. In the calendar, A is the first of the seven dominical letters. In old books of which only the alternate pages are numbered it denotes left-hand pages.

A, as an abbreviation, denotes many words of which it is the initial letter—*e.g.* Academy (R.A.), *anno* or *annus* (A.D.), *ante* (A.M.), Antiquaries (F.S.A.), Artillery (R.A.). In medical formulæ A or *aa* (Gr. *ana*) signifies that equal parts of each ingredient are to be taken; in Roman antiquities it stands for *absolvo* ('I acquit') on the judge's tablet; in textual notes on the Old and New Testaments it denotes the *Codex Alexandrinus.*

A 1 in shipping, first-class. See LLOYD'S.

Aa ('water' or 'stream'), name of many rivers in France, Switzerland, and Russia. Alternative forms are ACH, AACH, ACHEN.

Aachen (Fr. *Aix-la-Chapelle;* anc. *Urbs Aquensis* or *Aquisgranum*), tn., prov. Rhine, Prussia, 44 m. S.W. of Cologne; stands on the edge of an important coalfield, and possesses well-known sulphur springs and baths esteemed by the Romans. The city is noted for needles, sewing-machines, cloth, woollen, glass, buttons, machinery, cigars, and chemicals. In 1897 the town of Burtscheid was incorporated with Aachen, which it adjoins on the S. Charlemagne, who made Aachen the capital of his Germanic dominions, died (814) and was buried in the town. Between 1801 and 1815 Aachen was annexed to France. Two treaties of peace were signed here, the first in 1668, the second in 1748. Pop. of Aachen and Burtscheid (1900) 135,245. See Haagen's *Geschichte Aachens* (1874).

Aal, red dye obtained from the root of *Morinda citrifolia* (allied to madder), used greatly for dyeing cotton cloth in India; centre of industry at Gujarat.

Aalborg, tn. and port in N.E. of Jutland, Denmark, on Liim Fjord. It is an important commercial centre, and a bishopric. Pop. (1901) 31,457.

Aalen, tn., Würtemberg, Germany, on the Kocher, 48 m. N.E. of Stuttgart. Iron works, woollen mills, etc. Pop. (1900) 9,058.

Aalesund, tn., Romsdal Co., Norway; fishing port. Destroyed by fire, 1904. Pop. (1900) 11,672.

Aali Pasha, MEHEMET EMIN (1815-71), Turkish statesman, was born in Constantinople; Turkish ambassador to London (1840-4); Foreign Minister (1846-52); represented Turkey at the congress of Paris (1856); took part in suppressing the Cretan rebellion (1867-8); and brought about the submission of the Khedive of Egypt (1869). He was five times grand vizier, and an ardent advocate of reform.

Aalst. See ALOST.

Aar, or AARE, Swiss river; rises in canton Bern in the Grimsel at about 6,250 ft.; traverses Lakes Brienz and Thun. It is navigable below the town of Thun; flows through the city of Bern, and by Solothurn, Aarburg, Olten, Aarau, and Brugg. It enters the Rhine on the l. bk. near Waldshut. Its length is 175 m.

Aarau, cap. of canton Aargau, Switzerland, on the Aar, 50 m. N.E. of Bern; has silk, cotton, tile, ribbon, and cement factories. Pop. (1900) 7,824.

Aard-vark ('earth-pig'). See CAPE ANT-EATER.

Aard-wolf (*Proteles cristatus*), a burrowing, nocturnal animal, closely related to the hyæna. It is confined to S. Africa, and feeds on carrion and insects.

Aarestrup, CARL LUDWIG EMIL (1800-56), Danish lyric poet, born at Copenhagen; practised as a doctor. His *Efterladte Digte* (1863) created a sensation by their erotic tone. See his *Samlede Digte*, ed. by Georg Brandes in 1877.

Aargau (Fr. *Argovie*), a canton of Switzerland, S. of the Rhine. Area, 542 sq. m. Its cap. is Aarau. It was admitted into the Swiss Confederation in 1803. Pop. (1900) 206,659: 203,268 persons being German-speaking; 114,218 Protestants, as against 91,047 Catholics.

Aarhus, or AARHUUS, port on E. coast of Jutland, Denmark, 22 m. S.E. of Randers, with a good harbour. Exports grain, flour, butter, cattle, pork, beef; imports coal, iron, petroleum, and maize. Gothic cathedral. Pop. (1901) 51,814.

Aaron, the elder brother and the colleague and interpreter of Moses. Having been consecrated to the high-priesthood (Ex. 28, 29; Lev. 8), he is regarded as the ancestor of all lawful priests in Israel. Though always second to Moses in prominence, he too sometimes received the divine law and performed miracles (Num. 17:1-10); his budding rod was deposited in the ark (Heb. 9:4). His great sin was the making of the golden calf (Ex. 32:4); for a subsequent fault he was denied entrance into Canaan (Num. 20:8-13), and died, aged 123, on Mount Hor, in Edom (Num. 20:23-29), being succeeded by his third son, Eleazar. See MOSES, and references quoted.

Aaron's Beard, the name of two different plants—*Hypericum calycinum* ('rose of Sharon'), so named because of the tufted, beardlike stamens of its yellow flowers; and *Saxifraga sarmentosa* ('mother of thousands'), a Chinese plant, often seen hanging at cottage windows.

Aaron's Tomb (*Kabr Harun*), on E. peak (4,360 ft.) of Mount Hor, is, according to ancient tradition, the place where Aaron was buried. It is alluded to by Josephus (*Ant.* iv. 4), and is a place of pilgrimage.

Aasen, IVAR ANDREAS (1813-96), Norwegian philologer and author, of peasant origin, and self-educated. In 1848 his *Norske Folkesprogs Grammatik* was published, and his *Ordbog over det Norske Folkesprog* in 1850. Aasen reconstructed an eclectic 'national' language (*Landsmaal*) out of the existing Norwegian dialects; his efforts in this direction being chiefly concentrated upon a grammar (*Norsk Grammatik*, 1864), a dictionary (*Norsk Ordbog*, 1873), which has been supplemented by the *Norsk Ordbog* (1890-2) of Hans Ross, and the publication of original poems, etc.

A.B., Bachelor of Arts. See DEGREE, UNIVERSITY.

A.B., 'able-bodied' seaman. In the British navy a boy between fifteen and sixteen and a half years enters a naval training ship, and signs on for twelve years from the age of eighteen as an ordinary seaman; and then, after gaining some knowledge of gunnery, he is rated an able seaman. From the rating of A.B. he may be advanced to be successively a second-class petty officer, first-class petty officer, chief petty officer, warrant officer, chief warrant officer, and lieutenant.

Ab, in Jewish calendar, fifth month of the ecclesiastical and eleventh of the civil year; our July. On the 9th of this month both temples were destroyed (586 B.C. and 70 A.D.).

Ababdeh, pastoral Arab Mohammedan tribe living in the hilly district about the frontiers of Upper Egypt and Nubia, between the Red Sea and the Nile. They are Hamites, and in colour are deep brown to black.

Abaca, or ABAKA. See MANILLA HEMP.

Abaco, GREAT, or LUCAYA (80 m. by 20 m.), one of the Bahama Is., E. of Great Bahama. Pop. 2,500. LITTLE ABACO is N.W. of Great Bahama.

Abaculi, small cubes of coloured glass, enamel, stone, or other material, used in marquetry and mosaic work.

Abacus. (I.) A flat stone, square, octagonal, or circular, and either plain or variously ornamented, placed above the capital of a column. (2.) An instrument to facilitate calculation, used by the ancient Greeks, Romans, Egyptians, Hindus, and Mexicans. It consists of a board in which parallel grooves are cut to contain pebbles, or a rectangular frame of wires on which beads are strung. The latter form exists in the *tschotü* of Russia and the *suan-pan* of China, and is used in Europe for teaching arithmetic (Eng. 'ball-frame;' U.S.A. 'adder'). See Knott's *Abacus; Gow's Hist. of Greek Mathematics* (1884).

Abaddon, Hebrew word for 'ruin' or 'destruction.' Though sometimes used generally (Job 31:12), it is often equivalent to *Sheol*, the place of the dead (Prov. 15:11), or, more particularly, that of the lost. Sometimes it is personified, as in Job 28:22; while in Rev. 9:11 it is the name of the 'angel of the abyss,' and is interpreted as Apollyon ('the destroyer'), made familiar by Bunyan in his *Pilgrim's Progress.*

Abadeh, vil., Persia, half way between Ispahan and Shiraz; noted for wood-carving. Pop. 5,000.

Abaissé, or ABASED ('lowered'). In heraldry, when an ordinary or other charge, which would naturally occupy the centre of the shield, is placed *lower* than the centre, it is blazoned *abaissé.*

Abakansk, tn., Yeniseisk, Siberia, near the junction of the Abakan with the Yenisei; fortified by Peter the Great. There are coal mines and iron works, and ancient tombs. Pop. 2,000.

Abalone, EAR-SHELL, or AWABI, shell-fish (Haliotidæ) of the E. and W. Pacific coasts. The shell is used as mother-of-pearl, and the flesh is dried and eaten.

Abana, or AMANAH, and PHARPAR, rivers of Damascus (2 Kings 5:12), now the Barada (a branch of which is still called the Banias), flowing through the city, and the Awaj, to the S. of the Damascus plain. But some identify the Pharpar with the Barbar, a S. tributary of the Barada.

Abancourt, CHARLES XAVIER JOSEPH D' (1758-92), a supporter of Louis XVI. in the French revolution; made Minister of War (June 1792); killed at Versailles by the populace.

Abandonment. See CRUELTY TO CHILDREN; DOMICILE; INSURANCE, MARINE; POSSESSION; RAILWAYS; TRADE MARKS.

Abano, wat.-pl., prov. Padua, Italy, foot of Euganean Hills, 6 m. S.S.W. of Padua. Its hot saline springs (98° to 181° F.) were known to the Romans. Pop. (1901) 4,541.

Abano, PIETRO DI (1250-1316), physician, born at Padua; became professor of medicine at Padua. He was a disciple of Averroes, and given to the study of alchemy and astrology; was brought before the Inquisition on a charge of heresy, and condemned to death, but died before the sentence could be carried out. His most famous work is *Conciliator Differentiarum quæ inter Philosophos et Medicos versantur* (1472). In his *Tractatus de Venenis* (1472) he deals with antidotes to poisons.

Abanto, tn., prov. Vizcaya, Spain, near Bay of Bilbao; rich iron-ore mines. Pop. about 7,000.

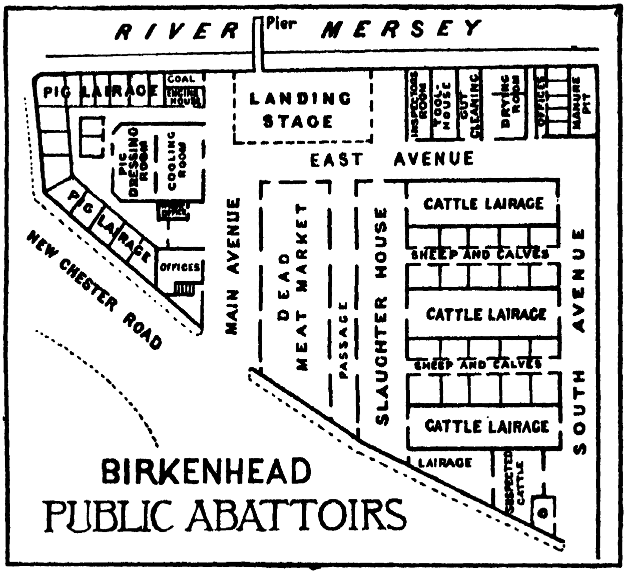
Abarbanel. See ABRAVANEL.

Abarim ('those on the other side'), a range of highlands E. of the Dead Sea, containing Pisgah, where Moses viewed the Promised Land (Num. 21:20; 23:14; Deut. 34:1), and, 2 m. to the E., Mount Nebo, 'the lonely mountain,' where Moses died and was buried (Deut. 32:49; 34:1). See Smith's *Historical Geog. of the Holy Land*.

Abasa, or ABASINS, Circassian tribe, of Indo-European origin, akin to the people of Abkhasia. They were originally Christians, and in some cases bear Christian names.

Abatement. (**1.**) In England legal proceedings formerly abated, or ended, on the marriage, death, or bankruptcy of one of the parties, or some change of interest in the matter in dispute. This does not now happen, if the cause of action survives in some one before the court (Rules of the Supreme Court, Order XVII.). Criminal proceedings do not now abate on the death of the prosecutor (R. *v.* Truelove, 5 T.B.D. 336), nor on the demise of the crown (4 Wm. & M. c. 18, s. 6; 1 An. c. 2, s. 4). Pleas in abatement were formerly allowed, but were abolished by Order XXI. R. 1, of the Rules of the Supreme Court. Without admitting or denying the cause of action, the defendant set up some facts, the legal effect of which was to preclude the plaintiff from succeeding—*e.g.* one of the parties was alleged to be under age. Pleas in abatement to criminal indictments have also become obsolete since powers of amendment were given to the court. When the owner of a freehold estate dies and his heir succeeds, and a stranger wrongfully enters and takes possession before the heir, an abatement of the freehold is said to occur, and the seizin in law of the heir is reduced to a right of entry. (*Coke upon Littleton*, p. 277.) (**2.**) Marks of disgrace invented by heralds and annexed to coat armour, to denote some dishonourable or disloyal act or quality in the bearer, are called abatements. See LEGACY, NUISANCE, REBATE.

Abattoir (Fr. *abattre*, 'to slaughter'), a public slaughter-house. The first abattoirs were those of Paris, established in 1818, on the recommendation of the commission of 1810. In the construction of an abattoir careful consideration must be given to the selection of the site. It must not be near dwelling-houses; it should admit of extension; and control should be had, if possible, over any buildings in the immediate neighbourhood. It should be easy of access, adjacent to the cattle market, and close to main thoroughfares and railways. A good water supply is most important. The abattoir must include accommodation for lairing, killing, dressing, cooling, inspection of suspected animals and meat, offices, and various buildings for the treatment of the feet, intestines, and blood. The slaughter-house proper ought to be separate from the rest of the building. The walls and floors should be smooth and impervious, to prevent absorption, and to admit of thorough cleansing. The offal is usually removed in trucks or in barges, to be used as manure; in Chicago it is disposed of by means of Tobey's drive. (See *Pract. Mag.*, vol. v. pp. 255-6.) Other systems have been tried on the Continent—*e.g.* destructors, chemical treatment—but the sewage farm method is preferred in Britain.



Specimen of Modern Abattoirs.

A public health officer and a veterinary surgeon, acting in conjunction, are essential to the administration of a good abattoir.

Abauj-Torna, co. in N. Hungary. In the N.W. and E. are ranges of wooded mountains, which yield iron, besides some gold, silver, copper, marble, and kaolin. Cereals, vegetables, fruit, and wine are produced. Chief town, Kaschau (Kassa). Area, 1,378 sq. m. Pop. (1900) 156,218, consisting of Hungarians, Slovaks, and Germans.

Abauzit, FIRMIN (1679-1767), born at Uzès, France; fled to Geneva on the revocation of Edict of Nantes; assisted in translating the New Testament into French (1726), and became librarian at Geneva, 1727. He was a great scholar, much esteemed by Newton, Voltaire, and Rousseau. Of his *Works* (Gen. 1770, and Amst. 1773) some parts have been translated by Harwood (Lond. 1774).

Abba (Aram. 'father'), a devotional expression for the Divine Fatherhood, and apparently the chief appellation of God used by Jesus in prayer, occurs three times in the New Testament (Mark 14:36; Rom. 8:15; Gal. 4:6), accompanied by its Greek equivalent. It is supposed to have been used as a sacred proper name; servants were forbidden to use it to their masters.

Abbadie, ANTOINE THOMPSON D' (1810-97), French savant and explorer; of French-Irish parentage; born at Dublin, but educated in France, whither his parents removed in 1818; sent by the *Académie des Sciences* on a mission to Brazil (1835); occupied with the exploration of Abyssinia (1837-48); a member of the *Académie des Sciences* (1867), and of the *Bureau des Longitudes* (1878); received the Arago medal, along with Lord Kelvin (1896). He bequeathed his estate of Abbadie, yielding 40,000 fr. yearly, to the *Académie des Sciences*, on condition of its publishing a catalogue of 500,000 stars within fifty years. His chief works are *Un Catalogue raisonné de MSS. Éthiopiens* (1859); *Géodésie d'Éthiopie* (1860-73); *Observations relatives à la Physique du Globe faites au Brésil et en Éthiopie* (1873); *Dictionnaire de la Langue Amarinna* (1881); *Géographie de l'Éthiopie* (1890); *Reconnaissances magnétiques* (1890).

Abbadie, ARNAUD MICHEL D' (1815-93), accompanied his brother Antoine to Abyssinia, and wrote *Douze Ans dans la Haute-Éthiopie* (1868).

Abbadie, JACQUES (1654-1727), Protestant theologian, a native of Nay, in Béarn, France; pastor of a French Protestant church in Berlin (1676), and, in 1688, pastor of the French church of the Savoy in London. William III. nominated him dean of Killaloe, Ireland. He died in Marylebone. His best-known work is *Traité de la Vérité de la Religion Chrétienne* (1684), an apologetic work inspired by the Cartesian philosophy. Other noteworthy books are *L'Art de se connaître soi-même* (1692); *Défense de la Nation Britannique* (1692), a vindication of the revolution of 1688; and a book on *La Grande Conspiration d'Anglèterre* (1696).

Abbas (c. 566-652), uncle of Mohammed, was taken prisoner at the battle of Bedr, and afterwards became the leading supporter of the faith. He was the founder of the dynasty of the Abbasides, who were caliphs of Bagdad from 750 until the Mongol conquest in 1258. See CALIF and CALIFATE.

Abbas I., 'THE GREAT' (1557-1628), Persian monarch, ascended the throne in 1586; defeated the Uzbegs at Herat (1597), and the Turks in many battles (1601-9), and, with British assistance, drove the Portuguese from Ormuz (1622). His dominion extended from the Tigris to the Indus. He established the capital at Ispahan, and was the author of many important reforms.

Abbas Hilmi. See KHEDIVE.

Abbas Mirza (1783-1833), Prince of Persia, son of Shah Feth-Ali, was commander in the Russian campaigns of 1811-13 and 1826-8, in which Persia lost her Caucasian territories. He was recognized as Shah by the treaty of 1828.

Abbas Pasha (1813-54), grandson of Mehemet Ali, succeeded his uncle, Ibrahim Pasha, as viceroy of Egypt, 1848. His rule was wasteful and reactionary.

Abbate, NICCOLO DELL' (1512-71), Italian painter; born at Modena; studied under Correggio; assisted Primaticcio in decorating the palace of Fontainebleau. His best works are the altar-piece of San Pietro (Modena), and *The Execution of the Apostles Peter and Paul* (Dresden).

Abbates Milites, or ABBACOMITES, lay abbots in the 10th century, who deputed deans or priors to the spiritual oversight of their abbeys.

Abbazia, health resort in Istria, Austria, at the head of the Gulf of Fiume, 9 m. w. of Fiume. It is well sheltered: mean summer temp., 77°; winter, 50° F. Pop. (1901) about 1,500.

Abbé, at first meaning abbot, was early applied in France to any ecclesiastic, a sense which the word still holds. See ABBOT.

Abbess, superior of a nunnery; chosen by the secret votes of the nuns; must be over forty years old, and have kept the vows of the order for at least eight years; receives episcopal benediction, and exercises the temporal and spiritual duties of an abbot, except confession and preaching. She may take part in synods.

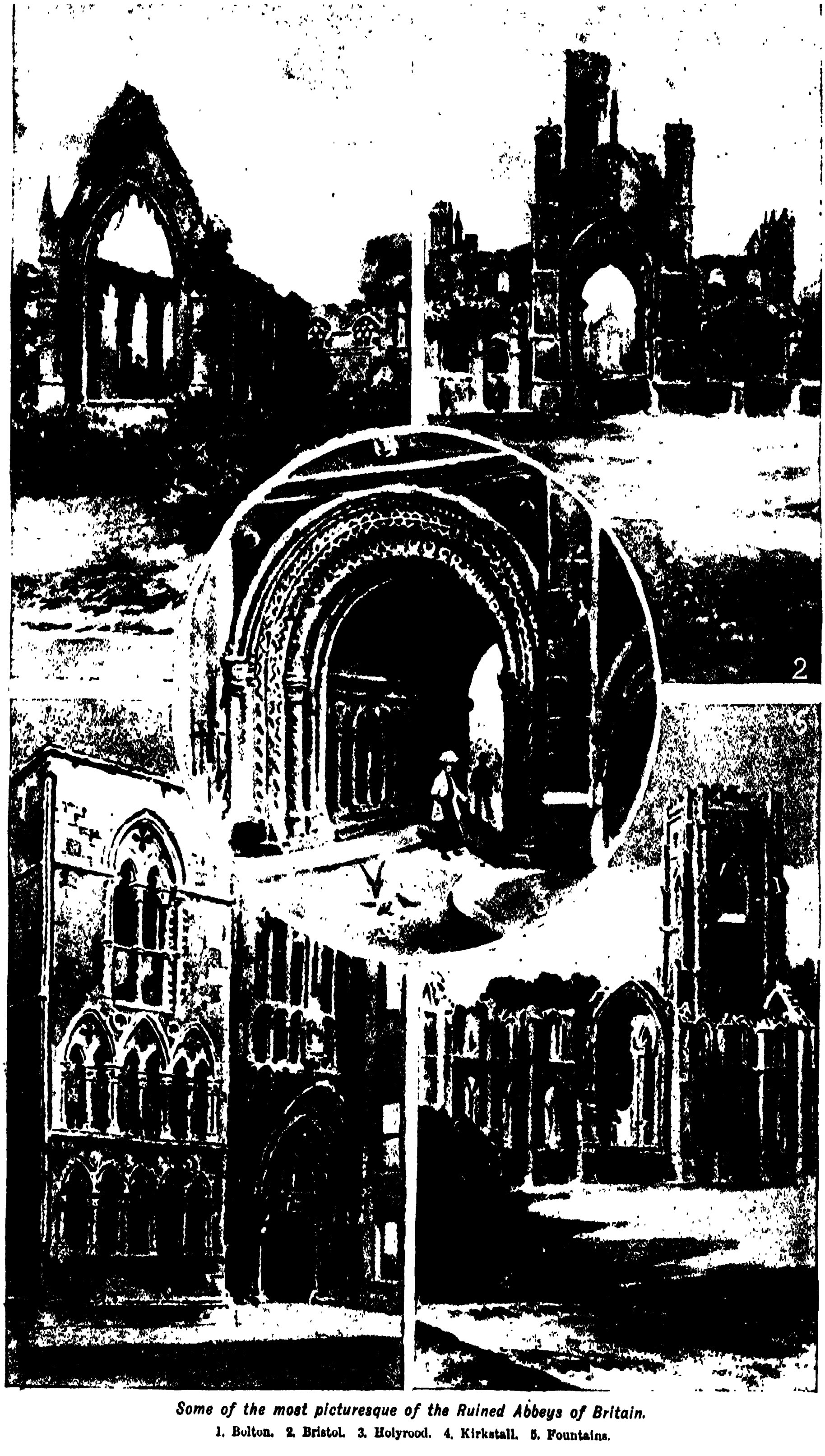
Abbeville (*Abbatis Villa*), tn., dep. Somme, France, on the Somme R., 15 m. from its mouth in the English Channel. Textile fabrics, and trade in wheat and linseed. Noted for the Church of St. Wolfram (Gothic of the 15th century). In 1259 a treaty was concluded here between Louis IX., king of France, and Henry III., king of England. Another treaty was concluded here in 1527 between Henry VIII. and Francis I. of France. Pop. (1901) 20,388.

Abbey, the abode of a community of monks or nuns, originated among the early Christian hermits of the Egyptian desert as a cluster of separate huts built round that of an anchorite of distinguished piety. The name signifies the institution as well as the building. As the monastic system became organized, there arose a form of architecture suited to its needs. The principle adopted by the Benedictines, that an abbey should be entirely self-contained, led to great complexity in the many thousand buildings erected by that order throughout W. Europe. These included the church, the centre of the whole monastic life; the chapter-house; the pisalis, or calefactory, the common room of the monks; the refectory, or dining-room; dormitories; cloisters; buildings devoted to the reception of guests; the almonry, where the needs of the poor were relieved; infirmary and physician's residence; library and writing-room; schools for novices and children; besides bakehouse, brewery, workshops, stables, and farm buildings. The gardens were filled with vegetables, fruits, and medicinal herbs; and the whole abbey was surrounded by a wall. Among British abbeys are Westminster, Canterbury, York, Tewkesbury (Benedictine), Durham, Fountains, Kirkstall (Cistercian), Bolton, Bristol, Holyrood (Augustinian). The first English abbey was founded at Bangor in 560. Henry VIII. suppressed many of the smaller foundations in 1525 and following years, and abolished all institutions of this kind in 1539-40. See PRIORY and MONASTICISM; also Walcott's *Church and Conventual Arrangement* (1861); Bonney's *Abbeys and Churches of England and Wales* (1887); Billings's *Baronial and Eccles. Antiq. of Scotland* (4 vols. 1848-52); and books by Willis.

Abbey, EDWIN AUSTIN, R.A. (b. Philadelphia, U.S.A., 1852), American artist; mainly self-taught. In 1871 he came to England. His first academy picture was *A May-Day Morning* (1890). In 1896 he was elected A.R.A., in the year of his fine picture *Richard III. and Lady Anne* (etching by M. L. Flameng); and R.A. in 1898, his diploma picture being *A Lute-Player*. Abbey is best known for the frescoes which he, together with Puvis de Chevannes and John Sargent, was invited to execute in the Boston Public Library, U.S.A. This work *The Quest of the Holy Grail* (completed in 1901 in fifteen panels)—marks an important era in the development of American art. Other works are *Hamlet* (1897), and *King Lear's Daughters* (1898).

Abbiategrasso, tn., province Milan, Italy, 17 m. s.w. of Milan, on the Naviglio Grande Canal. Pop. (1901) 12,270.

Abbot, the head of a monastery. The name was first given as a title of honour to aged or distinguished monks. In the East the corresponding title is archimandrite or hegumenos. In the West, in orders founded after the eleventh century, superiors are known, not as abbots, but as priors, guardians, rectors, ministers, etc. An abbot may preside over one house, or over many houses united in a monastic congregation; he may be exempt from episcopal jurisdiction, and be subject directly to the Pope; he may possess quasi-episcopal jurisdiction over a whole district; he may be mitred—*i.e.* have the right to wear the insignia of a bishop; he may hold political rank, like the prince-abbots of Germany, or the twenty-eight English abbots who sat in the House of Lords immediately before the dissolution of the monasteries. He may be chosen for life or for three years. An abbot must be at least twenty-five years old, and (according to the modern law) a priest. The choice is made by the professed monks who are in holy orders, and confirmed by the bishop, or, in case of exempt monasteries, by the superior abbot or by the Pope. He must, as a rule, receive solemn benediction for his office at the hands of a bishop; he may empower priests to absolve his subjects, etc. In important cases he must obtain the consent of the community. *Commendatory abbots* are persons who enjoy the revenues of an abbey without necessarily being monks. Originally appointed for the protection of the monasteries in troublous times, they were afterwards appointed as a mark of royal favour. Hence the courtesy title of *abbé*, or *abbate*, given to secular unbeneficed clerics.

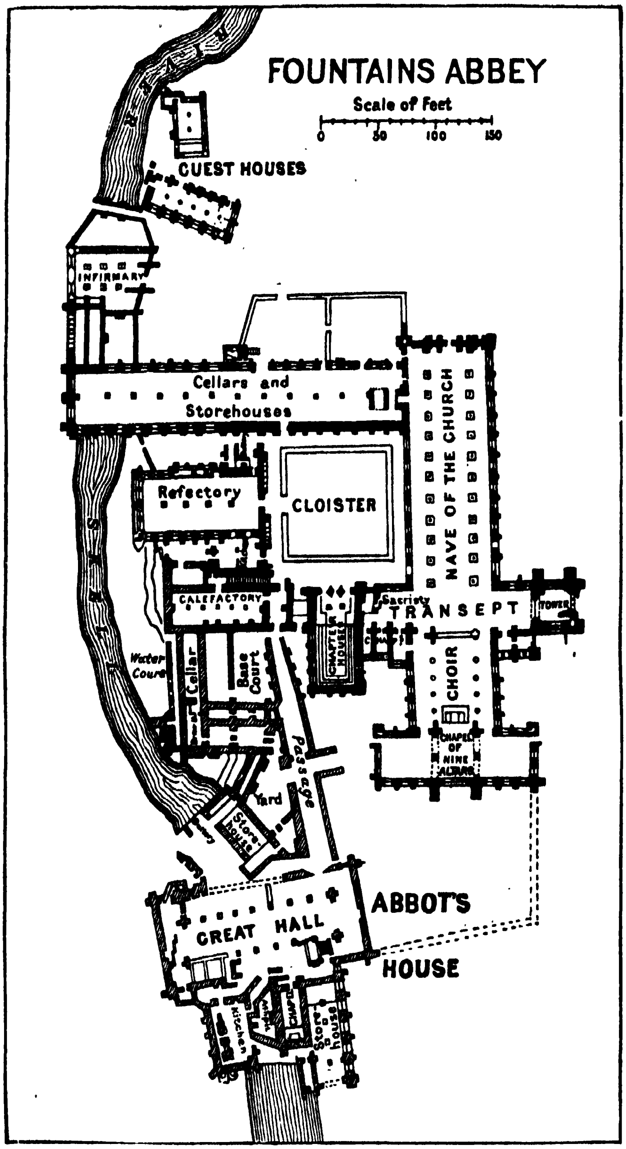


Some of the most picturesque of the Ruined Abbeys of Britain.

1. Bolton. 2. Bristol. 3. Holyrood. 4. Kirkstall. 5. Fountains.

Abbot, Charles (1757-1829). See Colchester, Lord.

Abbot, Ezra (1819-84), Unitarian layman and distinguished biblical scholar; born at Jackson, Maine, U.S.A.; became Bussey professor of New Testament criticism (1872-84); edited Hudson's *N.T. Concordance* (1870), and (with Dr. Hackett) Smith's *Dict. of the Bible* (1867); and assisted the American committee for N.T. revision. He edited Alger's *Doctrine of a Future Life* (1864), and wrote *Authorship of the Fourth Gospel* (new ed. 1891). He died at Cambridge, Massachusetts.



Plan of a Cistercian Abbey.

Abbot, George (1562-1633), Archbishop of Canterbury; born at Guildford; gained a fellowship at Oxford in 1583, and became master of University College, dean of Winchester, and vice-chancellor (1600) of Oxford; assisted in the translation of the Bible (1604); bishop of Coventry and Lichfield (1609), then of London (1610); succeeded Bancroft as archbishop in 1611. As president of the Essex Divorce Commission, he incurred the king's displeasure by opposing the petition (1613). His accidental shooting of a gamekeeper at a hunting party caused him much trouble—bishops-elect refused to be consecrated by a homicide; and the king allowed a commission of inquiry, but formally pardoned him. Then ill-health and the accession of Charles I. (who favoured Laud) crippled his influence, and in 1627 he was deprived of authority. An ardent Calvinist, he opposed both Catholics and Arians, and did not scruple to employ torture and the stake. His *Lectures on Jonah* have been reprinted (1845); and his account of his sequestration is contained in Arber's *Eng. Garner* (1882). See Hook's *Lives of the Archbishops of Canterbury* (1876).

Abbot, Lemuel (1760-1803), a portrait painter of some celebrity, largely self-taught. His portraits of Cowper and Lord Nelson are well known.

Abbot, Robert (1560-1617), bishop of Salisbury; brother to George Abbot, Archbishop of Canterbury; was master of Balliol College, Oxford, and a well-known preacher, but his reputation rests chiefly on his writings in defence of the reformation and the royal supremacy; as, *The Mirror of Popish Subtleties* (1594); *Defence of the Reformed Catholike of Mr. William Perkins* (1606-9); and a book on the Gunpowder plot, *Antilogia adversus Apologiam Andreæ Eudæmon Joannis* (1613). See Featley, in Fuller's *Abel Redivivus* (ed. 1651), and Anthony à Wood's *Athenæ Oxon.*

Abbot, William (1789-1843), playwright and actor, made his first appearance at Bath; afterwards performed principally in light comedy at Covent Garden. He created the parts of Appius Claudius and Modus in Sheridan Knowles's plays of *Virginius* and *The Hunchback.* He was the author of two melodramas, *Youthful Days of Frederick the Great* (1817) and *Swedish Patriotism* (1819). He died at Baltimore, U.S.A.

Abbot of Unreason, also Lord of Misrule, the master of the revels at the season of Christmas, the former being his title in Scotland, the latter in England. At Oxford and Cambridge the part was filled by a Master of Arts, who superintended the annual representation of Latin plays by the students, and took charge of their Christmas diversions. His 'reign' lasted from All-Hallows Eve to Candlemas Day. The revels of the London Inns of Court (*e.g.* Inner Temple and Gray's Inn) were presided over by a Lord of Misrule. See Leigh's *Accedence of Armorie* (1612), and ch. xiv. and note thereon in Scott's novel, *The Abbot* (1821).

Abbotsford, the home of Sir Walter Scott from 1812-32, is an estate on the r. bk. of the Tweed, 3 m. from Melrose. In 1811 Scott bought a farm of 110 acres, called Cartleyhole (not *Clartyhole*, as Lockhart calls it), and named it Abbotsford. In 1813 he added the hilly tract from the Roman road near Turnagain to Cauldshiels Loch; in 1815, Kaeside, 'a large lump of wild land;' and, in 1817, the lands of Toftfield, which he bought for £10,000. The house stands on a terrace between the river and the road from Melrose to Selkirk. It is a picturesque, irregular building in the Scottish baronial style. Abbotsford, completed only in 1825, was involved in the collapse of 1826, and was not liberated till 1847, on the death of Scott's son. The Scott Collection of books, paintings, and relics is held in trust by the Dean and Council of the Faculty of Advocates, who leave it in the keeping of Scott's representatives. See Scott's *Familiar Letters* (1894); Lockhart's *Life;* Washington Irving's *Abbotsford;* Scott's *Journal* (1890); Jeffrey's *Hist. of Roxburghshire* (1864), vol. iv.; Ornsby's *Memoirs of J. R. Hope-Scott* (1884); Hannay's *Glimpses of the Land of Scott*, illust. by MacWhirter (1888); Mrs. Maxwell Scott's *Abbotsford*, illust. by W. Gibb (1893), and *Making of Abbotsford* (1897); Napier's *Homes and Haunts of Sir Walter Scott* (1897). See SCOTT.

Abbotsford Club, now extinct, founded in 1834, on the model of the Bannatyne and Maitland Clubs; printed works of history and antiquities having relation to Scott and the Waverley Novels. Issued 34 vols. (1835-64).

Abbott, CHARLES (1762-1832). See TENTERDEN, LORD.

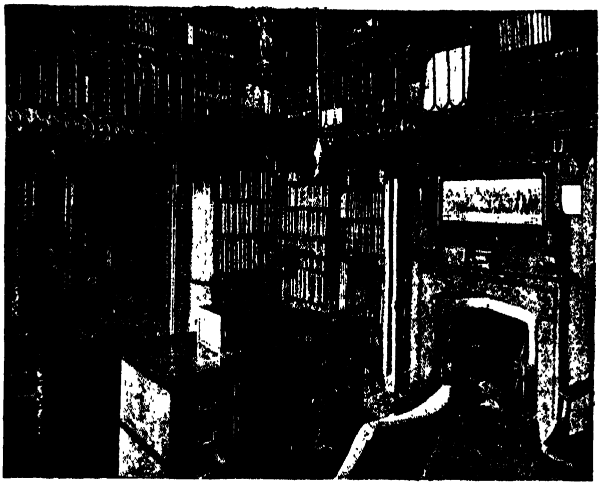
Abbott, EDWIN ABBOTT (1838), theologian; born in London; taught at King Edward's School, Birmingham, and at Clifton College; headmaster of the City of London School (1865-89); Hulsean lecturer (1876), etc. His scholarly publications include *Bible Lessons* (1872); *Through Nature to Christ* (1877); article 'Gospels' in *Encyc. Brit.; Shakespearian Grammar* (1870); *Latin Prose* (1873); ed. of Bacon's *Essays* (1876); *Bacon and Essex* (1877); *Francis Bacon* (1885); *Philochristus* (1878); *Onesimus* (1882); *Kernel and Husk* (1886); *Philomythus* (1891); *Anglican Career of Newman* (1892); *The Spirit on the Waters* (1897); *St. Thomas of Canterbury* (1898); *Clue: a Guide through Greek to Hebrew Scripture* (1900); *Corrections of Mark adopted by Matthew and Luke* (1901).

Abbott, EVELYN (1843-1901), graduate of Balliol College, Oxford; an authority on classical literature and philology; wrote *A Hist. of Greece* (3 vols. 1901). He contributed the articles HISTORY OF GREECE, SPARTA, and others, to this work.

Abbott, SIR FREDERICK (1805-92), major-general Royal (Bengal) Engineers; distinguished Indian officer; took part in the first Burmese war (1825), the Afghan war (1842), and the first Sikh war (1846); lieut.-governor of the East India Co.'s Military College at Addiscombe (1851-61); served on several royal commissions; devoted his leisure to investigations in connection with the microscope and the polarization of light.

Abbott, JOHN STEVENS CABOT (1805-77), was Congregational minister at Worcester, Roxbury, and Nantucket, Mass. He published *Mother at Home* (1833, and later translated into many languages); *Hist. of Napoleon; Hist. of the Civil War in America; American Pioneers*, 12 vols.; *Kit Carson.*

Abbotsford House.



Sir Walter Scott's Library.

Abbott, LYMAN (1835), son of Jacob Abbott; born at Roxbury, Mass.; became a pastor, and succeeded Henry Ward Beecher at Brooklyn (1888). With his brothers, Benjamin and Austin, he published legal works and novels, under the pseudonym 'Benanly,' and many books on religious subjects—*e.g.* a *Dict. of Religious Knowledge* (1872), *Evolution of Christianity* (1892), *Life and Literature of the Ancient Hebrews* (1891), and a *Life* of H. Ward Beecher (1883).

Abbottabad, chief tn. (63 m. N. of Rawal Pindi) of Hazara dist., Punjab, India. Pop. (1901) 7,764.

Abbreviate of Adjudication, in Scots law, an abstract of the decree of adjudication, which must be recorded in a register kept for the purpose within sixty days.

Abbreviations are distributed throughout this work in alphabetical order. See also PALÆOGRAPHY.

Abbreviators, the draughtsmen of papal bulls, etc. See BULL.

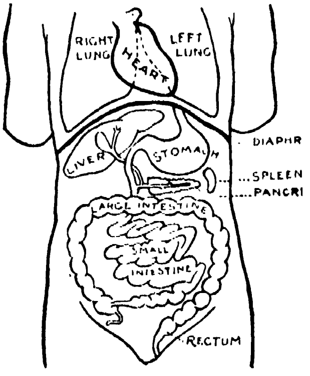
Abd (Ar. 'slave,' 'servant,' 'worshipper'), in Mohammedan countries, forms, in composition with Allah (God) and with other words, many of the common Arabic personal names—*e.g.* Abdullah, Abd-el-Kader.

Abd - el - Kader, or ABDUL-KADIR, EMIR (1807-83), Algerian patriot, was the son of a marabout of Mascara, with whom he twice performed the *hajj*, and visited the shrine of Sidi Abdul-Kadir at Bagdad. Preaching a *jihad* (holy war) against the French, he opened the campaign at Oran in 1833. Concluding a treaty with the French, he was recognized as emir in 1834; but war was soon resumed, and Abd-el-Kader fled to Morocco in 1843. In 1847 he gave himself up to General De Lamoricière, and was sent to Toulon. Released by Louis Napoleon in 1852, he received a pension of 100,000 francs (1863), and finally resided at Damascus. He wrote a work on the Consolations of Philosophy (translated in 1858 into French under the title *Rappel à l'Intelligent: Avis à l'Indifférent*), and contributed commentaries to *Les Chevaux du Sahara* of E. Daumas (trans. by J. Hutton, 1863). See *Lives* by Churchill (1867) and Pichon (1899).

Abdera, tn., Thrace, on the Ægean Sea. It was the birthplace of Democritus and Protagoras; but its inhabitants had a reputation for stupidity, and 'Abderite' or 'Abderian' was a term of reproach, similar to 'Gothamite.'

Abdication, the surrender, properly the voluntary surrender, of an office of trust, especially of the office of king or head of the state. An abdication, however, is generally a forced resignation—a surrender of power due to stress of political circumstances. There have been many abdications—those, for example, of Ptolemy Soter (285 B.C.), Sulla (79 B.C.), Diocletian (305 A.D.); in modern history, those of the Emperor Charles V. (1555)—a parallel to Diocletian's, as Gibbon remarks; Charles IV. of Spain (1808), amid family differences and court intrigues—Napoleon's opportunity; Louis-Philippe of France (1848, the year of revolution); Isabella II. of Spain (1870). Poland has provided several notable examples of abdication. John Balliol of Scotland, overcome by Edward I., formally renounced all claim to his kingdom (1296). In English history the depositions of Edward II. (1327), Richard II. (1399), and James II. (1688) did not differ much in the character of their substantial causes, although in this last case an attempt has been made to throw the onus of deposition on James himself.

Abdomen. In systematic zoology this term is used to describe the posterior region of the body in insects, crustaceans, arachnids, and other arthropods which have the body divided into regions. The abdomen in arthropods is typically segmented, or divided into rings; but the segments tend to disappear in parasitic or much-modified forms. In vertebrates it is the cavity supported by the pelvis, separated from the thorax by the diaphragm, and surrounded by muscular body-walls, and encloses the intestines, liver, spleen, pancreas, kidneys, bladder, and internal genital organs. A delicate serous membrane, the peritoneum, lines the abdomen and its viscera, permitting a smooth, gliding movement of the organs. It is the seat of the inflammation known as peritonitis. Wounds involving the peritoneum were, until recent years, calculated to be fatal in over eighty per cent. of cases. Recent experience in S. Africa has, however, made the prognosis much more favourable with regard to bullet wounds. In peritoneal wounds caused by Mauser bullets, 'expectant' treatment became the rule for ordinary cases, and proved successful in sixty per cent. Abdominal diseases are referred to in connection with the special organs. For abdominal surgery, see LAPAROTOMY.



The Abdomen.

Abducens, or sixth cranial nerve, rises in the medulla oblongata, and supplies the external rectus muscle of the eye, which draws the eyeball outward.

Abduction. (1.) OF WOMEN. In England and Ireland the law relating to the abduction of women is now contained in secs. 53-55 of the Offences against the Person Act, 1861, and sec. 7 of the Criminal Law Amendment Act, 1885. There are three cases in which abduction is a *felony* punishable with fourteen years' penal servitude, and two cases in which it is a *misdemeanour* punishable with two years' imprisonment. It is a felony—(*a*) By force to take away or detain against her will any woman of any age with intent to marry or know her, or cause her to be married or known by some other person (24 & 25 Vict. c. 100, s. 54). (*b*) With the like intent, and from motives of lucre, to take away or detain against her will any woman of any age who has or is presumptively entitled to property (*ibid.*, s. 53). (*c*) With the like intent and motives, fraudulently to allure, take away, or detain out of the possession and against the will of her parents, or those having lawful charge of her, any such woman under the age of twenty-one (*ibid.*, s. 53). In cases (*b*) and (*c*) the offender is incapable of taking any of the woman's property, which will be settled for her benefit by the court in the event of a marriage. It is a misdemeanour (*a*) Unlawfully to take or cause to be taken out of the possession and against the will of her parents, or those having lawful charge of her, any unmarried girl under sixteen (*ibid.*, s. 55). No intent has to be proved, and reasonable belief that the girl was sixteen is no defence. (*b*) To take or cause to be taken out of the possession and against the will of her parents, or those having lawful charge of her, any unmarried girl under eighteen with intent that she shall be unlawfully known by any man, whether a particular man or not (48 & 49 Vict. c. 69, s. 7). Reasonable belief that the girl was eighteen is a good defence. This last-mentioned act applies to Scotland, where it is also, by the common law, a crime to carry off and confine any person forcibly and without lawful authority, or to abduct women for the purpose of rape or marriage. (2.) OF VOTERS. Under the Corrupt and Illegal Practices Act, 1883, any person who prevents the free exercise of the franchise of any elector by abduction is guilty of a corrupt practice, and is punishable with imprisonment for one year, or a fine of £200, and is also disqualified to vote, sit in Parliament, or hold municipal office for seven years. This act now applies to parliamentary, municipal, and local government elections. See Russell, *On Crimes*; Stephen's *Criminal Law*; Rogers's *Law of Elections*.

Abdul-Aziz (1830-76) succeeded his brother, Abdul-Medjid, as Sultan of Turkey in 1861. His reign was troubled by the cholera epidemic at Constantinople (1865), revolts in Crete and Herzegovina, and by the Bulgarian atrocities of 1876. In May 1876 he was deposed, and within a week was murdered. See Lusignan's *Reign of Abdul-Hamid II.* (trans. 1889).

Abdul-Hamid I., or AHMED IV. (1725-89), Sultan of Turkey, son of Ahmed III.; succeeded his brother, Mustapha, Jan. 21, 1774. The chief events of his reign were the successes of the Russians, the treaty of Kainardji (July 21, 1774), the annexation of the Crimea in 1783, and the siege of Ochakov in 1788.

Abdul-Hamid II., the present Sultan of Turkey.
(*Photo by W. and D. Downey.*)

Abdul-Hamid II. (1842), son of Abdul-Medjid, became Sultan in 1876, in succession to his brother, the insane Murad V. Events of his reign are: Servian war (1876); Russo-Turkish war (1877-8); the Armenian atrocities, which occasioned the epithets, 'great assassin' (Gladstone, *Letter to Duke of Westminster*, 1897) and 'Abdul the damned;' the disturbances in Crete; and the Greco-Turkish war (1897). A chief aim of his policy has been to revive the caliphate and promote a pan-Islamic movement. See Elliot's *Diary in Constantinople* (1892).

Abdul-Kadir, surnamed AL-GILANI (1078-1166), a Moslem saint and mystic, was born in the province of Gilan, Persia, and died at Bagdad. He wrote on Moslem law and mystical divinity, as well as a book of odes. But he is most noted as a saint, and the founder of the Kadiriya order. See J. P. Brown's *Dervishes* (1868); Trumelet's *Les Saints de l'Islam* (1881); A. le Chatelier's *Les Confrèries musulmanes du Hedjaz* (1887).

Abdul-Kadir. See ABD-EL-KADER.

Abdullah-el-Teishi es Sayyid (1830-99), successor of the Mahdi, Mohammed Ahmed, was born in Dar Fur, and belonged to the Baggara tribe; succeeded to the Mahdi's position in 1885; defeated the Abyssinian emperor John in March 1889, but was himself beaten by the Italians at Agordat in 1893, by Lord Kitchener at Omdurman in 1898, and by Colonel Wingate at Om Debrikat, in which battle Abdullah perished.

Abdul-Latif al-Bagdadi (1162-1231), a Moslem savant, born at Bagdad. He studied and taught medicine and philosophy at Cairo and Damascus, and died at Bagdad. He wrote a *Hist. of Egypt* (ed., with Lat. trans., by White, 1800; French trans. by De Sacy, 1810; and Eng. trans. in Pinkerton's *Voyages*, vol. xv. 1814).

Abdul-Medjid (1823-61), Sultan of Turkey, succeeded his father, Mahmud II. (1839), and in 1841 concluded peace with Mehemet Ali of Egypt. He followed up the reforms of his father by the organic statute of Gulhana (Nov. 3, 1839), securing the rights of person and property to all his subjects without distinction of religion; and, counselled by Stratford Canning from 1842, he introduced many reforms, which form part of the treaty of Paris (March 30, 1856). He resisted in 1853 those claims of Russia to a protectorate over his orthodox subjects which led to the Crimean war. He instituted the Imperial Order of the Medjidieh (1852).

Abdur-Rahman, Arab chief, fought at the battle of Toulouse (721); invaded Aquitaine in 732, sacked Bordeaux, and carried destruction as far as Burgundy. In 732, however, he was defeated and slain by Charles Martel, leader of the Franks, after seven days' fighting.

Abdur-Rahman I. (731-787), founder (755) of the Ommiad dynasty of Cordova, was born at Damascus. He was engaged in almost constant warfare, and conquered the Iberian peninsula northwards to the Pyrenees.

Abdur-Rahman II. (788-852), fourth Ommiad ruler of Cordova, and son and successor of Al-Hakim I. (822). His reign was disturbed by intestinal wars, and also by those against the French, the Astures, and the caliph of Bagdad. He wrote *Annals of Spain* in Arabic.

Abdur-Rahman III., or ABDERAME (912-961), eighth and greatest ruler of the Ommiad dynasty in Spain. His great wars against the Christian princes, Alfonso III. of Leon and Sancho of Navarre, culminated in the defeat of their combined forces in 918. He was defeated by Ramiro II. of Leon at Alhandega (939); but on Ramiro's death he assisted the deposed Sancho I. to regain his throne. He did much to promote Mohammedan unity in Spain. See Dozy's *Hist. des Musulmans d'Espagne.*

Abdur-Rahman Khan (1830-1901), Ameer of Afghanistan (1880), did much to consolidate the power of his country, define its boundary, and improve its social conditions. He was succeeded by his son, Habibullah Khan. See AFGHANISTAN; also *Life* by S. Wheeler (1895); *Autobiography* (1901).

Abecedarians (from A B C), a nickname applied to an extreme section of the German Anabaptists in the 16th century who despised all human learning.

À Becket, THOMAS. See BECKET.

À Beckett, ARTHUR WILLIAM (1844), journalist, son of Gilbert Abbott à Beckett; war correspondent to the *Standard* and the *Globe* in the Franco-German war; joined *Punch* (1874); has published *Our Holiday in the Highlands* (1874), *London at the End of the Century* (1900), etc.

À Beckett, GILBERT ABBOTT (1811-56), comic writer and journalist; born in London; called to the bar, and was a metropolitan police magistrate (1849-56). He wrote numerous plays, edited *Figaro in London*, and was on the original staff of *Punch*; wrote leaders for the *Times*, *Morning Herald*, etc., Comic Histories of England and Rome (illus. by Leech), *Comic Blackstone* (illus. by Cruikshank), and *Quizziology of the British Drama.*

Abel, the second (perhaps twin) son of Adam; a shepherd, who, having offered to God a more acceptable sacrifice than his brother Cain, was slain by the latter out of jealousy (Gen. 4:1 8). In the New Testament 'righteous Abel' is regarded as the first martyr, and as a hero of faith (Matt. 23:35; Heb. 11:4). See Dillmann's *Genesis* (1882).

Abel, SIR FREDERICK AUGUSTUS (1827-1902), chemist, born in London; professor of chemistry at the Royal Military Academy (1851 5); chemist to the War Department (1854 88); president of the British Association (1890). He was a high authority on explosives, and especially improved the manufacture of gun-cotton. He was part inventor (with Professor Dewar) of cordite, and invented the close-test apparatus for determining the flash-point of petroleum. He was the first director of the Imperial Institute (1887), and published *Gun-Cotton* (1866), *The Modern History of Gunpowder* (1866), *On Explosive Agents* (1872), *Researches in Explosives* (1875), and *Electricity applied to Explosive Purposes* (1884).

Abel, Heinrich Friedrich Otto (1824-54), historian, born at Reichenbach, Würtemberg; was for several years engaged in the Prussian diplomatic service; appointed professor of history at Bonn (1851). His works include *Makedonien vor König Philipp* (1847); *Das neue Deutsche Reich und sein Kaiser* (1848); *König Philipp der Hohenstaufe* (1852); *Die deutschen Personennamen* (1853); *Die deutschen Kaiserdynastien* (1851); and *Die Legende vom heiligen Nepomuk* (1855).

Abel, Niels Henrik (1802-29), Norwegian mathematician; distinguished himself by his able development of the theory of elliptical functions and algebraic equations. See his *Works* (pub. in French, 1839), and *Life* by Bjerknes, also in French (1885).

Abel, Robert (b. 1859), cricketer, a member of the Surrey County Club. In 1886 he scored 144 against Australia. Highest score, 217. In 1888, 1890, and 1891 he was at the head of the county averages, and in 1895 at the top of professional averages.

Abélard, or Abailard (Lat. *Abalardus*), Pierre (1079-1142), theologian and scholastic philosopher, was born at Pallet (Palais), near Nantes, whence he received the epithet 'Doctor Palatinus.' He lived when the controversy of the scholastic philosophy between nominalism and realism was at its height; studied under Roscellin, and then under William of Champeaux, the champions, respectively, of the opposing principles. He became, at thirty-six years of age, the most famous teacher in Europe, and his school at Notre Dame was crowded by students from every land. Abélard rose above the abstract controversy of the schools, and taught a critical as opposed to the prevalent dogmatic method.

Abélard is most remembered for the story of the love of Héloïse, niece of Fulbert, canon of Notre Dame, who, believing that Abélard had deceived his ward, procured an outrage upon him. Abélard then became a monk at St. Denis; Héloïse, a nun of Argenteuil. Having suffered imprisonment for heresy, by judgment of the synod of Soissons in 1121, Abélard retired to a hermitage—the 'Paraclete'—where eager students surrounded him; and later was called to preside over the abbey of St. Gildas-de-Rhuys in Brittany, while Héloïse directed a sisterhood at Paraclete. Leaving the abbey after ten years, Abélard again became a teacher of great influence; but his enemies accused him of heresy, and Abélard set out for Rome, to die in the priory of St. Marcellus, near Châlon. His body was taken to Paraclete, where Héloïse was laid beside him in 1163; their remains were placed (1817) in one tomb, within the churchyard of Père-la-Chaise in Paris.

The first of Abélard's works to be printed was the ethical discourse *Scito te ipsum* (1721). But it was only in Victor Cousin's *Ouvrages inédits d'Abélard* (1836-59) that his principles were made plain. Cousin printed the *Dialectica*, and Abélard's logical commentaries upon Aristotle, Boethius, and Porphyry, together with portions of his work *Sic et Non*, a collection (to serve discussion) of opposite views on points of doctrine. Stölzle published in 1891 a long-hidden treatise on the Trinity. Selections from another work, *Glossulæ super Porphyrium*, are accessible in the notable monograph *Abélard* (1845) by the Comte de Rémusat, who also wrote a philosophical drama with the same title (1877). See also works on Abélard by Wilkens (1855), Carrière (1853), and Deutsch (1883); also Gabriel Compayré's *Abélard and the Origin and Early Hist. of Universities* (Great Educators Series), 1893; Pope's *Epistle of Eloisa to Abélard*; *Life* by Joseph M'Cabe (1901).

Abelin, Johann Philipp (d. *c.* 1635), historian; better known by the pseudonym, Jean Louis Gottfried; born at Strassburg; founded the *Theatrum Europæum*; and wrote *Arma Suecica* (1631), *Inventarium Sueciæ* (1632), *Historia Antipodum* (1655), etc.

Abelmoschus. See Hibiscus.

Abencerrages, an ancient and powerful Moorish family of Granada, who were at feud with the family of Zegris, and were, it is traditionally said, massacred within the hall of the Abencerrages in the Alhambra in the 15th century. Their story is found in Gines Perez de Hita's *Guerras Civiles de Granada*, on which Chateaubriand's *Aventures du dernier des Abencérages* and Cherubini's opera are based.

Aben-Ezra. See Ibn-Ezra.

Abeokuta, or Abbeokuta ('underneath a well'), tn., cap. of Egba, Yoruba, in the Lagos Protectorate, w. coast of Africa, on Ogun R., by which it is accessible for vessels up to the rapids of Aro (2 m. off) during the flood season, and up to Agmega during the dry season. It is 80 m. from Lagos to Abeokuta by the Ogun, and 60 m. by rail. Pop. 150,000.

Aber, 'at the mouth or confluence of' two rivers, or a river with the sea. By some the *a* of *aber* is thought to be *ath* (pron. *ah*), a 'ford,' as in Abernethy.

Aberavon, or Aberafon, par. (1,943 ac.), munic. bor. and mrkt. tn., Glamorganshire, Wales, on r. bk. of the Avon; forms part of the parl. bor. of Swansea. Tin and copper works. Pop. (1901) 7,555.

Abercarn, vil., 10 m. n.w. of Monmouth, England, with collieries and iron works. Pop. (1901) 12,607.

Abercorn, stn., British Central Africa, at s.e. end of L. Tangañyika, established in 1889.

Abercorn, James Hamilton, first Duke of (1811-85), succeeded his grandfather as Baron Hamilton (1818); lord-lieutenant of Ireland (1866-8 and 1874-6) under the Derby and Disraeli ministries; created duke in 1868. He claimed the dukedom of Châtelherault in France, as heir to the house of Hamilton; but Napoleon iii. decided in favour of the Duke of Hamilton (1864). See *Times*, Nov. 2, 1885.

Abercrombie, John (1780-1844), the celebrated physician, was born in Aberdeen; became one of the foremost consulting physicians in Edinburgh, and was appointed physician to the king in Scotland (1824). His papers in the *Edin. Med. and Surg. Jour.* (1816-24) formed the basis of his later works, *Diseases of the Brain* (1828) and *Diseases of the Stomach* (1828). Besides minor essays on religious subjects, he published *The Intellectual Powers* (1830) and *The Moral Feelings* (1833), which were popular.

Abercromby, David (d. *c.* 1702), Scottish physician and philosophical writer, of whose life we know only what is told by himself in *Protestancy to be Embrac'd* (1682). He wrote *Nova Medicinæ Praxis* (1685; repr. 1740); *De Variatione et Varietate pulsus Observationes* (1685); *Ars explorandi Medicas Facultates Plantarum ex solo Sapore* (1685-8); *Discourse of Wit* (1686), in which Reid's philosophy of common sense is taught; *Academia Scientiarum* (1687); *A Moral Discourse of the Power of Interest* (1690), etc. In 1833 James Maidment published *A Short Account of Scots Divines*, by him. See Haller, in *Bibliotheca Medicinæ Tract.*, vol. iii. p. 619.

Abercromby, Sir Ralph (1734-1801), son of George Abercromby of Tullibody, near Alloa; fought under Prince Ferdinand of Brunswick in Germany (1758); served under the Duke of York in Flanders (1793-5); and on his return to England was made a Knight of the Bath. In 1795-6 he conducted the campaign in the W. Indies. In 1799 he commanded the first division in the expedition to Holland; and in 1801 landed at Aboukir Bay, in Egypt. On March 21 he repulsed the attack of the French under General Menou, but was himself wounded, and died on March 28. Abercromby did much to improve the discipline of the army, and was universally respected for his courage, uprightness, and personal charm. See the *Memoir* (1861) by his son James, Lord Dunfermline.

Aberdare, tn., Glamorganshire, Wales, about 4 m. S.W. of Merthyr-Tydfil. Coal mines, iron and tin works. Pop. (1901) 43,357.

Aberdare, Henry Austin Bruce, first Baron (1815-95), born at Aberdare, Glamorganshire; M.P. for Merthyr-Tydfil (1852), for Renfrew (1869); Under-Secretary for the Home Department (1862); Privy Councillor (1864); Home Secretary (1868), when he carried through the Licensing Act of 1872; and became Lord Aberdare (1873), and Lord President of the Council (1873-4). He was first Chancellor of the University of Wales (1894). He wrote a *Life of General Napier* (1864), *National Education* (1866), and *Speech on the Education of the Poor Bill* (1867).

Aberdeen, a royal, munic., and parl. bur. of Scotland, 130 m. N.E. of Edinburgh by rail (Tay and Forth Bridges). The municipal burgh (6,694 ac.) comprises the district between the Dee and the Don, embracing the burgh of Old Aberdeen (1 m. N.), and Woodside (2 m. N.W.), both on the r. bk. of the Don; Cults (4 m. S.W.), on the l. bk. of the Dee, and Torry, on the r. bk., are also included within the city parish. It was constituted a county of a city in 1899. The parliamentary burgh (6,234 ac.) consists of a N. and a S. division, each sending one member to Parliament. Aberdeen rose into importance in the 12th century, when it became the see of the north. It took an active part on behalf of Bruce. It is a handsome town, built chiefly of granite, and so called 'the Granite City.' Of modern edifices, the chief are the fine Municipal Offices in the Scottish Baronial style, the Post Office and Parish Council Offices in Renaissance style, Marischal College in Gothic, and the United Free Church College in Tudor, the new Market, Trades Hall, Royal Infirmary, Asylum, Grammar School, Art Gallery and School, and Gordon's College. Of its churches, the most noteworthy are the East and West, which have a spire in common; and the Roman Catholic cathedral. Chief industries are salmon and herring fisheries, fish-curing, engineering, chemical tanning, brewing, distilling, and papermaking; woollen, linen, cotton, jute, and combs. The trade of the port amounts to over £1,100,000, of which about nine-tenths are imports. Pop. of parl. burgh (1901), 143,728; of roy. and munic. burgh, 153,114. See Smith's *New and Old Aberdeen* (1882), and Watt's *Aberdeen and Banff*, with full bibliography (1900).

ABERDEEN UNIVERSITY comprises the two separate foundations of King's College and Marischal College, which were united in 1860. The former was founded in 1494-5, at Old Aberdeen, by Bishop Elphinstone. Marischal College was founded at New Aberdeen in 1593 by George Keith, fifth earl marischal. There are 24 professors, classified under the five faculties of arts, sciences, divinity, law, and medicine, 40 lecturers, and about 860 students. The library dates from 1500, and contains upwards of 140,000 volumes. Along with Glasgow University, it sends one member to Parliament. See *University Calendar* (yearly from 1864); J. M. Bulloch's *Hist. of the Univ. of Aberdeen* (1895); R. S. Rait's *The Univ. of Aberdeen: a Hist.* (1895).

Aberdeen, George Hamilton Gordon, fourth Earl of (1784-1860), was born in Edinburgh; appointed minister to Vienna (1813), and signed the treaty of Töplitz; Foreign Secretary in Wellington's ministry (1828-30); Colonial Secretary (1834-5). His Non-Intrusion Bill (1840) failed to avert schism in the Scottish Church; and his similar bill of 1843, although it became law, was practically nullified by the Abolition of Patronage Act, 1874. Foreign Secretary in Peel's administration (1841), he negotiated the Tahiti incident (1844), the peace with China, the Ashburton treaty (1842), and the Oregon treaty (1846); resigned office with Peel (1846), and became prime minister (1852). His cabinet, termed the 'Coalition Ministry,' which included Lord John Russell, Palmerston, Gladstone, and the Duke of Argyll, did not fulfil its promise; the alliance with France and the Crimean war were consequences of a weak and 'drifting' policy; the commissariat was grossly mismanaged; and a majority having been returned in favour of Roebuck's motion calling for inquiry, Aberdeen resigned (1855). He wrote an *Inquiry into the Principles of Beauty in Grecian Architecture* (1822). His *Correspondence* was privately printed (1858 88). See *Life* by Sir A. Gordon (1893); Kinglake's *Crimea*.

Aberdeen, Ishbel Maria, Countess of (1857), youngest daughter of first Baron Tweedmouth, married seventh Earl of Aberdeen in 1877. She is much interested in all questions affecting the welfare of women, and has published *Through Canada with a Kodak* (1893).

Aberdeen, John Campbell Hamilton Gordon, seventh Earl of (1847), grandson of the fourth earl; succeeded to the title (1870); lord-lieutenant of Ireland (1886); governor-general of Canada (1893-8).

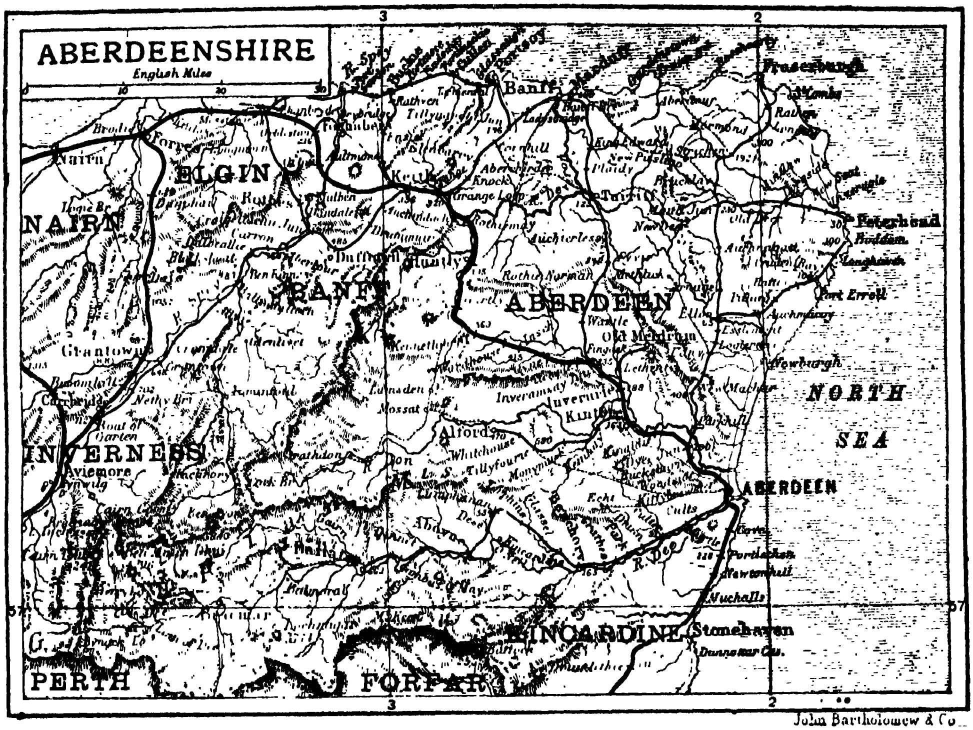
Aberdeen Line, a steamship company plying between London and Australia *viâ* the Cape; is managed by Messrs. G. Thompson and Co.; founded 1824. Fleet, 13 vessels, aggregating 48,424 tons.

Aberdeenshire, a maritime co. in the N.E. of Scotland, bounded on the N. and E. by the North Sea. Greatest length, from N.E. to S.W., about 86 m.; breadth, from N.W. to S.E., 47 m.; coast-line, 62 m.; area (excluding foreshore), 1,982 sq. m., or 1,268,705 ac. Pop. (1901) 304,439; in 1801 the pop. was 121,061. Towards the sea the land is fertile and comparatively level, but a great portion lies in the mountainous region of the Grampians, which form in the S.W. the knot of the Cairngorm; the soil in the vicinity of the rivers is rich and loamy, but in the hilly parts there are extensive tracts of moorland. The principal rivers are the Deveron; Ythan; Don, with the Urie (82½ m.); and the Dee (87 m.). They are all noted salmon rivers. The predominant rocks are granite and gneiss; other minerals are manganese, plumbago, rock-crystal (cairngorms), and amethysts. The county is divided politically into two divisions, each sending one member to Parliament. The county town is Aberdeen. See Smith's *New Hist. of Aberdeenshire* (1875); Watt's *Aberdeen and Banff* (County Histories: 1900). *Map, p. 20.*

Abergavenny (the *Gobannium* of the Romans), mrkt. tn. and munic. bor., W. Monmouthshire, England, 16 m. W. of Monmouth. It stands on an eminence in the valley of the Usk. Its castle, still partly inhabited, was the scene of the treacherous murder of Welsh princes by William de Brasse. Collieries and iron works in vicinity. Pop. (1901) 7,795.

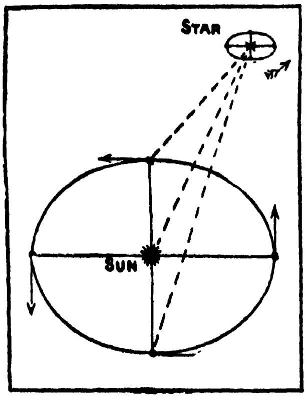
Abernethy, John (1680-1740), Irish Presbyterian clergyman; appointed minister of a church in Antrim (1703); received calls from churches in Dublin and Belfast (1717). The synod agreed that he should go to Dublin, but he decided to remain at Antrim. His refusal caused a division in the Irish Presbyterian Church, his party of the non-subscribers being opposed by the subscribers. In 1730 he went to Dublin, and engaged in the controversy relative to the Test Act (1731), which he opposed. His *Discourses on the Divine Attributes* (1740-2), *Posthumous Sermons* (1748-51), containing a Life by Duchal, and *Tracts* (1751), show advanced principles. See manuscript *Diary* (6 vols.).

Abernethy, John (1764 1831), eminent surgeon; born and studied in London; surgeon of St. Bartholomew's Hospital (1815-27), and lecturer on anatomy at the College of Surgeons (1814-29). His insistence on the connection of local diseases with disorders of the digestive system has deeply influenced English medical practice. His writings were collected in the *Works* (4 vols. 1830). See *Memoirs* by Macilwain (1853), and B. C. Brodie's *Autobiography* (1865).



John Bartholomew & Co.

Aberration, an apparent displacement of the heavenly bodies, due to the combined effects of the earth's orbital motion and of the finite velocity of light. Each star, consequently, describes about its true position a small ellipse, the semi-major axis of which represents the arc traversed by the earth during the interval of light-transmission from the sun, and is known as the 'constant of aberration.' Its accepted value is 20·47″. And since it stands for the ratio of luminous to terrestrial speed, the distance of the sun can thence be deduced when the velocity of light has been independently determined. This explanation is very simple on the old corpuscular theory of light, but presents great difficulties on the wave theory of light. (See ÆTHER.) A similar but much smaller effect, depending upon the earth's axial movement, is known as 'diurnal aberration.' A third variety, called 'planetary aberration,' arises from the delay in the visibility of a moving luminous body caused by the progressive transmission of light.



Apparent Annual Path of a Star due to Aberration of Light.

Aberration, SPHERICAL AND CHROMATIC, in optical instruments, means the deviation of part of a pencil of rays from the point through which every component ray of the pencil should pass, if the theoretical conditions for distinct vision are to be rigorously fulfilled. It is of two kinds, spherical and chromatic. Spherical aberration results from the sphericity of the lens surfaces, or of the mirror used to produce the image of the object, distant or near according as the instrument is a telescope, camera, or microscope. Consider in particular the case of a convex lens. (See LENS.) Parallel rays passing through the lens are brought very nearly to a focus; but no lens with spherical surfaces will bring all rays exactly to this focus, even though these rays are of the same colour and refrangibility. The amount of deviation of any particular ray from the focus will depend upon which part of the lens it passes through. Lenses might be ground with suitable forms of surface to produce perfect focussing for a particular kind of light from a source at a definite distance; but these would not have the same accurate focussing effect upon other kinds of light, or upon rays coming from sources at different distances. For ordinary use of telescopes and microscopes this imperfection is not of great significance, and in high-class types of instruments other causes operate which are as effective as spherical aberration in diminishing definition. Chromatic aberration is due to quite a different cause—*viz.* the different refrangibilities of the coloured components of white light. When a single lens is used, the different coloured rays from a given source are brought to different foci, thereby producing an image fringed with colour. (See DISPERSION.) This defect—a much more serious one than any that practically arises from spherical aberration—is almost entirely removed by means of achromatic combinations of lenses. These are compound lenses formed of lenses of different kinds of glass; and their action depends upon the fact that there is no necessary relation between refraction and dispersion. See TELESCOPE.

Aberystwyth, port and wat.-pl., Cardiganshire, Wales. It has a university college (1872), with about 500 students, which forms part of the University of Wales. Exports lead and copper ore, bark, and timber. Pop. (1901) 8,005.

Abeshr (Fr. *Abêchr*), cap. of Wadai, in the French Sudan. It is on the Sudan *hajj* caravan highway, between Khartum and Kuka. Vogel (1855-6) was killed there. Pop. estimated at about 25,000.

Abeyance. If a freehold estate has no present owner, the freehold is in abeyance. For reasons based on the old law of real actions and feudal services, the freehold cannot be put in abeyance by any voluntary act of the owner, and any limitation which purports to create a freehold estate *in futuro*, and thus to put the freehold temporarily in abeyance, is void. But an abeyance sometimes arises by operation of law, as during the period between the death of a corporation sole—a bishop, for example—and the appointment of his successor. In England, a female peerage will fall into abeyance if it descends upon coparceners—*i.e.* sisters who are together the one heir of their ancestor—but the crown may revive it in any one of them. In Scotland there is no abeyance in this case, as a female peerage descends to the eldest daughter or her heir. See Challis's *Real Property*, pp. 90, 104.

Abgar, the titular name of twenty-eight kings of Edessa in Mesopotamia, one of whom was said to have sent a letter to Jesus, asking Him to share his kingdom and cure his disease, and to have received a reply from Christ. The letters were translated by Eusebius, but were discredited by Pope Gelasius in 494. See Lipsius, *Die Edessenische Abgarsage* (1880), and Tixeront, *Les Origines de l'Eglise d'Edesse* (1888).

Abhorrers, a name given (1679-80) to the Court or Prerogative party, who signed addresses to the crown 'abhorring' the petitions presented by certain of Shaftesbury's followers. The latter (named 'Petitioners,' 'Excluders,' 'Protestants,' 'Country Party') besought the crown not to prorogue Parliament further, in order that the Exclusion Bill against the Duke of York, afterwards James II., might be proceeded with, and that measures might be taken, in the Protestant interest, 'to smite the king through the duke's side.' The Abhorrers (known also as 'Tantivies,' 'Masqueraders,' and 'Papists in Masquerade') received the nickname of 'Tories,' and the Petitioners that of 'Whigs;' and these terms superseded the names 'Abhorrers' and 'Petitioners,' 'Court Party' and 'Country Party.'

Abiathar, son of Ahimelech the high priest, escaped when Doeg slaughtered the priests at Saul's command (1 Sam. 22 : 20), and joined David at Keilah. Appointed high priest with Zadok (1 Chron. 15 : 11), he became David's counsellor (1 Chron. 27 : 34), and remained faithful to him during Absalom's rebellion (2 Sam. 15 : 24), but later joined Adonijah in his revolt (1 Kings 1 : 7, 19), and was therefore deposed from the priesthood by Solomon (1 Kings 2 : 26).

Abib, in the Jewish calendar, the first month of the ecclesiastical year, when the feast of the Passover is celebrated; later named Nisan, and corresponding nearly to our April.

Abich, WILHELM HERMANN (1806-86), geologist, born at Berlin; professor of mineralogy at Dorpat (1842); went to Vienna (1877). He explored the Caucasus, Russian Armenia, N. Persia, and Daghestan, and published *Geologische Forschungen in den Kaukasischen Ländern* (3 vols. 1878-88), *Ueber die geologische Natur des armenischen Hochlandes* (1893), etc.

Abies. See FIR.

Abigail, wife of Nabal the Carmelite, who, by her tactful speech and gifts, dissuaded David from his purpose of revenge against her churlish husband (1 Sam. 25 : 18-35). After Nabal's death she became the wife of David (ver. 39-42), and, after a short period of captivity among the Amalekites, resided at Hebron, where she bore David a son, named Chileab or Daniel (2 Sam. 3 : 3; 1 Chron. 3 : 1). In speaking to David she called herself 'thine handmaid,' and her name has thus come to be colloquially used for 'waiting maid,' 'servant;' the derivation of this usage from Abigail Hill, Mrs. Masham, waiting-woman of Queen Anne, is erroneous.

Abijah, the name of several individuals mentioned in the Bible, of whom the most notable are the following:—(1.) A king of Judah (c. 920-917), also called Abijam, the son and successor of Rehoboam. The meagre account of him given in 1 Kings 14 : 31 to 15 : 8 is supplemented by 2 Chron. 13, according to which he gained an overwhelming victory over Jeroboam, of whose army no fewer than half a million were slain, near Mount Zemaraim, in the hill country of Ephraim. He was succeeded by his son Asa. (2.) A son of Jeroboam I., who succumbed in childhood to a severe illness (1 Kings 14). (3.) One of the descendants of Eleazar, the son of Aaron, who was chief of the eighth of the twenty-four courses of David's priests (1 Chron. 24 : 10; *cf.* Luke 1 : 5, 'Abia'). (4.) A son of Samuel (1 Sam. 8 : 2, R.V.), whose corrupt administration of justice gave the elders of Israel a colourable plea for their demand for a king. For other bearers of the name, see 1 Chron. 2 : 24 (Abiah); 7 : 8 (R.V.); 2 Chron. 29 : 1 (mother of Hezekiah).

Abimelech. (1.) A king of Gerar, who, owing to Abraham's misrepresentation, took Sarah into his harem; but being divinely warned in a dream, soon restored her to her husband (Gen. 20). A remarkably similar story is told also in connection with Isaac and Rebekah (Gen. 26). (2.) Son of Gideon and a Shechemite woman, who persuaded the Shechemites to make him their king, and who, by assassination, got rid of all his seventy half-brothers except Jotham (Judg. 9). The Shechemites ultimately rebelled against Abimelech, and while assaulting Thebez he was struck by a piece of a millstone cast from the wall by a woman, and, to save himself from the disgrace of having died by female hands, he ordered his armour-bearer to kill him. See G. F. Moore's *Judges*, 237 *et seq.*

Abingdon, a munic. bor. and mrkt. tn., Berkshire, England, 6 m. s. of Oxford. It dates from about 675, when a Benedictine monastery was founded. The manufacture of ready-made clothing employs about 2,000 persons. Down to 1885 it returned one member to the House of Commons. Pop. (1901) 6,480.

Abinger, SIR JAMES SCARLETT, BARON (1769-1844), Lord Chief Baron of the Court of Exchequer, born in Jamaica; called to the bar (1791); entered Parliament as member for Peterborough (1819); became Attorney-general in Canning's ministry (1827), and in Wellington's (1829-30); raised to the bench, with title of Baron Abinger, under Peel's ministry (1834). See *Memoir* by P. C. Scarlett (1877); Foss's *Judges of England* (1864), ix. 255-61; Martin's *Masters of the Bench of the Inner Temple* (1883), p. 93.

Abington, or HABINGTON, EDWARD (1553-86), took part in the Catholic plot hatched by Babington against Queen Elizabeth; was sent to the Tower, and, protesting innocence, was executed in St. Giles's Fields on Sept. 20, 1586.

Abington, MRS. FANNY (1737-1815), English actress, born in London; was a flower-girl and domestic servant. During her career on the stage (1755-99) she created thirty original characters, her most famous being Lady Teazle.

Abington Law, an English equivalent of the well-known Scottish 'Jeddart (Jethart, Jedwood) justice'—hanging a man in haste, trying him at leisure—from the summary hanging of a man at Abington by Major-Gen. Brown during the commonwealth.

Ab initio. See Trespass.

Abiogenesis, the production of living from non-living matter, was generally believed in until recent times, but was disproved by Pasteur, Tyndall, and others. The present attitude of biologists is a reserved scepticism, which allows the possibility but denies the probability of spontaneous generation. Under unknown conditions in the past, abiogenesis may have occurred; but all experiments show that life is now produced only from life. See Huxley in *Brit. Assoc. Report* (1870).

Abipones, one of the chief peoples of Gran Chaco, Argentina, between the Bermejo and Rio Grande; a fine tall race, with black eyes, aquiline nose, and long black hair. See Dobrizhoffer's *Account of the Abipones* (1822).

Abishai, nephew of King David, and one of his most courageous and faithful followers (1 Sam. 26:6). He assisted in the night expedition to the camp of Saul (1 Sam. 26:6-9). After David's accession he took part with Joab in numerous wars (2 Sam. 2:18, 24; 3:30), was faithful to the king in Absalom's rebellion, and became one of the captains of the kingdom (2 Sam. 23:18; 1 Chron. 11:20).

Abjad is the first of eight mnemonic words which tell the numerical order of the Arabic alphabet from 1 to 1,000; also the name for the whole system, which is much used in amulets, etc., and for the alphabet, as in the phrase *huruful-abjad*, 'the letters of the alphabet.'

Abjuration. (**1.**) Of the Realm. If a person accused of any crime except treason or sacrilege took sanctuary, and within forty days confessed, and took the oath that he abjured the realm, and would depart from it forthwith, and would never return without leave of the king, he saved his life; but his blood was attainted and his goods forfeited. All right of private sanctuary was abolished by 21 Jac. I. c. 28. (**2.**) Oath of. 13 Wm. III. c. 6 provides that holders of any office under the king, and also ecclesiastics and lawyers, shall take an oath renouncing and abjuring allegiance to the son of James II. This oath was superseded in 1858 by a single oath, which took the place of the oaths of allegiance, supremacy, and abjuration, and contained words renouncing and abjuring allegiance to any one claiming a right to the crown except the present royal family (21 & 22 Vict. c. 48). A new form of oath was introduced in 1867 by 30 & 31 Vict. c. 75, and words of abjuration were omitted. The Promissory Oaths Act, 1868 (31 & 32 Vict. c. 72), prescribes the form of oath now in use, and directs who shall take it.

Abkhasia, or Abasia, dist., Kutais, Caucasia, along the Black Sea littoral; produces wheat and wine. Chief town, Sukhum Kale. It became Russian in 1809-10, but was not pacified till 1864. Pop. 13,000.

Ablaut. The use of the term ablaut in philology is due to Jacob Grimm (*Deutsche Grammatik*). The word gradation may be employed as its equivalent in English (Skeat, Sweet, etc.). It finds special application in the comparative grammar of the Indo-European languages. Monosyllabic speech-elements, both bases and suffixes, show a marked tendency in these languages to split up and become, by vowel change, each a group of related syllables. Each group is a regular series, in virtue of its adherence to one of several possible schemes of variation (*e.g. sing, sang, sung*). The regular vowel change of such a series is called gradation. It is an inheritance from the Aryan parent-speech, and is connected there with the influence of the accent. The differentiation at first was phonetic only; afterwards it was utilized in the expression of differences of meaning. The most important use of gradation as a means of expressing grammatical distinction occurs in the inflection of the so-called strong verbs. The varying forms or grades are there employed to mark differences of tense. The existing types of tense gradation may be distributed into seven classes, which are exemplified in the English verbs *fall, shake, bear, give, drink, drive, choose* (Skeat's examples). The regularity of the sequence has been obliterated in some verbs by phonetic changes of limited application. A good account of 'ablaut' (in French, *apophonie*) will be found in Victor Henry's *Précis de Grammaire comparée de l'Anglais et de l'Allemand* (1893). See also Skeat's *English Etymology* (1889), and Brugmann's *Grundriss*, vol. i. (1886).

Able-bodied Seaman. See A.B.

Ablution, a rite symbolizing the purification of the soul by the cleansing of the body. In the Roman Catholic Church the word indicates the washing of the chalice and the priest's fingers with water and wine after mass.

Abner, a Hebrew warrior, son of Ner (1 Sam. 14:51), cousin of Saul, and captain of the army. He proclaimed Ish-bosheth king (2 Sam. 2:8), joined David (2 Sam. 3:12), and was killed by Joab (2 Sam. 3:27).

Abney, Sir William de Wiveleslie (1844), English chemist and physicist, was born at Derby, and educated at the Royal Military Academy, Woolwich. Became instructor in chemistry to the Royal Engineers, Chatham; assistant-secretary to the Board of Education (Science Dept.) in 1899, and adviser to the Board in 1903; as also a member of Council for Education to the War Office. His researches in light, including stellar photometry, in photography, and in spectroscopy are of great value. His writings on these subjects include *Instruction in Photography* (1870); *Treatise on Photography* (1875); *Colour Vision, Colour Measurement and Mixture* (1893); and many papers in the *Philosophical Trans.* and the *Proc. Royal Society*. In 1900 Captain Abney was made a K.C.B. in recognition of his scientific attainments. Among his works in other fields are *Thebes and its Five Great Temples* (1876), and *The Pioneers of the Alps*, in collaboration with C. D. Cunningham (1888).

Åbo, port, Finland, Russia, 50 m. from the open sea, 124 m. from Helsingfors. Coaling station; exports of timber and iron. Here was signed the peace of Åbo between Sweden and Russia in 1743. Pop. (1897) 34,964.

Abo, Ibo, or Eboe, tn., S. Nigeria, W. Africa, on r. bk. of the Niger (Quorra), 80 m. from the sea. Palm oil. Pop. 8,000.

Åbo-Björneborg, gov., Finland. Area, 9,332 sq. m. Pop. 395,000.

Abolitionists, advocates of the abolition of slavery in the United States, were organized in 1775 in Philadelphia, Benjamin Franklin being their first president. But in 1760 the Quakers had made the holding of slaves a matter of church discipline. Gradually the states in the north abolished slavery; and the great N.W. Territory, including Ohio, Indiana, Illinois, Michigan, Wisconsin, and a certain portion of Minnesota, were protected against slavery by the ordinance of 1787. The territory called the Louisiana purchase, including also what is now Iowa, Oregon, Kansas, Nebraska, and a part of Minnesota, came in as free states by embodying in their state constitutions laws against slavery. The abolition of the slave trade by Great Britain in 1807, and in 1808 by the United States, gave the abolitionists great encouragement, as so far their efforts had been practically futile. In 1816 the National Colonization Society was formed. Indirectly it was organized that the South might be rid of her free blacks, but its real object was that a colony might be furnished outside of the States for the emigration of the negro. In 1829-30 the feeling against slavery and its existence had become so well grounded that the leaders, especially William Lloyd Garrison, resorted to more aggressive methods, and insisted upon immediate abolition. In 1831 Garrison began to publish the *Liberator* in Boston, and in 1832 the New England Anti-Slavery Society was formed. In 1833 another was organized in Philadelphia. Garrison visited England, and secured from prominent men a condemnation of the Colonization Society. In many quarters the feeling against the abolitionists was strong, and in the south rewards were offered for the capture of the leaders. In 1840 the American Anti-Slavery Society was formed by abolitionists opposed to the radical methods of Garrison, who made attacks upon both church and state, and had allowed dangerous social ideas to creep into the society, such as free love, community of property, and the then new idea of women's rights. The Liberty Party, an outgrowth of the abolition sentiment, united with the Free Soil Party; and in 1856 they joined with the Republicans. They gave great assistance to the negro in his efforts to escape, by means of an organization known as the 'Underground Railway.' Finally the civil war brought about the legal emancipation of the slave. See *Wm. Lloyd Garrison: The Story of his Life* (4 vols. 1885-89); Wilson's *History of the Rise and Fall of the Slave Power in America* (1872); Williams's *History of the Negro Race in America* (1882); Frothingham's *The Abolition of Slavery* (1878).

Abomey, tn., French Sudan, 65 m. N. of Whydah; former capital of Dahomey, now capital of the division of Abomey; occupied by the French, Nov. 17, 1892. Trade in ivory, palm oil, and gold. Pop. 20,000.

Abondance (Ital. *Abbondanza*), tn., Haute-Savoie, France, 18 m. E.S.E. of Thonon-les-Bains, on L. of Geneva; famous for the vacheries cheese.

Aborigines. This word was first used of the original inhabitants of Italy; it was afterwards extended to the inhabitants of other countries when first known; now it generally means the natives found in a country by European colonists. The word is also used of plants and animals, to denote the flora and fauna indigenous to a place. The abolition of slavery in the British dominions (1833) led to the formation of the Aborigines Protection Society. The Kidnapping Act, 1872, and the Pacific Islanders Protection Act, 1875, were passed for the protection of the natives of the Pacific islands, and for regulating the importation of them into the Australasian colonies, including Fiji. The British North America Act, 1867, gives exclusive legislative authority with regard to Indians to the Dominion (of Canada) Parliament. The constitutional acts of several of the colonies contain provisions for the protection of the natives. The General Act of the Brussels Conference, signed July 2, 1890 (*Hertslet's Treaties*, vol. xix. p. 278), sets out what the powers declare to be the most effective means of counteracting the slave trade in the interior of Africa, and contains in ch. vi. restrictive measures concerning the drink traffic, intended to protect the native population from the abuse of it. For Australian aborigines, see AUSTRALIA.

Abortion denotes the expulsion of a fœtus incapable of life, and medically the term is applied to those cases occurring before the sixth month of pregnancy. Later, the term used is miscarriage.

The causes of abortion may depend upon the health of the fœtus, or on that of the mother. Any illness of the mother during pregnancy is apt, either by lowering the general health, or by a more direct action, to induce abortion or miscarriage. Certain drugs, mental or physical shock, overexertion, or a muscular strain or a fall, may have the same effect, the danger of abortion being much greater with some constitutions and temperaments than with others.

Preventive treatment means in the average case merely the living of a sane life, not inactive, but quiet, regular, and healthy, with special care to avoid exhaustion, excitement, and crowded rooms, and the pressure of tight clothes. Should abortion be threatened (principally by bleeding and pain), the patient must *at once* take to bed, and send for medical assistance. Cold compresses, changed before they grow warm, will help to check the hæmorrhage temporarily; but for this purpose it is of the greatest importance to lie quiet. Should abortion take place, and skilled assistance be unobtainable, absolute quiet, complete rest, and cleanliness are the most important points. Unless a woman treat herself as carefully after an abortion or a miscarriage as she would after a confinement, she runs not only grave immediate danger, but also risks chronic invalidism later. Intentional abortion, except when judged necessary by medical men in consultation, and performed by them with the care necessary for any surgical operation, is not only always criminal, but often proves suicidal. In law, procuring, or attempting to procure, abortion, whether by the woman herself or by another, is in England a felony, and in Scotland a crime, punishable by penal servitude for life, or by imprisonment. If the woman dies, or if the child is born alive but dies because of premature birth or the means used, it is murder. In England, to supply any poison or instrument, knowing that it is intended to be used to procure abortion, is a misdemeanour punishable by penal servitude not exceeding five years, or by imprisonment.

Aboukir, or ABUKIR (anc. *Kanobos*), vil., Aboukir Bay, Egypt, 13 m. N.E. of Alexandria. Aboukir Bay, 16 m. wide, was the scene of the Battle of the Nile (Aug. 1, 1798), in which Nelson defeated the French. At Aboukir, Bonaparte, with 6,000 men, defeated an army of 18,000 Turks (July 25, 1799); and there Sir Ralph Abercromby landed in face of the French, whom he defeated (March 8, 1801), and compelled them to quit Egypt. In the vicinity are many ancient remains. The Lake of Aboukir, a salt marsh of 31,000 ac., is in process of reclamation.

Abousambul. See IPSAMBUL.

About, EDMOND FRANÇOIS VALENTIN (1828-85), French novelist and dramatist, born at Dieuze, Lorraine; devoted himself to fiction and journalism, and produced *La Grèce contemporaine* (1854), the first of a long list of works. In the Franco-German war he accompanied Macmahon's army as special correspondent of the *Soir;* he was editor of the *XIX Siècle* from 1875, which he founded with Sarcey; and was elected a member of the Academy (1884), but died (in Paris) before his reception. His fame rests principally upon his novels, such as *Roman d'un Brave Homme* (1880; Lond. 1880); *Le Nez d'un Notaire* (1862; Lond. 1882); *Le Roi des Montagnes* (1856); *Madelon* (1863); *L'Homme à l'Oreille Cassée* (1862); *Trente et Quarante* (1865), all of which have been translated into English.

Abra, rugged, volcanic prov., Luzon, Philippine Is. (area, 3,280 sq. m.; pop. 49,000); watered by river of same name, large and navigable for boats, which rises in Caballeros Cordillera, and enters the sea on W. coast.

Abracadabra, a cabalistic word used by the Gnostics and others of the second century and later as a spell to secure the assistance of good spirits against evil; supposed, when written in the form of a triangle and worn round the neck for nine days, to act as a charm against fevers, etc. First occurs in a poem by Sammonicus, second century.

Abraham. The account of Abraham given in Gen. 11:31 *ff.* is less a connected biography than a series of tableaux. As Abram, the son of Terah, he comes before us a noble figure, great in moral and religious attributes, as also in material possessions. A native of Ur of the Chaldees (in Mesopotamia, or, less likely, Uru, now Mugheir, in Babylonia), married to his half-sister Sarai, he migrates to Haran in Upper Mesopotamia; thence, in obedience to a divine command, to Canaan, which land is thereupon promised to his seed (Gen. 12:1-6). Thenceforward he lives the life of a nomad chief, wandering mainly in the districts around Shechem, Beth-el, and Hebron. While sojourning in Egypt, he imperils Sarai's honour by misrepresenting her as only his sister (*cf.* the similar action in Gerar, Gen. 20:1-11); but he shows true self-denial in giving the choice of pasture land to his nephew Lot, and true courage in his successful attack upon the victorious Chedorlaomer, while the tenderness of his nature is evinced in his unwillingness to expel Hagar and Ishmael from his tent at Sarai's instigation, and in his pathetic intercession on behalf of Sodom. The promises grow ever in splendour: Jehovah makes a covenant with him, ordaining the rite of circumcision, and changing his name from Abram to Abraham (and Sarai's to Sarah), as the credentials thereof; heavenly messengers are commissioned to visit him, and his prayers have power on high (Gen. 17, 18). At length Isaac is born, and the crowning expression of Abraham's faith is given in his willingness to obey God even to the extent of offering up the son of promise as a sacrifice (Gen. 21, 22). After Sarah's death Abraham marries Keturah, and has six sons by her; and at last, at the age of 175, he is laid to rest beside Sarah in the cave of Machpelah (Gen. 25:1-10). No quite satisfactory explanation has been given of the names Abram, Abraham, or Sarai, Sarah. The patriarch plays a great rôle in later Judaism, as also in the New Testament; many remarkable legends have gathered round his name; and to the Arabs he is, as Ibrahim, the first and greatest Moslem. On the more debatable or extra-biblical points, the commentaries (*e.g.* Dillmann's *Genesis*, trans. by Stevenson, 1897) and the recent Bible dictionaries (*e.g.* Hastings's; and Cheyne's *Encyc. Bib.*) may be consulted with advantage. For Assyrian relations, see Tomkins's *Studies on the Times of Abraham*; for Abraham's place in Biblical history and theology, see Schultz's *O.T. Theology* (trans. by Paterson, 1892), and Kittel's *History of the Hebrews*, i. (trans. by Taylor, 1895).

Abraham, HEIGHTS OF, or PLAINS OF, S.W. of Quebec, along the St. Lawrence, the scene of the battle between Wolfe and Montcalm (Sept. 13, 1759), which added Canada to the British empire. Wolfe ascended the heights at Anse du Foulon (Wolfe's Cove), 1½ m. above Quebec.

Abraham-a-Santa Clara—family name, ULRICH MEGERLE—(1644-1709), a great pulpit orator of the Roman Catholic Church; born near Messkirch in Baden; joined the Barefooted Augustinians (1662); court preacher (1677); from 1682-9 worked at Graz, but spent the rest of his life at Vienna. His style was fearless, humorous, and racy. The sermon, *Up, up, ye Christians!* (1683), against the Turkish menace, was used by Schiller in *Wallenstein's Lager.* His most typical book is *Judas der Ertz-Schelm* (1686-95). See also *Sämmtliche Werke* (21 vols. 1835-50); also Sexto's *Abraham-a-Santa-Clara* (1896).

Abrahamites, a Syrian sect in the 9th century who denied the divinity of Christ. Also applied to a deistic sect in Bohemia in the 18th century, who professed to be followers of Huss: they were expelled from Bohemia in 1783.

Abraham-men, a cant term, current 1573-1824, signifying half-naked vagabonds. One of the wards in Bedlam was named after Abraham, in allusion probably to Luke 16:22, and was devoted to mendicant lunatics, who wore a special badge, and were permitted to wander about the country begging. Hence the term 'Abram cove,' and the phrase 'to sham Abraham;' though the latter is also used in reference to forging bank notes, in allusion to Abraham Newland (d. 1807), cashier of the Bank of England. See *King Lear*, ii. 3,' and Dekker's *Bellman of London* (1608; ed. Grosart, 1885).

Abraham's Bosom, a term applied by the Jews to the abode of the righteous after death. As a metaphor, it is borrowed from the custom of reclining at meals, the head of each guest leaning towards the breast of his left-hand neighbour; to be next the host was to lie in his boson—*i.e.* to occupy the place of distinction. By some it is supposed that Abraham's bosom—otherwise the Garden of Eden and Paradise—denoted one of the compartments of the intermediate state in which all must sojourn for a time before entering the abode of final weal or woe. It is certain that the Jews of our Lord's time believed in an intermediate state with two localities; but it seems to be questionable whether the term 'Abraham's bosom' was then used of the intermediate resting-place of the righteous, and not rather of the higher paradise or heaven itself. The latter would seem the more probable, from the fact that in the only scriptural passage in which the phrase occurs (Luke 16:22 *f.*) its correlative Hades is plainly the place of torment. See Salmond's *Chris. Doctrine of Immortality* (1895).

Abranchiata, vertebrates which breathe throughout life only by lungs, never by gills.

Abrantes, tn., prov. Estremadura, Portugal, at the head of navigation on the r. bk. of the Tagus, 88 m. N.E. of Lisbon. Strongly fortified. Trade in grain, olive oil, wine, and fruit. Pop. about 8,000.

Abrasives, minerals used to put an edge on cutting instruments, or to polish metallic or other surfaces. They include burrstones, millstones, corundum, emery, garnet, grindstones, pulpstone, infusorial earth, tripoli, oilstones and whetstones, quartz, carborundum, and crushed steel.

Abravanel, or ABARBANEL, a family of Spanish Jews tracing its descent from the royal house of David. (**1.**) ISAAC BEN JEHUDA (1437-1508), minister of state to King Alfonso v. of Portugal, and from 1483 to 1492 chancellor to Ferdinand the Catholic, king of Castile; subsequently lived at Naples, in Corfu, and at Venice. He was distinguished for his high intellectual and moral qualities; author of a number of philosophical and exegetical treatises, his *chef-d'œuvre* being probably his exposition of the Messianic belief among the Jews in his Spring of Salvation, Salvation of his Anointed, and Herald of Salvation. See Carmoly's *Biographie d'Isaac Abravanel* (1857). (**2.**) LEO HEBRÆUS, physician at the court of Gonsalvo de Cordova, and friend of Pico de Mirandola. His principal work is the *Dialoghi di Amore* (written 1502; published 1535). In philosophy he was an eclectic, trying to combine Plato, Aristotle, and the Arabic philosophy into a harmonious system. See Zimmels's *Leo Hebræus* (1886).

Abraxas, a mystic word of Eastern origin, thought by the Gnostic Basilidians to signify the 365 spiritual orders of the divine manifestation, because in Greek notation the equivalents of its letters yield that number. This sect, and later theosophists, cut the holy name on gems (abraxas stones), together with monstrous figures—*e.g.* a man with a cock's head and serpentine limbs.

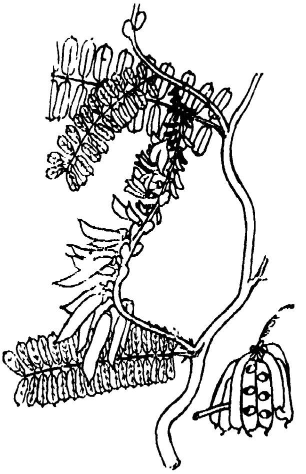
Abridgment and Abbreviation of Books, the reproduction of a book or other literary work in a shorter form, retaining the general scheme and arrangement, and the sequence of ideas. In early literary history an abridgment was recognized as a lawful use of another's book; but an abridgment, in the ordinary sense of the word, would now be held to be an infringement. Since Gyles *v.* Wilcox (1740), however, it has been accepted in various cases that a fair abridgment is allowed. In Dodsley *v.* Kinnersley (1740) the court went so far as to admit as a fair abridgment a

The Battle that won Canada. Death of Wolfe on the Plains of Abraham.
(After the Painting by West.)

magazine article containing about one-tenth of Dr. Johnson's *Rasselas*. A case of unfair abridgment of one of Dickens's Christmas Stories in 1844 was decided in favour of the plaintiff.

Abrogation, in English law, the repeal by a higher court of an enactment by a lower; in ecclesiastical law, the annulling of any previous law. See REPEAL.

Abrus Precatorius (Gr. *habros*, 'elegant'), wild liquorice, a leguminous plant having seeds like small peas, of a scarlet colour, with a black patch on one side. These are used in India as weights (*rati*), and are strung together to form rosaries, whence their name 'prayer-beads.' They are said to have given origin to the carat, the jeweller's unit of weight.



Abrus precatorius and Fruit.

Abruzzi, PRINCE LUIGI, DUKE OF THE (1873), geographer, third son of Amadeo, Duke of Aosta, and cousin of the king of Italy. He ascended Mount St. Elias, in Alaska, July 31, 1897, when he determined its altitude and geological origin. His large and well-equipped Arctic expedition (1899-1900) reached the highest recorded latitude, 86° 33′ N. See Filippi's *Ascent of Mt. St. Elias* (1900; Eng. trans.); *On the 'Polar Star' in the Arctic Sea* (1903; Eng. trans.).

Abruzzi and Molise, territorial div. (compartimento) of Central Italy, occupies the half of the peninsula on the Adriatic side, to the E. of the province of Rome. It is traversed by the two main ranges of the Central Apennines, between which lie the high valley of the Aterno (2,300 ft.) and the plateau basin of the now drained L. Fucino (2,165 ft.). On the Adriatic side the eastern range goes down abruptly to the sea, and its flanks are seamed with numerous short, swift streams. In the higher parts the climate is severe. Forestry and pasturage are the chief occupations: cereals and wine are produced in the fertile lower valleys; saffron in Aquila. Asphalt is found in Chieti. Area, 6,565 sq. m. Pop. (1901) 1,442,365. The territory embraces the provinces of Aquila, Chieti, Teramo, and Campobasso—the last-named corresponding to Molise, and the first three to the Abruzzi.

Absalom, King David's third son, born at Hebron. Because of his personal charms, Absalom became a universal favourite, and his ambition made him a danger to the realm. Though forgiven by his father for the murder of his half-brother Amnon, he stirred up sedition, and raised a formidable insurgent force. His army was routed by the royal troops in the wood of Ephraim, and Absalom, fleeing upon a mule, was caught by the head in a tree, and killed by Joab, to the great sorrow of the king. See 2 Sam. 13–18.

Absalom and Achitophel, Dryden's greatest political satire, published (first part, 1681) on introduction of the Exclusion Bill. It is an allegory of the history of King David, thinly veiling the real theme—the attempt by the court party, led by Shaftesbury (Achitophel), to secure the succession of the Duke of Monmouth (Absalom), Charles's illegitimate son. For a full criticism, see Ward's *English Poets* (1881–2).

Absalon, or AXEL, archbishop of Lund (1128–1201), born in Sjælland, Denmark. From 1157 onwards he energetically assisted King Valdemar to reconstruct the Danish state; took an active part in the struggle with the heathen Wends; and became successively bishop of Roskilde and archbishop of Lund (1178). After Valdemar's death (1182) Absalon's influence became still stronger, and he was of essential service to young King Canute in his successful struggle with Bogislav of Pomerania (1184). Absalon was of the best type of the mediæval warrior-priests, one of the greatest of Danish statesmen, yet pious and conscientious. A scholar himself, he supplied his clerk, Saxo Grammaticus, with the materials for his great history. See Estrup's *Absalon som Helt, Statsmand og Biskop* (1826).

Abscess, a collection of pus covered by the skin or other tissue, resulting from inflammation. It is often recognized by the feeling of 'fluctuation,' as of a sac containing liquid, when the fingers are pressed over it. Treatment requires rest, poulticing, and attention to general health, until the abscess is sufficiently liquefied to be cut open; the abscess is then emptied, the wound is dressed antiseptically until healed, and, if deep, is drained by a tube.

Absciss Layer, a layer of cork formed in autumn between the base of the leaf and the stem in many deciduous trees. It divides across the middle, and causes the fall of the leaf, half of the cork remaining to cover the leaf-scar.

Absconce, a shaded lantern used in churches to light the lectern during the reading of absolution and matins.

Absentee, one who does not reside on the estate or in the country from which he derives his income, thus shirking the duties of a patron, and spending abroad the money which might usefully be disbursed in the district. The practice has undoubted disadvantages for the country, but its precise economic effect is debated. M'Culloch held that tenants of resident owners are more oppressed than those of absentees. The common view, that the absentee's tribute is paid in coin which is thereby lost to the district, is erroneous: rent is really paid in goods produced by the tenants, and the landlord's mode of life is beneficial in proportion as it stimulates the quantity and quality of that production. The chief evils are probably the loss to the district of the educational influence of a leisured class, and the increased scope for the harsh methods of the middleman. Absenteeism has long been a sore grievance of the Irish people, and acts have been passed to check it, as 3 Rich. II. and 28 Hen. VIII., which taxed absentees at two-thirds of their net income. A tax of one-fifth was levied in Ireland on the incomes of absentees (1715–53); and a renewal of this legislation has been proposed more recently, but not carried into effect. See Senior's *Lect. on the Rate of Wages* (Lect. 2), and *Polit. Econ.*; Swift's *Drapier Letters*, No. 7; Arthur Young's *Tour in Ireland* (1780); Adam Smith's *Wealth of Nations*, v. 2; Brodrick's *Eng. Land and Landlords*; M'Culloch's treatises and essays on Money, etc.; Mill's *Unsettled Questions* (Essay 1), and *Polit. Econ.*; Miss Edgeworth's *Absentee*.

Absey Book (lit. A B C book), a primer for teaching the elements of reading; it sometimes included a catechism also. The term is used by Shakespeare in *King John*, i. 1. It is now obsolete.

Absinthe, a liquor made by distillation, containing alcohol and a number of essential oils, the chief among the latter being the oil of wormwood, to which the deleterious properties of the liquid are in great measure due. The green colour of absinthe should be due to chlorophyll, which is usually introduced by the maceration of the liquor with spinach or parsley; but various artificial colouring matters—*e.g.* indigo, turmeric, or copper sulphate—are frequently employed. The average composition of absinthe, according to Wynter Blyth, is as follows:—Alcohol, 50·00; oil of wormwood, 0·33; other essential oils, 2·52; sugar, 1·5; chlorophyll, traces; water, 45·65. The essential oil—derived from the wormwood—combined with the spirit, produces rapid intoxication. Absinthe is principally made and consumed in France and Switzerland (especially in Neuchâtel), and in some parts of the United States. The 'absinthe hour' in Paris means from 4 to 6 p.m. It was first introduced as a febrifuge in the Algerian army (1844), but is now prohibited in the French service. Absinthism, caused by excess in absinthe, is common in France. The symptoms are distinct from those of alcoholic poisoning. Absinthe seems to act directly through the higher nerve-centres, nervous symptoms being the most prominent throughout, appearing first in the forms of excitation, hallucinations, and terrifying dreams, and ending in delirium or idiocy. See ALCOHOLISM.

Absolute, that which is freed from relation, limitation, or dependence. As an adjective it is therefore applied (1) to the essence of a thing apart from its relations or appearances, and (2) to the complete or perfect state of being. Hence comes its substantival meaning of 'The Absolute' as the self-existent, self-sufficient Being, that which is free from all limitation, the all-inclusive Reality. The absolute in one form or another forms a central feature in the philosophical systems of Spinoza, Schelling, and Hegel. The absolute was made a theme of discussion in British philosophy by Sir Wm. Hamilton, whose denial of the possibility of knowing the absolute gave rise to much controversy. For a view of the discussions which centre round the conception at the present time, see F. H. Bradley's *Appearance and Reality* (1893), with the criticism of it in A. S. Pringle-Pattison's *Man's Place in the Cosmos.*

In its general sense, *absolute* is opposed to *relative*: thus, in physics, in speaking of the motion of one body through space, we refer to its *absolute* velocity; in comparing the motion of two or more bodies, we speak of their *relative* velocity. In music, absolute is used to denote the definite pitch of a musical note, which does not vary with the pitch to which an instrument may have been tuned, but depends on a definite number of sound vibrations per second. For absolute monarchy, see ABSOLUTISM. For absolute alcohol, see ALCOHOL. For absolute zero of temperature, see TEMPERATURE.

Absolute Disposition, in Scots law, a conveyance, usually of heritable property, unqualified by any burden or reservation in favour of the disponer or of any other party.

Absolution is the remission of sin, or of certain consequences of sin, in virtue of power committed by Christ to His church. The claim to this power is usually based on Matt. 18:18 and John 20:19-23. In the former of these passages Christ empowers the church to enact conditions of fellowship—what it binds (*i.e.* forbids) or looses (*i.e.* pronounces lawful) on earth shall be bound or loosed in heaven. The second passage goes further. There the risen Christ confers, not merely on His apostles, but upon all His disciples (*cf.* Luke 24:33), the Holy Ghost; and then, having thus endowed them with spiritual discernment, he gives them authority to remit or retain sin (*i.e.* to declare the true conditions of forgiveness). From the latter part of the 2nd century the church specially exercised the power in the case of persons excluded from its communion because of notorious and enormous sins—*viz.* murder, adultery, robbery, and apostasy from the Christian faith. Such persons were subjected to long and severe penance, but might be absolved by the bishop, who restored them to the church by imposition of hands and prayer. Great changes occurred in the custom of confession. The list of mortal or capital sins was extended; secret sins were secretly confessed; the penitent confessed sins of thought to the priest, after the example of the monks, who confessed such sins to their superior, though he, as a rule, was not a priest. But down to the 13th century absolution was simply a petition for the forgiveness of the penitent. Such is at this day the only form used in the Eastern Churches. The doctors of the church regarded the priestly absolution as declaratory, like the absolution in the daily service; or precatory, like that in the Anglican communion office. Largely under the influence of a treatise falsely ascribed to St. Augustine, the view obtained that God forgives through the priest, and the modern form, 'I absolve thee from thy sins,' was introduced. Absolution was now regarded as the one appointed means for remission of mortal sin after baptism. In the Roman Catholic Church absolution from sin can be given only by a priest empowered to do so by his bishop or by the Pope. Absolution from the censures of the church may be given by any cleric authorized to do so. The word absolution is also used of certain prayers said over a corpse before it is taken from the church to the cemetery. See Freiburg's *Kirchen-Lexikon, s.v.* 'Absolution.'

Absolution, DAY OF. In the early church public absolutions were pronounced on Good Friday, or on the previous day, Thursday, on which our Lord was betrayed. So St. Ambrose (*Ep.* xxxiii., *Ad Marcellin Sororem*) says that 'the day on which the Lord gave Himself for us was that on which penances are remitted in the church.' In the Roman Catholic Church, in the time of Pope Innocent (Innocent, *Ep.* i., *Ad Decent.* c. vii.), penitents were absolved only on the Thursday before Good Friday, unless great urgency, such as imminent death, required otherwise. The Emperor Valentinian introduced the practice of civil absolution at the Paschal festival, granting pardon to criminals. Mention is made of this in the Theodosian Code (lib. ix., tit. xxxviii., *De Indulgentiis Criminum*, leg. iii. iv. *et seq.*). The monks who pleaded for Eutyches at the second Council of Ephesus evidently refer to both the ecclesiastical and civil customs in the granting of absolutions.

Absolutism, the term applied to that type of rule wherein the sovereign is not under constitutional check. Yet even the 'absolute' monarch or autocrat—a Czar has checks: the instruments of his rule may be inefficient, and there are limits to the endurance and obedience of subjects. The 'enlightened despotisms' of the 18th century in Europe—those of Frederick II., of Joseph II., and of Catherine II.—were rooted in the maxims of benevolent monarchy, and had for their object strength and contentment at home, so that there might be national power and success abroad. The absolutism of rulers, with active officials, in the middle ages and in modern history, has its analogy to-day in the demand for the concentration of the agencies and efforts of the state, and for the extension of its sphere: the conditions have changed, but the end is the same—efficiency. See GOVERNMENT; SOVEREIGNTY.

Absolutists, a name given to a Spanish political party which in 1819 wished to abrogate the constitution of 1812, and to restore the absolute power of the throne. Their opponents—the Exaltados—favoured the constitution which was afterwards abrogated (in 1814).

Absolvitor, DECREE OF, in Scots law, decree in favour of the defendant.

Absorbents. Anything which absorbs is literally an absorbent, but the term is usually restricted to medical, chemical, physiological, and botanical processes. In medicine, the term is applied to such substances as magnesia, chalk, etc., which absorb or neutralize acid fluids in the stomach; in chemistry, to anything that takes up into itself a gas or a liquid (*e.g.* to such a drying agent as caustic soda, which withdraws moisture from the air); and in physiology (animal and vegetable), to the vessels by which the processes of absorption are carried on, such as the lymphatics in animals and the extremities of the roots in plants.

Absorption of gases by liquids depends on the pressure, the temperature, and the nature of the particular gas and liquid. If the temperature remains constant, and the pressure is altered, the amount of the gas absorbed is directly proportional to the pressure: thus, one volume of water, at 15·5° C., and under ordinary atmospheric pressure, takes up one volume of carbonic acid; but under a pressure of two atmospheres it absorbs two volumes of the gas. Dalton discovered that any liquid, in the presence of a mixture of gases, absorbs as much of each gas as it would absorb, under the same conditions of temperature and pressure, if one gas alone were present: at freezing-point water takes up 1·8 its own volume of carbonic acid; at 20° C. it absorbs the gas in only half that proportion; at boiling-point the gas is entirely driven off. The coefficient of absorption indicates the volume of any gas which is taken up by one volume of water: at 15·5° C. water absorbs ·015 volume of nitrogen, ·03 of oxygen, 3·25 of hydrogen sulphide, 450 of hydrochloric acid, and 727 of ammonia. Many solid bodies also absorb gases: thus, iron and platinum at a red heat take up hydrogen, and the same gas is absorbed by suitably-prepared palladium in the proportion of 936 volumes to one volume of the metal. Very porous bodies condense large quantities of gas over their extensive surfaces, with evolution of heat: thus, spongy platinum is used to ignite coal gas, and finely-divided iron takes up oxygen so rapidly that it becomes incandescent and is consumed. Wood charcoal will condense within it as much as 90 volumes of ammonia.

Absorption in plants can only take place when the substance to be absorbed has been changed into the liquid form of solution; for all food has to pass through the actual cell-walls by a process of osmosis. In the case of the higher plants, the greater part of the water and dissolved substances which enter the plant do so by way of the roots, the root-hairs and the uncuticularized epidermal cells of the younger roots being the actual absorbing parts. In the case of ordinary terrestrial plants, the roots penetrate among the minute air-spaces between the small particles of solid earth. Each of these particles is covered with a layer of water adherent by attraction. This water is absorbed by the root-hairs, as also are any salts which it has in solution. Moreover, by force of capillary attraction, the water covering the neighbouring particles is continuously sucked in, as oil is sucked up by the wick of a lamp. In the case of plants with aerial roots, moisture drops or is deposited on the roots, and is absorbed together with the dissolved dust previously deposited on the roots' external surface. Parasitic plants, again, send their roots into the substance of another plant, and thence derive both their water and dissolved food. But plants do not absorb all the soluble matter brought into contact with their roots. They exercise a selective power; and plants of a given species absorb definite foods approximately in a definite proportion only. The principal elements required by plants are carbon (see AERATION), nitrogen (in the form of nitrates), hydrogen and oxygen (in the form of water); oxygen also in the form of mineral salts (also in aeration), sulphur (as sulphates), phosphorus (as phosphates), silicon (as silica), chlorine (as chlorides), potassium, calcium, magnesium, and iron.

Absorption of light occurs whenever light falls upon a material surface and suffers refraction and reflection. Neither of these phenomena could be produced unless the light penetrated some distance into the substance. The vibrations in ether which constitute light act upon the particles of the substance and set them in motion, which is partly irregular, and produces heat. This involves an expenditure of energy, and hence the light loses part of its original energy; and this we call absorption. Opaque bodies absorb more light than transparent bodies; and yet it is the very opaque bodies like metals, which absorb a great proportion of the light falling upon their surfaces, which also behave as good reflectors. That great absorptive power should, in certain cases, be accompanied by great reflective power is not so paradoxical as it might seem at first glance to be. For absorption implies a taking in of vibratory energy from the disturbed ether; and the molecules being then set into vibration, may well become centres from which energy, in the form of light, may pass back again into the ether. Most substances exert a general absorption, so that all kinds of radiation suffer diminution in passing through them; but they also exert a selective absorption, certain rays being more freely absorbed than others. It is this selective absorption which gives rise to the varied tints and colours of bodies, the colour of any body being determined by the excess of the corresponding kind of light in the radiations sent back from it or transmitted through it. A great law, first recognized in some of its applications by Prevost, and established independently by Balfour Stewart in Britain, and by Kirchhoff and Bunsen in Germany, asserts that a substance absorbs what it radiates, and the emissive and absorptive powers of any substance for each kind of ray are equal. The phenomena of fluorescence form an exception to this so-called law of exchanges. Some of the most striking instances of the law will be found discussed under SPECTRUM. See also DISPERSION.

Absorption Lines and **Bands,** dark lines or bands in an otherwise continuous spectrum, produced when the light so examined passes through a vapour or other transparent body of lower temperature than that of the incandescent body. Every vapour, under these conditions, absorbs those rays which it would emit if it were the source instead of the absorber of light.

Abstemii, a name formerly given to those who refused to partake of the cup of the eucharist because of their aversion to wine. Calvinists considered that such persons might be permitted merely to touch the cup; this the Lutherans strenuously opposed. The controversy has recently been revived in regard to the use of unfermented wine.

Abstinence, TOTAL. See TEMPERANCE and FASTING.

Abstract and **Abstraction.** An abstract term or idea, in the logical sense, is one which expresses a quality or essence regarded apart from the individuals or particular objects of which it may be predicated—*e.g.* colour, man, wisdom. (See NOMINALISM.) Abstraction is the selective process by which such ideas are formed: for example, in forming the abstract idea of Man, the particular differences which distinguish one man from another are disregarded, and only the qualities common to all men, or those that belong to man as such, are retained. Abstraction in this sense is one aspect of generalization. The terms abstract and abstraction are also used in a depreciatory sense to signify a partial or limited view of a thing, in which the thing, being more or less isolated from its proper context or surroundings, is therefore imperfectly understood. But thinking may involve abstraction in the former sense, without being abstract in the latter—*i.e.* it may abstract from what is trivial, to fasten upon what is real and essential.

Abstract of Title, in English law, a short statement of the material parts of the deeds, wills, and other instruments, and of events, such as deaths, marriages, etc., under and by means of which a vendor or mortgagor makes out his title to the property to be sold or mortgaged. When an agreement has been made for the sale or mortgage of real or leasehold property, the purchaser or mortgagee has an implied right to an abstract of the title. It is usually prepared by the vendor's solicitor, and submitted to the purchaser's solicitor for perusal. See Dart's *Vendors and Purchasers*, vol. i. ch. viii.

Absurdum, Reductio ad. See Reductio.

Abt, Franz (1819-85), musical composer, born at Eilenburg, Prussia; was *Kapellmeister* at Zürich (from 1841) and at the Hof Theater, Brunswick (from 1852). He wrote many pleasing songs, and part-songs for men's voices.

Abu is much used in Arabic in the formation of personal and topographical names. The common view is that 'paternity' is the primary meaning; but see W. Robertson Smith's *Kinship and Marriage in Early Arabia* (1885) for a discussion which assigns 'possession' as the primary and 'paternity' as the secondary meaning.

Abu, Mount, in s.w. of Rajputana, India, and close to the Gujarat border; highest peak, 5,650 ft. above sea-level. Mount Abu possesses a beautiful lake, called the Nakhi Talao ('Gem Lake'), 1⅓ m. by ¼ m., about 4,000 ft. above the sea; also temples of white marble and the most elegant and striking specimens of Jain religious architecture. It is a sanatorium for Europeans. See Fergusson's *Hist. of Ind. Architecture* (1876), for the temples; *Ind. Antiquary*, ii. (1873); Adams's *W. Rajputana States* (1899).

Abu-Abdallah. See Al-Battani and Boabdil.

Abu-Bekr ('father of the maiden') (573-634) received this name in allusion to his daughter Ayesha, the only maiden among the wives whom Mohammed married. A man of wealth and position among the Koreish, as well as a native of Mecca, he was one of the first to believe in the prophet, and was his sole companion in the Hejira: and on the death of Mohammed (June 8, 632) was elected head of the Moslems, with the title of Caliph (*khalifa*, 'successor'). He reigned two years.

Abu-Hamid, or Abu-Hammed, tn., Egyptian Sudan, on the Nile, 199 m. by rail s. of Wady Halfa, where the caravan highway from Berber crosses the Bishari Desert (249 m.) to Korosko. It was taken from the Mahdists (Aug. 7, 1897).

Abu-Klea, wells on the caravan highway across the Bayuda Desert, between Korti and Metammah, from which it is 25 m. distant. Here Sir H. Stewart defeated the Mahdists (Jan. 17, 1885).

Abu-Nuvas (762-810), lyric and Bacchic poet, born at Al-Ahwaz, in Susiana. His mother was a Persian washerwoman employed in a fuller's yard. Educated at Bassora by the poet Wâliba and by Abu-'Ubaida; spent a year in the desert to acquire the Bedouin tongue; at Bagdad was a favourite of the Caliphs Haroun and Amin. Composed elegies, humorous verse, satires, etc., and, in later life, religious poems.

Abu-Simbel. See Ipsambul.

Abu-Thubi, tn., Arabia, on an isl. in the Persian G., w. of Oman, principal town of the Banu Yas. It sends 600 boats to the pearl banks. Pop. 20,000.

Abu-Tig, or Abutige, tn., Upper Egypt, on the Nile, 13 m. s.e. of Siut. Pop. 11,000.

Abulfaraj (Lat. *Abulfaragius*), Mar Gregory John (1226-86), called by the Syrians Bar 'Ebhraya, 'the son of the Hebrew,' but commonly known by his Latinized surname Bar-Hebræus, was born at Malatia, in Armenia. After studying Greek, Arabic, and Syriac, he devoted himself to philosophy, divinity, and medicine, completing his studies at Antioch, where he began his monastic life. Ordained bishop of Gubos, near Malatia, Sept. 4, 1246, he was successively bishop of Lakabhin and of Aleppo, and was *maphrian*, or primate, of Taghrith and the East from 1264 until his death at Maragha. He was 'one of the most learned and versatile men that Syria ever produced' (Wright). Of his many works, the most celebrated is the *Chronicum Syriacum*, or Universal History. See Assemani's *Bibl. Orientalis* (1719-25); Gibbon's *Decline and Fall*; Badger's *The Nestorians* (1852)—i., p. 97, for epitaph; Renan's *De Philos. Peripat. apud Syros* (1852); Noeldeke's *Sketches from E. Hist.* (1892); Wright's *Syriac Lit.* (1894); and Budge's *Laughable Stories of Bar-Hebraeus* (1896).

Abulfeda (1273-1331), born at Damascus; early achieved distinction in the field (against Crusaders and Mongols) and by his pen. He was sultan of Hamah, but a vassal of the Mameluke sultan of Egypt, from 1310 till his death. Of his many works the most celebrated are: a *Universal History* down to his own day, and a *Geography*. The History has been edited (with Lat. trans.) by Reiske, *Annales Moslemici* (5 vols. 1789-94), and by Fleischer, *Hist. Anteislamica* (1831). The Geography has been edited by Reinaud and De Slane (1840), and trans. into French by Reinaud and Guyard (1848-83).

Abul Ghazi Bahadur (1605-63) gave up the khanate of Khiva in favour of his son, and devoted himself to writing a history of the dynasty of Jenghiz Khan, since translated into German and French (by Desmaisons, 2 vols. 1871-4).

Abulug, tn., prov. Cagaya, Luzon, Philippine Is., in a rich valley. Pop. 5,806.

Aburi, tn., W. Africa, in the British colony of Gold Coast, 20 m. n.e. of Accra; botanical station; sanatorium; alt. 1,400 ft.

Abuse of Distress, a law term applied to the use of a distrained animal or chattel. The user is liable to prosecution for wrongful appropriation.

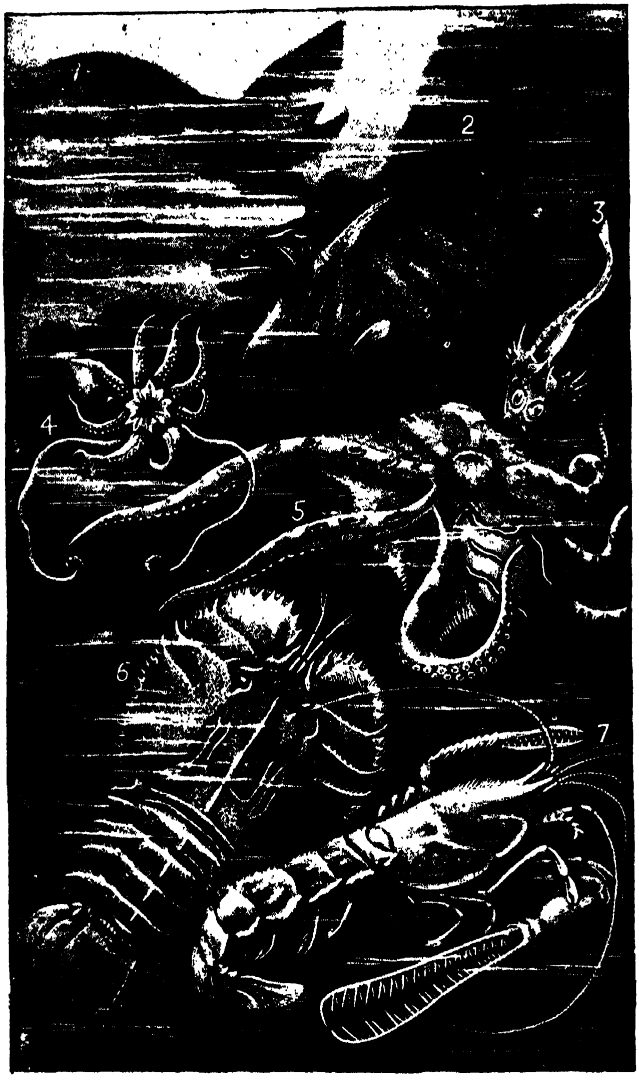
Abuse of Process. Every court of justice has an inherent power to protect itself from the abuse of its own procedure, and to stop an action or to strike out a defence which is frivolous or vexatious (Metropolitan Bank *v.* Pooley, 10 App. Cas. 210, p. 214). Order xxv. rule 4 of the Rules of the Supreme Court extends this inherent power in England by enabling the court to order any pleading to be struck out which discloses no reasonable cause of action or answer (Dodswell *v.* Jacobs, 34 Ch. D. 284). Where any person habitually and persistently institutes legal proceedings without any reasonable grounds, the court has power, on the application of the attorney-general, to make an order under the Vexatious Actions Act, 1896, that no legal proceedings be instituted by that person without the leave of the court. If legal proceedings be taken against any one maliciously and without reasonable cause, he has by the common law a right of action for damages.

Abutilon.

a, Flower, one sepal removed.

Abutilon is a genus of shrubs belonging to the order Malvaceæ. They are easily grown in a light peaty loam. In most parts of

Britain they may be grown out of doors from May to September. Even when grown all the year under glass, it is desirable to give them plenty of root space. Young plants should be propagated for pot work each spring. Take off the tips of growing shoots about four inches long, insert them singly in three-inch pots in light, sandy soil, and put them under a handlight in a warm house or on a hotbed, keeping them shaded from bright sunshine for about a fortnight. Remove them to the greenhouse, and pot in good soil, transferring them from time to time into larger pots.



Types of Deep-Sea or Abyssal Animals.

1. Gastrostomus Bairdii. 2. Chiasmodon niger. 3. Cottus bathybius. 4. Bathyteuthis abyssicola. 5. Octopus pictus. 6. Ibaccus Verdi. 7. Thaumastocheles zalenca. (All half natural scale except No. 1, which is 20 in. long.)

Abyad, or Abiad (Ar.), white, the feminine of which is *baida, beida,* or *beda:* Bahr-el-Abiad, White Nile.

Abydos, ancient city, Upper Egypt, near the modern Arabat-el-Madfuneh, on l. bk. of the Nile. During the 19th dynasty it was a place of great commercial importance; later it declined, and in early Christian times was in ruins. Here was the most famous tomb of Osiris, one of the holiest places of pilgrimage in ancient Egypt; discovered in 1893 by Amélineau. Here also are the tombs of the oldest dynasties of the Egyptian kings; ruins of the temple built by Seti I., and dedicated to a number of deities—called by Strabo the Memnonium; and the fragments of another temple, built by Rameses II. From very early times Abydos was the seat of a famous oracle of the god Bes. See Flinders Petrie's *Royal Tombs of the Earliest Dynasties* (1900-1); Mariette's *Abydos* (1869-80); MacIver and Mace's *El Amrah and Abydos, 1900-1* (1903).

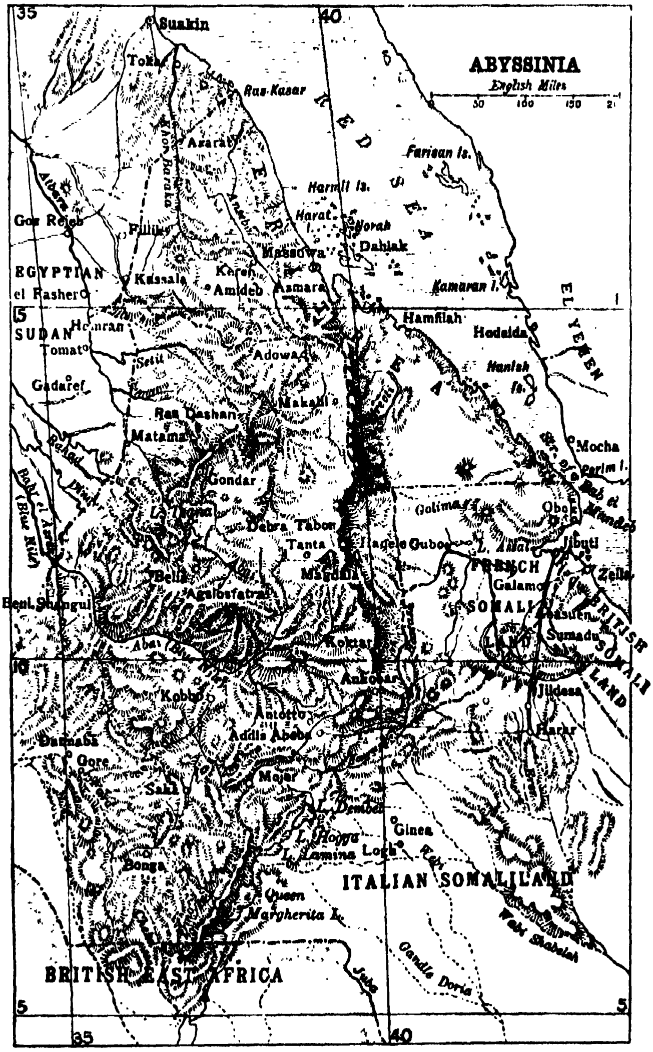
Abydos, ancient tn. near Kale-i-Sultaniye, Asia Minor, on the Hellespont (Dardanelles), here less than one mile wide, opposite to ancient Sestos. Here Xerxes crossed (480 B.C.) by a bridge of boats. Associated with the tradition of Hero and Leander.

Abyla. See Ceuta and Pillars of Hercules.

Abyssal Animals. One of the most interesting discoveries of the last half of the 19th century was the fact that the ocean has an abundant population down to its greatest depths, and is not, as was once supposed, inhabited only in its upper strata and in shallow water. The *Challenger* expedition not only proved that the great abysses of the ocean support an abundant and varied population, but also showed that all the large groups of marine animals are represented there, and that the fauna is not, as was expected by some, of a primitive type. Once the existence of abyssal animals was demonstrated, it was confidently believed that research would show the existence of 'living fossils'—*i.e.* of representatives of the fauna of bygone days. As a matter of fact, although types were discovered, especially among echinoderms, more nearly related to fossil than to existing forms, it is nevertheless true that the striking discoveries made were of much-modified and not of primitive forms. In other words, the deep-sea animals show clear signs of having been derived from shallow-water or surface forms, and they do not shed any light on the origin of life in the sea. Further, as was only to be expected from the great uniformity of the physical conditions, deep-sea animals tend to be widely distributed, the temperature, pressure, and other conditions not being affected by geographical position. At great depths the water is exceedingly cold; the sun's light cannot penetrate; the pressure is enormous; above all, plants, the basal food-supply elsewhere, are here necessarily absent. It follows that the animals must all be carnivorous, and must ultimately depend upon the dead organisms which drop downwards from the surface waters. Again, the striking peculiarities of form are associated with the peculiar conditions under which the animals are found. Many deep-sea animals, especially fishes and crustaceans, are blind, while others have exceptionally large eyes, as though to catch the faint gleams of phosphorescent light. Correlated with the reduction or absence of eyes in abyssal fish, we have a great development of delicate tactile organs, these being often produced by the elongation of some of the fin-rays. Very many abyssal animals possess phosphorescent organs, though it is still uncertain whether the power of emitting light is commoner in deep-sea or in pelagic forms. A very striking characteristic of virtually all abyssal animals is the uniformity of the body colour. Though the colours are very diverse when a collection from one locality is studied, they are very uniform if the individuals themselves be considered. The crustaceans, for example, are often a bright uniform scarlet, a colour which also occurs among the corals. Among fish dark tints are prevalent. In short, the colours of deep-sea animals show no direct relation to their surroundings. Another common peculiarity is the feeble development of the hard parts, the bones of deep-sea fish and the shells of molluscs and crustaceans being deficient in salts of lime. The last volume of the *Challenger* monographs, entitled *Summary of Results*, gives a historical account of deep-sea dredging.

Abyssinia (Amhar. *Habasha* or *Abasa*), or ETHIOPIA (Ethiop. and Amhar. *Ityopya*; Lat. *Æthiopia*), an empire of N.E. Africa. Its precise limits have not been determined, save in the N.E. and E., with Eritrea and Somaliland; according to the terms of the Anglo-Italian protocol (March 24, 1891), the limits assigned on the S. and W. were the Juba, 6° N. lat. and 35° E. long. But in May 1902 the boundary between Abyssinia and (British) Sudan was fixed by treaty, making an irregular western frontier W. of 35° E. long. below lat. 11° N., but trending E. to 36½° E. long. N. of lat. 11° N. Abyssinia proper consists of territories N. of the Abai and the Hawash, to which the remaining territories have been added during the reign of Menelik II.; a probable estimate of the whole empire is 250,000 sq. m., with a population of 8 to 10 millions.

Abyssinia consists chiefly of an elevated irregular table-land, with a general elevation of 6,500 ft., rising in parts to 8,000 and 10,000 ft., and in summits to 15,000 ft. The E. scarp, running S. to Ankober, and thence S.W., and rising abruptly from the low, arid, and hot coast-lands to a height of 8,000 to 10,000 ft., forms a vast retaining wall, along the coping of which are many of the chief towns. The W. scarp is less elevated, but both in the N.W. and S.W. there is a rapid descent of several thousand feet. This *massif* is divided by deep ravines into many subordinate table-lands, above which, as bases, rise several mountain chains and table-mountains. The predominant formations are gneiss and schist, basalt and trachyte; columnar basalt in Lasta, Amhara, and Shoa; limestone and marble in Geralta, Enderta, and Harar; sandstone, chiefly red, in Temben. The determining physical agency has been volcanic. The main slope in the N. is drained by the system of the Nile, to which belong the Atbara, Abai, and Sobat. In the S.E. are the systems of the Webi Shebeli and Juba. The largest lakes are Tsana, Margherita (Abala), and Abaya.



The climate is determined by altitude, according to which a native division recognizes three zones. These are, lowlands below 5,500-6,000 ft., uplands up to 7,500-8,200 ft., and highlands above 7,500-8,200 ft. There are two seasons—the rainy, which lasts from June to September, and the dry. The lowlands are unhealthy, hot, and humid. Their vegetable life is tropical, comprising sugar-cane, cotton, coffee, indigo, aloe, baobab, tamarind, banana, sycamore, fig, tamarisk, and acacia: the total loss of foliage during the dry season is characteristic. To the lands of moderate elevation belong the vine, myrtle, bamboo, oil palm, banana, wheat, teff, dagusa, tobacco, pomegranate, orange, lemon, olive, and peach. In the highlands, which are chiefly pastoral, wheat, barley, and oats are grown up to 12,000 ft., above which the vegetation is alpine. Animal life is represented in the lowlands by the elephant, rhinoceros, hippopotamus, zebra, giraffe, gazelle, and many birds, reptiles, and insects; in the highlands by the buffalo, antelope, lynx, hyæna, lion, and ibex. The minerals comprise iron, gold, coal, saltpetre, sulphur, copper and silver, rock-salt, and numerous mineral springs.

The dominant race is Semitic (Tigré or Agazi in the N. and Amhara in the S.). The Hamitic is the aboriginal race, and is represented in the N. by the Agau and Falasha; in the S. by the Oromo (or Galla), the Sidama, and Gonza; and in the E. by the Afar (or Danakil), Faltal, and Somali. The Negritic are known as Shankela or Shangalle. Others occur sporadically, as the Adone (Bantu), on the Shebeli, and the Wato (or Waito). Pigmies are met with S. of Kaffa and the Oromo, as in the Doko. The Habashi or Makadi slaves, prized in the Moslem East for their good looks and intelligence, are Galla or Sidama. The profession of arms is most esteemed; industry and trade are looked down upon. The court or official language is Amharic, but Geez or Ethiopic is that of the church and literature; Tigrai is the language of the Tigré. The native industries are the weaving of cotton and woollen cloths, and the working of metals and leather. The chief exports are gold, civet, ivory, coffee, wax, and gum-arabic. Camels are used from the coast through the lowlands; mules, horses, ponies, and donkeys in the highlands. A railway (186 m.) has been built from Jibutil to Harar; a connection with Zeila or Berbera is proposed; and the concession comprises the right of prolongation to Adis Abeba and the Nile. The unit of currency is the Maria-Theresa dollar (value about 2s.).

The government is a despotic monarchy, based on a system partly federal but chiefly feudal, and tempered by the power of the clergy. At its head is the emperor, whose full title is Negusa Nagast za-Ityopya, 'King of Kings of Ethiopia.' Next to him come the kings (*negus*) of the subordinate states, and the governors (*ras*) of the chief provinces. These constitute a council of state. There is an appeal to the supreme court at Adis Abeba. The legal code is of Byzantine origin, with additions from the Mosaic code. The army, estimated at 150,000, and well armed with modern weapons, is organized territorially, and consists of a paid standing army, which garrisons the several provinces, and of a militia in local levies. The national religion is Monophysite Christianity, but Judaism is found among the Agau or Falasha; Islam is the faith of the Afar, Somali, and most of the Galla. At the head of the Abyssinian Church is the *abuna* ('our father'), who is a Coptic monk nominated by the patriarch of Alexandria; the head of the monastic orders is the *echage*, who is an Abyssinian. Both of these are celibates, but the priests may marry once. Education is slight; the Psalms of David are chiefly taught. There are many festivals. The civilization of Abyssinia has been long retarded by isolation and anarchy, but there is now a national awakening to the civilized world.

Menelik II., Emperor of Abyssinia.

According to the evidence of speech, the Abyssinians—*i.e.* the dominant Semitic race—are immigrants from S. Arabia, where to this day a cognate dialect quite distinct from Arabic is spoken. The Abyssinian empire dates from the 1st century B.C. or the 1st century A.D., when these colonists founded the kingdom of Aksum, or Axum, on the downfall of the empire of the Ptolemies. The chief events of this period were the introduction of Christianity (*c.* 330) by Frumentius; the introduction of monachism from Egypt (*c.* 480) by the 'nine saints;' the translation of the Bible into Geez; the invasion of Yemen by Kaleb in 522, at the request of the Emperor Justinian, to avenge and protect the Christians of Najran; and the defeat of the Abyssinians at Mecca in 570. After the 7th century the kingdom of Aksum declined, and came to an end about 925, when an insurrection of the Agau or Falasha led to a revolution. Then followed a dynasty, known as the Zague, which held sway till 1270; its most celebrated member was Lalibala (*c.* 1200), who threatened to deprive Egypt of the Atbara flood by diverting it into the Marab, and had the ten rock-hewn churches excavated at the capital of Lasta.

Modern history begins with Yekuno Amlak (1270–85), who had his capital at Taguelat in Shoa, and made Amharic the language of court and state. His successors, to the middle of the 16th century, were occupied in repelling the advance of Islam, which had invaded the lowlands in the 7th century, and by the 14th had become dominant in the S.E. from Zeila to Harar. The Moslem aggression culminated in the reign of Lebna Deugel (1508–40), when the redoubtable Grañ, in a succession of campaigns, gained possession of nearly the whole of Abyssinia. In this extremity aid was sought from Portugal. But the saving of the state (1543) was at the cost of the church, which, along with the dynasty, has been the main cohesive strength of the nation. The Jesuits, who came with the Portuguese, were expelled by Fasilidas (1632–7). Abyssinia suffered heavily from the Galla or Oromo, who, at the end of the 18th century, gained possession of Amhara and the person of the sovereign. Shoa had become independent. Kasa, chief of Kuara, succeeded in making himself master of the whole of Abyssinia between 1852–5, when he was crowned as Theodore II. Neguse, who had seized Tigré during Theodore's campaign against the Galla and Shoa in 1855, and was recognized king of Abyssinia by the French, was taken prisoner and put to death in 1861. After Theodore's death (1868), on the taking of Magdala by Sir Robert Napier, Ras Kasa of Tigré succeeded against his rivals, Gobaze of Lasta and Menelik of Shoa, and was crowned at Aksum (1872) as Johannes, or John. He repelled the aggression of the Khedive by his defeat of the Egyptians at Gura (1876), but was killed in battle with the Mahdists at Galabat (1889), and Menelik II. of Shoa, aided by the Italians, was crowned at Antotto. Having denounced the Uchali treaty of May 2, 1889, he assumed his full sovereign position by the Adis Abeba convention with Italy, Oct. 26, 1896, dealing with Eritrea, after the Italian defeat at Adua, March 1, 1896; and concluded the Anglo-Abyssinian treaty, May 14, 1897. In 1902 the boundaries of Abyssinia, Eritrea, and the Sudan were agreed upon, and a railway line through Abyssinian territory, between the Sudan and Uganda, was authorized by the emperor. See Fumagalli's *Bibliografia Etiopica* (1893), uncritically compiled; and Massaja's *I mici 35 Anni* (1886-93); D'Abbadie's *Géodésie* (1860-73), and *Géographie* (1890); Borelli's *Ethiopie Méridionale* (1890); Sapeto's *Etiopia* (1890); Portal's *My Mission* (1892); Munzenberger's *Abessinia* (1892); Bent's *Sacred City of the Ethiopians* (1893); Gleichen's *With the Mission to Menelik* (1895); Baratieri's *Mémoires d'Afrique* (1897-8); Smith's *Through Unknown African Countries* (1897); Lauribar's *Douze Ans en Abyssinie* (1898); Blundell's 'A Journey through Abyssinia,' *J.R.G.S.* (1900); Vivian's *Abyssinia* (1901); Wylde's *Modern Abyssinia* (1900); Wellby's *'Twixt Sirdar and Menelik* (1901); Hagues le Roux's *Wallaga* (1901).

Acacia, a genus of thorny trees and shrubs (order Leguminosæ, sub-order Mimoseæ), of which 430 species are found in tropical and sub-tropical regions throughout the world, but especially in Australia and Africa. They have small flowers crowded into round or elongated heads; the leaves are bipinnate (doubly-feathered), except in species adapted to desert life, in which the leaf for the most part disappears, its function being performed by a flat and spiny leaf-stalk. Stunted acacias form the scrub ('wattles') of Australia and of the Sudan, where zarebas (enclosures) are formed of them. Most Australian species have no leaflets, but the leaf-stalk becomes flattened into a phyllode, which presents its thin edge to the light, and thus the tree gives little shade. *A. arabica*, or babul tree, much cultivated in India, gives a hard timber; the bark is used in dyeing and tanning; its leaves form an important fodder; and the red babul gum is used as a substitute for true gum-arabic, and is eaten by the natives in times of famine. *A. catechu* yields a resinous extract, catechu, used in medicine as a powerful astringent. *A. Senegal*, growing in W. Africa and India, is valuable for gum-arabic.

Academy, an institution for the cultivation of learning, of letters, or of art. The name has been applied to many and various organizations, such as schools, universities, colleges for instruction in particular arts and sciences, and societies of scholars, literary men, and artists. The present article, however, confines itself exclusively to academies which have for their object the promotion of learning and of letters. The **Platonic Academy** originated in a gymnasium and pleasure garden about one mile north of Athens, called after the hero Academus, and presented by Cimon to the Athenian public. It was frequented by Plato and his disciples for nearly fifty years; and the successive 'schools' which developed the doctrine after his death (348 B.C.) derived the name *Academies* from the place where their common master taught. The first or 'old' Academy (347-270 B.C.), which was led by Speusippus, Xenocrates, Polemon, Cantor, and Crates successively, was Pythagorean in tendency. Cicero calls it 'the workshop of every artist,' and says that the teaching of its followers comprised all liberal learning, all history, and polite discourse. The second or 'middle' Academy (316-241 B.C.), founded by Arcesilaus, insisted on the sceptical element in the Platonic teaching; and this method was further developed by the third or 'new' Academy (214-129 B.C.), led by Carneades, who denied all knowledge of reality, and set up the doctrine of probability as a practical guide in life. Some distinguish a fourth Academy, of Philo of Larissa, and a fifth, of Antiochus, both of whom were teachers of Cicero; these later schools were more dogmatic in method. Although not bearing the name of Academy, the school of learning which had its centre at the museum in Alexandria (300 B.C.-500 A.D.) was essentially an institution of the same kind. Charlemagne's Palatine Academy, founded before the year 800, was devoted to the study of mathematics, history, and letters; and the University of Oxford had its origin in the Academy of Alfred the Great in that city. But the revival of letters gave rise to the Academy in its modern form. The Accademia della Crusca, founded in Florence in 1582, had as its object the purification of the Italian language, and for that purpose it published, in 1612, the *Vocabulario della Crusca*. The most illustrious of all academies is the Institut de France, founded at Paris in 1795 'for the encouragement of science and of methods of research, by the publication of discoveries, by correspondence with other learned societies, and by the preparation of scientific works.' The Institute comprises five academies, and has a common fund and library for all, though each academy is autonomous. The annual public session of the Institute is held on October 25 (see Alfred Potiques' *L'Institut national de France*, 1871). The Académie Française, most famous of the five, originated (1630) as the informal weekly meetings of a few literary friends, in the house of Valentin Conrart. Assemblies of any kind were illegal at that time, and the members were pledged to secrecy; but the fame of the society soon reached Richelieu, who offered his patronage and incorporation by letters patent (1635). The Academy then formulated its rules and objects, of which the chief were 'to labour with all care and diligence to give certain rules to the language, to render it pure, eloquent, and capable of treating the arts and sciences.' By another of its articles, the Academy undertook to compose a dictionary, a grammar, and treatises on rhetoric and poetry. The sessions of the forty members began in 1637. The dictionary, edited by De Vaugelas, was first published in 1694; 7th ed. 1878. The *Dictionnaire historique de la Langue Française*, of which the first volume was published in 1858, has reached its fourth volume. The Academy has included almost all the most important French writers. After a member has been elected by ballot, the sanction of the government is obtained to his election, when he becomes entitled to his chair for life, with a salary of £60. The nature of the Academy's influence has been much debated. It has probably hindered originality to some extent, but many critics agree with Renan, Sainte-Beuve, and Matthew Arnold that to its labours we owe the exquisite simplicity of the language. See Mesnard's *Histoire de l'Académie Française* (1859); also Pellisson's *Histoire de l'Académie*, ed. Charles Livet; Rouxel's *Chronique des Elections à l'Académie Française* (1888); Matthew Arnold's *Essays in Criticism* (1st Series, Essay 2): 'The Literary Influence of Academies.' In 1663 four members of the *Académie Française* were entrusted by Colbert with the editing of the legends on public monuments, and with the preparation of devices and inscriptions for medals; and this commission, increased to a membership of forty, was incorporated by De Pontchartrain as the *Académie des Inscriptions et Médailles* (1706). The name was changed to Académie des Inscriptions et Belles Lettres (1716), and it became a section of the *Institut de France*. Its members are distinguished for their researches in history, archæology, and classical literature. Among its works are *Histoire Littéraire de la France*; *Recueil des Historiens de France*; *Corpus Inscriptionum Semiticarum*. See Desjardin's *Comptes Rendus des Séances* (1858). The Académie des Sciences, founded by Colbert in 1666, became a class of the Institute in 1795. It is divided into eleven sections, each with six members, and has two permanent secretaries. Publications: *Mémoires*, and *Comptes Rendus Hebdomadaires des Séances*. See Maindron's *L'Académie des*

Sciences (1887). The ACADÉMIE DES BEAUX-ARTS originated as an academy of painting and sculpture, which received definite form from Mazarin in 1655, and was united with the Academy of Architecture in 1795, as the fourth section of the Institute. It received its present name in 1819. Four volumes of the *Dictionnaire de l'Académie des Beaux-arts* have already appeared. The ACADÉMIE DES SCIENCES MORALES ET POLITIQUES (fifth class of the Institute), was founded in 1832. It publishes *Mémoires* (beginning 1835), and *Séances et Travaux* (beginning 1842). See Aucoc's *L'Institut de France: Lois, Statuts et Réglements* (1889). France possesses about thirty other academies in the principal provincial towns, the most important of which are the academies of Lyons (1700), Marseilles (1726), and Toulouse (1782).

ROYAL BRITISH ACADEMY.—From time to time efforts have been made to found a British Academy on the model of the French, but it was not until June 28, 1901, that the British Academy was founded, having for its object the promotion of the study of moral and political science, including history, philosophy, law, politics and economics, archæology and philology. A royal charter was granted by the King in August 1902, and the Academy started with a total of forty-nine members. The maximum number of ordinary members is not to exceed one hundred. The Academy embraces four divisions:—(1) History and Archæology - president, Mr. Bryce; (2) Philology—president, Sir R. C. Jebb; (3) Philosophy—president, Dr. Edward Caird; (4) Jurisprudence and Economics—president, Sir C. P. Ilbert. General president, Lord Reay.

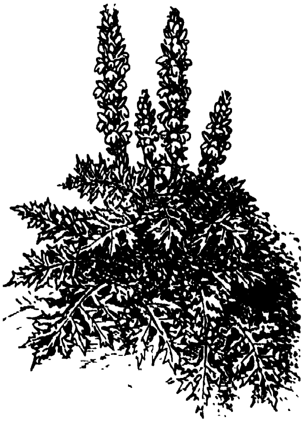
The oldest academy in Germany was the AKADEMIE DER WISSENSCHAFTEN, founded in Berlin in 1700 by Frederick I., on the plan suggested by Leibniz, who was its first president. Although opened in 1711, its real organization dates from 1812. It is divided into four sections. The number of active members is about fifty. It has published *Abhandlungen* since 1811. Other important German academies are the Academy of Sciences at Munich, founded in 1759, and the Association of Sciences at Göttingen, founded in 1742. In Holland there are the Royal Academy of Sciences at Leyden, the oldest in the country; another at Haarlem, founded in 1752; and another at Amsterdam (1852). Each of these publishes *Verhandelingen*. The Royal Academy of Sciences at Vienna, founded in 1847, is divided into two sections—philosophical and scientific. It contains sixty active members. Besides *Memoirs*, it has published many valuable books, chiefly connected with the history of Austria. The oldest academy of the empire is the Bohemian Society of Sciences in Prague, founded in 1769, and incorporated by charter in 1785. The Hungarian Academy was founded at Budapest in 1825. Belgium has the *Académie Royale des Sciences* at Brussels, founded in 1773, and divided into three sections—science, literature, and arts. In Italy, in addition to the *Accademia della Crusca* at Florence, which is still of great importance, there are the Milan Academy, removed there in 1820 from Bologna (it is styled the *Instituto Lombardo di Scienze*, and has published *Memorie* since 1820), and the Academy of Sciences (formerly *Accademia dei Lincei* at Rome, originally founded in 1603, revived 1870). In Portugal—the *Academia Real das Sciencas*, divided into three sections; founded in 1779, and reorganized in 1851. It publishes *Memorias*. In Roumania the *Academia Română* in Bucharest, founded in 1866, and divided into three sections. It publishes *Annale*, and has begun the issue of a *Dictionary* of the Roumanian language. In Russia—the Imperial Academy of Sciences at St. Petersburg, founded in 1725 by the Empress Catherine I. Its chief merit has been the promotion of the study of Oriental languages and customs. It possesses a rich and valuable collection of manuscripts, a large library, museum, etc. Its publications are issued under the general title of *Mémoires*. In Spain—the *Real Academia Española* at Madrid, founded by Philip V. in 1713; it has published *Memorias* since 1793. In Sweden—the Royal Academy of Sciences (*Svenska Vetenskapsakademien*) in Stockholm, founded in 1741. It is divided into seven classes, and numbers ninety members. In 1893 it began the publication of a national *Dictionary* of Swedish. There is an academy at Upsala (1719), which has published *Acta* since 1740. In Norway—the *Videnskabs Selskab* at Christiania, founded in 1859, and the *Norske Videnskabers Selskab* at Trondhjem, founded in 1760. In Denmark—the Royal Academy of Sciences at Copenhagen, founded in 1743.

In the United States there are many academies. Amongst the oldest is the American Academy of Arts and Sciences in Boston, founded in 1780; its aim is to cultivate any science or art which contributes to the utility, honour, fame, and well-being of a free, independent people. The American Philosophical Society at Philadelphia (since 1780), founded by Franklin. The Columbian Institute at Washington (since 1821), under the presidency of the President of the United States. The National Academy of Sciences, founded at Washington in 1856 as a national institute.

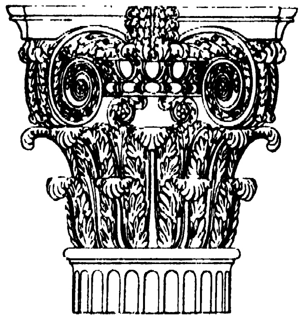
In Asia the most important academy is the Asiatic Society at Calcutta, founded in 1784, which publishes the very valuable *Asiatic Researches*. See ROYAL SOCIETIES; also *Minerva*, an admirable annual guide, in German, to all universities, museums, libraries, and societies; and *Official Yearbook of the Scientific and Learned Societies of Great Britain and Ireland*.

Academy (THE ROYAL) OF ART, London, was founded in 1768, with Sir Joshua Reynolds as its first president. It consists of forty members, about thirty associates, and a few foreign honorary members. An annual exhibition of painting, sculpture, etc., is held in Burlington House, Piccadilly, lasting from May till July. In connection with the Royal Academy are the schools which give instruction in art to students who pass the entrance examination (held on 1st January and 1st July of each year). Nine academicians, who take the duty in rotation, are selected to supervise the teaching. There are many prizes, the chief being the gold medals and travelling studentships of £200 each for historical painting, sculpture, and architecture, and the Turner gold medal and scholarship of £50 for landscape, all tenable for two years. See Coningham's *Royal Academy of Arts: Abstract of Constitution and Laws of the Royal Academy of Arts* (1850); *Laws Relating to Schools, the Library, and the Students* (1850).

Academy, THE. This journal was started in 1869 as 'a monthly record of literature, learning, science, and art.' Two years later it was converted into a fortnightly paper, and in 1874 it first appeared as a weekly, at the price of sixpence. Its first editor and proprietor was Charles Appleton, who, to give greater authority and sincerity to the judgments expressed in it, introduced the practice of signed criticism. In the first number articles appeared above the signatures of Matthew Arnold, Sidney Colvin, Professor Huxley, John Lubbock (now Lord Avebury), Mark Pattison, and John Conington. After the death of Appleton in 1879 the influence of the *Academy* somewhat waned; but in 1896 the property was acquired by Mr. John Morgan Richards, when, under the editorship of Mr. Lewis Hind, a new stimulus was given to its career. The *Academy* undertook the responsibility of 'crowning,' in accordance with the suffrages of its readers, the authors of the works of greatest literary merit during the year; and another new departure was made in the publication of a series of portraits of English men of letters. In 1897 the laurels of the *Academy* were awarded to Mr. Stephen Phillips and the late Mr. W. E. Henley, and in 1898 to Mr. Sidney Lee, Mr. Maurice Hewlett, and Mr. Joseph Conrad. The title of the paper was changed to *The Academy and Literature* in 1900, when the *Times* ceased the publication of *Literature*. In 1903 Mr. Teignmouth Shore succeeded Mr. Hind as editor.



Acanthus.



Composite Capital, with Acanthus Ornament.

Acadia, or ACADIE, name given to Nova Scotia by the early French settlers. The name was changed to Nova Scotia in 1621. After the treaty of Utrecht many of the French settlers emigrated (1755) to Louisiana, Georgia, etc., or were forcibly settled in the New England States. Longfellow's *Evangeline* is based on incidents in this expulsion. The social life of Acadie is described in the novels of G. W. Cable—*e.g. Bonaventure.*

Acajete, tn., Puebla, Mexico, between the volcanoes of Popocatepetl and Orizaba. Pop. 6,500.

Acajutla, port of Sonsonate (12½ m.), Salvador, Central America, 50 m. s.w. of San Salvador.

Acalephæ (Gr. 'a nettle'), an obsolete term variously applied to the Cœlentera.

Acambaro, tn., extreme S. of Guanajuato, Mexico; lat. 20° N. Pop. 6,000.

Acanthus, or BEAR'S-BREECH, a genus of tall, herbaceous plants of the order Acanthaceæ, with large, thorny-toothed leaves; mostly weeds, but some are cultivated for their foliage. It has no indigenous representative in Britain. It occupies a position between the foxglove and dead-nettle orders. The leaves of *Acanthus spinosus* are supposed to have suggested the acanthus of architecture. See Day's *Nature in Ornament*, p. 35.

A cappella, or ALLA CAPPELLA, a musical term implying that a composition is to be sung as ecclesiastical music. Frequently it means that the voices are unaccompanied, or accompanied only by an instrument (usually the organ) played in unison with the voices.

Acapulco, port in Guerrero, Mexico, on the Pacific, 230 m. s.s.w. of city of Mexico; one of the best harbours in the country. Exports hides, cedar, and fruits. Climate hot and unhealthy; subject to earthquakes. Pop. 6,000.

Acaraçu, tn., Ceara, Brazil, at mouth of river of same name. Pop. 13,000.

Acarina, an order of arachnids, including mites and ticks, which are usually parasitic for a part at least of their life, but sometimes live freely on organic débris. The body is unsegmented, and consists of fused cephalo-thorax and abdomen. See MITES and TICKS.

Acarnania, dist., N.W. Greece; with Ætolia it forms the prov. (nomarchy) of Acarnania and Ætolia, stretching N. from Gulf of Patras. Area, 3,034 sq. m. Pop. (1896) 170,565, or 56·6 to the sq. m. In ancient times its inhabitants were behind the Greeks in civilization; they lived mostly in villages, not in towns, kept up the practice of bearing arms in their daily life, and subsisted largely by piracy. *Map, p. 36.*

Acarus, or DEMODEX FOLLICULORUM, a minute parasitic mite which infests the hair follicles and sebaceous glands in man. It is very common, and is of no practical importance. The size varies from one-fiftieth to one-hundredth of an inch, and, as in mites in general, four pairs of legs are present, which are here rudimentary.

Acatalectic Measures, metres which do not allow of the excision of an unaccented syllable at the beginning or the end of the line. See CATALECTIC.

Accad. See AKKAD.

Accelerando (Ital.), a musical term indicating that the *tempo* is to be gradually increased.

Acceleration, the rate at which the velocity of a moving body changes. That of a falling body, due to gravity, is indicated by *g*, and amounts to a little over 32 ft. per second. If s be the number of seconds during which a body falls, then $s^2 \times 16\frac{1}{12}$ ft. is the distance through which it passes. See KINEMATICS; KINETICS.

Accent. (**1.**) A grammatical sign used to distinguish the varying sounds of the same vowel. They are three in number—*viz.* grave (`), acute (´), and circumflex (^), as exhibited in the French words *père*, *été*, *tête*.

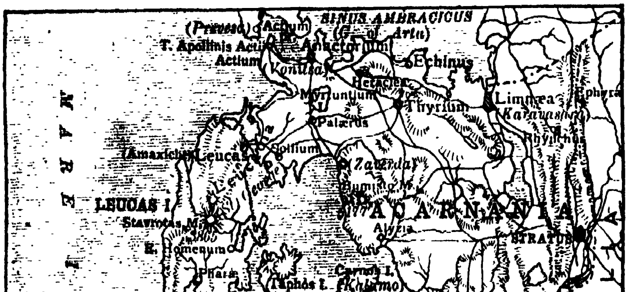
(**2.**) The stress laid in pronunciation upon one syllable of a word, corresponding with *emphasis*, the stress laid in elocution upon a word or words in a phrase. In Old English the first syllable of simple words bore the accent, and the inflectional parts remained unaccented, as now—*e.g. lóve, lóvable, lóveliness.* Again, nouns compounded with a prefix threw the accent back on the prefix; but verbs similarly compounded retained their former accent. Thus in modern English we say *óutcome* (noun), but *outdó* (verb). This principle was extended to words borrowed from other languages, and hence we have such pairs as *áccent* (noun) and *accént* (verb), *éxpert* (noun) and *expért* (verbal participle). Words taken from other languages generally conform to the same principles as native Teutonic words—*i.e.* they throw the accent as far back as possible towards the beginning of the word. Thus we no longer say *aventúre* or *soláce*, as was still possible even at the beginning of Elizabeth's reign. Nevertheless there are words of native origin which have run counter to this rule: *almighty* and *misdeed* were originally accented on the first syllable. Most English words have only one accent, but in the case of long words, like *dissimulátion*, we may also have a secondary accent—in this case on the second syllable. This secondary accent is scarcely perceptible in ordinary speech, but is of considerable importance for metrical purposes. The English habit of gliding quickly over the unaccented syllables of a word has given us some of our most curious derivations, such as 'proxy,' from French *procuracie*, and 'alms,' from Greek *eleemosyne.* For accent in its metrical aspect, see under VERSE. See Sweet's *English Sounds;* Kellner and Bradley's edition of Morris's *English Accidence*, ch. ix.

(**3.**) In music, accent is the regular recurrence of stress or emphasis upon certain notes, always (unless syncopated) upon the first note of a bar; while a slighter accent falls on the third note of a bar in common time, or the fourth in a bar of $\frac{6}{8}$ time.

Acceptance. See BILL OF EXCHANGE.

Acceptilation, a term in Scots and civil law—remission of a debt without receiving full payment.

Accession, DEED OF, in Scots law, is a deed by the creditors of a bankrupt or insolvent debtor, by which they approve of a trust executed by the debtor for the general behoof, and bind themselves to concur in the arrangement of his affairs proposed.



Acarnania.

Accession of Property. In Lat. *accessio* meant an increase or addition to something already ours. Hence in Roman law it came to mean the mode of acquiring property by the natural or artificial increase, addition to, or improvement of things already ours. Thus the owner of land became entitled to plants and trees growing upon it, and to the increase or addition to it arising from accretion and alluvion; and the offspring of animals belonged to the owner of the mother. When the increase, addition, or improvement was artificial, as by the addition to our property of the property or work of others (houses built on our land, or embroidery worked on our cloth), the owner of the principal thing became entitled to what was accessory to it, subject generally to the payment of compensation, and subject also to certain exceptions. For example, when the result of expending work upon another's goods was the production of a new thing, the rule was reversed, so that when a man made wine from another's grapes, he kept the wine and paid for the grapes; again, when an artist painted a picture on the tablet of another, he kept the picture and paid for the tablet. (See Sandars's *Institutes of Justinian*, p. 98; Hunter's *Roman Law*, p. 53.) The English and Scots law on this question substantially follows the Roman. See Blackstone; Stephen's *Commentaries; Broom's Legal Maxims;* and Bell's *Dictionary;* also FIXTURES and AGRICULTURAL HOLDINGS ACT.

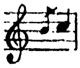
Accession of Sovereign. See CROWN.

Accessories, the paraphernalia, other than the shield, of a heraldic achievement—*viz.* the helm, wreath, crest, cap, crown, mantling, badge, scroll, etc.

Accessory. An accessory *before the fact* is a person who, either himself or by a third person, instigates another to commit a felony which is committed as the natural and probable consequence of his instigation. An accessory *after the fact* is a person who, knowing that a felony has been committed, takes active steps to shelter the felon from justice or enable him to escape. The law of Scotland does not recognize accession after the fact. See 24 & 25 Vict. c. 94; Stephen's *Digest of Crim. Law*, art. 40 *ff.;* Russell, *On Crimes*, p. 169 *ff.;* Bell's *Dictionary*.

Acci, a Latin name of Cadiz, alternating with Gades in bibliography.

Acciaccatura, a 'grace-note' played as close as possible before the note which it accompanies, the latter retaining its accent.



Acciajuoli, DONATO (1428-78), Italian historian, philosopher, and statesman, gonfalonier of Florence (1473). Wrote *Lives* of Hannibal, Scipio, and Charlemagne, and Commentaries on Aristotle.

Accidence, that part of grammar which deals with inflections, or changes in the form of words produced by the declension of nouns and adjectives or the conjugation of verbs; while syntax deals with the arrangement of words in a sentence.

Accident. (**1.**) In law. See EMPLOYERS' LIABILITY. (**2.**) In logic, accident signifies a predicate which neither is contained in nor can be inferred from the definition of its subject—*e.g.* the predicate *black* as applied to the subject *crow*. If all crows without exception were black, blackness would be an 'inseparable accident' of the subject *crow*, but otherwise it is a 'separable accident.' See also SUBSTANCE.

Accidentals, signs in musical score which raise (sharp ♯, double sharp 𝄪) or lower (flat ♭, double flat 𝄫) the notes beside which they are placed to the extent of one or two semitones, or revoke previous sharps or flats (natural ♮). They affect only the bar in which they occur.

Accident Insurance. See INSURANCE.

Acclimatization. All organisms display what is known as periodicity in regard to the main phenomena of life, especially those of growth and reproduction. This periodicity is directly conditioned by the physical environment, especially by what are known as the climatic factors, such as temperature, moisture, light. Any sudden alteration of these environmental conditions destroys the necessary harmony between organism and its surroundings, and tends to the destruction of the organism. On the other hand, organisms are as capable of physiological as of morphological variation; and if the climatic conditions change slowly, they can adjust themselves to these, and become acclimatized. This acclimatization has been very extensively practised by man, as in the case of domestic animals, but it also occurs without his aid. There is some doubt as to the effect of a mere change of temperature upon organisms, but it seems certain that in the majority of cases transference from an equable climate to one in which there is a great annual range of temperature is rapidly fatal. Thus, many plants from S. Europe will live out of doors in the mild uniform climate of the west coast of Britain, but will not live in localities on the Continent where the mean annual temperature is the same, but where the extremes of heat and cold are greater. Similarly, many marine organisms are very widely distributed in both warm and cold seas, apparently because in both cases the range of temperature is small, and the power of adaptation to a new but constant temperature is readily acquired.

In general, the plants and animals which are most readily acclimatized to new conditions are those in which the reproductive period is prolonged. Such forms often show an enormous increase of fertility when transferred to a new and more favourable climate. The rabbit, which has become a pest in Australia and New Zealand, is an illustration of this; but as in the parallel cases of the English sparrow in America, and white clover, together with many other British plants, in New Zealand, the extraordinary abundance of the introduced form is in part to be ascribed to the absence in the new country of the natural checks to increase present in the original home. The abnormal increase of the rabbit in Australia is sometimes given as a proof that the marsupial fauna of that island-continent could not have persisted if isolation had not saved it from the competition of the higher mammals; but such facts as the extraordinary spread of Canadian water-weed (*Anacharis*) through the British Isles, shows that even in countries in which the struggle for existence has been keen, vacant places in nature may still remain which can be seized by a dominant foreign species. It is said that the reign of this species in Britain is likely to be brief, and in many similar cases it is possible that the native species may ultimately recover their lost ground, and oust the intruder. Thus, it is interesting to note that American zoologists have found that European earthworms have become naturalized in many parts of the United States, and are often much more abundant than the native species. They ascribe this in part to the fact that the European species have a long breeding season, and the American a very short one. One would suspect, however, that the latter is a form of periodicity conditioned by the climate, and that ultimately it may be found to be a more perfect adaptation than the European condition.

Associated with the fact of the frequent great fertility of an introduced species is the fact that a parasitic or semi-parasitic form often inflicts far greater injury on its host in a new country than in the old. Thus, the vine phylloxera, introduced into Europe from America, has worked fearful havoc in vineyards in the former continent, while it produced relatively little injury in its native habitat. A study of the American Agricultural Bureau's publications will similarly show that insects, relatively harmless in Europe, have almost paralyzed agriculture when introduced into the States. Again, a great obstacle to the colonization of various parts of the world by the white man is his liability to parasitic disease, to which the natives are almost or entirely immune. Malaria—a disease due to the introduction of a protozoon parasite into the blood by the mosquito—has hitherto been a great obstacle to the spread of the white races over many parts of the globe. On the other hand, the advent of the white man has often resulted in the sweeping away of native races, owing to the introduction of micro-organisms to whose action the white is at least partially immune, while the native races are singularly susceptible to it—*e.g.* measles introduced into Fiji in 1875. These facts show that organisms are adapted to their surroundings, not only by their structure, but also by functional peculiarities which are equally real, but from their nature are incapable of exact description. These functional peculiarities are hereditary, but in the case of dominant stocks, at least, are capable of slow, cumulative modification, so that the descendants may ultimately become habituated to surroundings which would have been at once fatal to the original stock. Acclimatization is thus a proof of the occurrence of physiological variation in organisms. Darwin's *Animals and Plants under Domestication* (1868) is the great storehouse of information on the subject. See also Hann's *Handbuch der Klimatologie* (1897).

Accolade. (1.) The ceremony by which knighthood is conferred; formerly an embrace round the neck, now the touch of a sword on the shoulder. (2.) In musical score, the brace connecting the staves.

Accommodation, a term used in Biblical exegesis to denote the modification of absolute truth to assist its acceptance, either by a *formal* change of method—*e.g.* in parables—or by a *material* perversion of the truth to suit contemporary modes of thinking.

Accommodation Bill. See BILL OF EXCHANGE.

Accommodation of Vision, the muscular adaptations of the eye to focus objects at various distances, and in varying degrees of light and darkness.

Accommodation Works are works such as bridges, fences, etc., required to be executed by a railway company in order to enable the owners or occupiers of land affected by the railway to make a convenient use of their land. Railway Clauses Consolidation Act, 1845, 8 & 9 Vict. c. 20, s. 68.

Accompaniment, a musical term designating the subordinate instrumental parts which accompany the principal voice or instrument, as the pianoforte part in a song, or the orchestral part in a concert. It has every degree of importance and complexity, from that of a simple 'background' which is quite unessential to the leading melody, and may even be omitted (*ad libitum*), to that of an organic part of the composition having a large share in the development of the melodic scheme.

Accomplice, the general name applied to any person who is associated with another in committing, or attempting to commit, any criminal offence. The evidence of an accomplice is admissible; but as he is generally an interested and always an infamous witness, his evidence is scarcely ever acted upon without corroboration, although there is no exact rule of law to that effect. See Stephen's *Dig. Crim. Law*; Taylor, *On Evidence*, p. 830; also KING'S EVIDENCE and APPROVER.

Accord and Satisfaction, a special defence to a civil action in England. The defendant pleads that he has agreed with the plaintiff that something shall be paid or done in satisfaction of the cause of action, and that what has been agreed upon has been paid or done. See Bullen and Leake's *Pleadings*.

Accordion, a portable musical instrument, with keyboard and mechanical contrivance for wind, invented by Damian at Vienna in 1829. Each key gives two notes, one in expanding, the other in compressing the bellows. The right hand manipulates the keyboard, while the left works the bellows, on the lower side of which are usually found two keys which furnish a simple harmony, generally of the tonic and dominant. The instrument is of no artistic value.

Account. See BOOKKEEPING and STOCK EXCHANGE. The law with regard to accounts is as follows:—In England actions for an account are assigned to the Chancery Division of the High Court, and an account may be claimed when there is a fiduciary relation, or mutual accounts, between the parties, or where circumstances of great complexity make it equitable that an account should be taken. Even if an account is not claimed, the court may at any stage of the proceedings direct any necessary accounts to be taken. In Scotland an account will be taken in most similar cases in an action of count, reckoning, and payment. In English law a stated account is an admission of a sum of money being due by the defendant to the plaintiff. It may be oral, or in writing, or implied from letters, conversations, or circumstances. It is a good cause of action, but not conclusive, as the defendant may plead mistake, want of consideration, etc. A final statement in writing of the position of accounts between two parties, agreed to by both as correct, is called a settled account. It is a serious offence in bankruptcy if the bankrupt has failed to keep such books of accounts as are usual in his business. Corporations, public companies, friendly and other statutory societies, executors and administrators, and officers appointed by the courts, are all bound to keep accounts, and are generally subject to statutory provisions as to audit, inspection, and submission of abstracts or copies to government departments, public officers, or courts of law. See also FALSIFICATION OF ACCOUNTS and PRESCRIPTION.

Accountant, a person skilled in the keeping of books of account and in financial matters generally. Insurance offices, banks, railway companies, and large mercantile firms employ an official called the accountant, whose duties include oversight of the bookkeepers' and cashiers' work, preparation of statements, balance-sheets, profit and loss accounts, etc. As a profession accountancy includes much more than this, and an accountant is usually a member of one of the chartered societies or institutes. Among these may be mentioned the Institute of Chartered Accountants in England and Wales (1870 and 1880); the Society of Accountants and Auditors (1885); Society of Accountants in Edinburgh (1854); the Institute of Accountants and Auditors, Glasgow (1855); and the Institute of Chartered Accountants in Ireland (1888). There are also similar bodies in Aberdeen, and in the colonies and abroad. The work of an accountant involves great responsibility, and necessitates not only a thorough knowledge of bookkeeping and accounts, but also of mercantile, bankruptcy, and other branches of law, and of the methods of conducting different businesses. As auditor, he is called upon to certify to the correctness of the accounts of firms, companies, trustees, cities, boroughs, etc. He reports upon the financial status of businesses in view of amalgamation, or upon their solvency or insolvency. He is frequently called upon to act as trustee in bankruptcies, sequestrations, liquidations, trust deeds for the benefit of creditors, private trusts, executories, curatories, judicial factories, etc.; and his expert knowledge is sought in such matters as apportionment of funds, partnerships, capital and revenue expenditure, limited company work, etc. (See AUDITOR.)

To enter the profession it is necessary to become an indentured apprentice for five years to a qualified accountant, to whom a premium (returned in salary) is usually paid. During this period the preliminary, intermediate, and final examinations are taken, and if successfully passed, the society grants a certificate of professional qualification.

The preliminary or general knowledge examination includes papers in arithmetic, algebra, Euclid, dictation, grammar, composition, history, geography, and Latin, French, or German. The intermediate examination includes bookkeeping and accounts, general commercial knowledge, partnership and executorship accounts, law, duties of liquidators, receivers, and trustees, etc.; and the final examination comprises a more extended knowledge of the same subjects, with auditing, and arbitration, executorship, partnership, bankruptcy, mercantile law, and joint-stock company practice. Much of the training required is gained during the years of office apprenticeship, and opportunities are usually given for attendance at university law classes.

For further information consult the published transactions of the Chart. Accts. Students' Society of London, 10 Coleman Street, E.C.; the Incorp. Accts. Students' Society of London, 4 King Street, Cheapside, E.C.; the C.A. Students' Society of Edinburgh, and others; *The Accountant*, *The Accountants' Journal*, *The Accountants' Magazine*, Lisle's *Accounting in Theory and Practice*, Whatley's *Accountants' and Bookkeepers' Vade Mecum*, Pixley's *The Profession of a Chartered Accountant*, Dawson's *Accountant's Compendium*, Dicksee's *Manual on Auditing;* Power's *Complete Accountant*, and Keister's *Corporation Accounting and Auditing* (the two last are American publications).

Accountant-general, the title of two officers, one of the Court of Chancery, and the other of the Court of Exchequer. The offices were both abolished in 1872, their duties being transferred to the paymaster-general.

Accountant of Court, an officer of the Court of Session appointed under the Judicial Factors (Scotland) Act, 1889. He took over the duties of the accountant in bankruptcy abolished by that act, and has also the duties of supervising factors (with certain exceptions), supervising the investments and auditing the accounts of trustees, acting as custodian of consignations under the Court of Session's Consignation Act, 1895, and settling questions as to commissions and accounting referred to him by private parties.

Accountant Officers (NAVAL) enter between the ages of sixteen and eighteen, and are subject to a competitive examination held by the Civil Service Commissioners. Application should be made to the secretary of the First Lord of the Admiralty. From assistant-clerk a candidate may be promoted to be clerk. When twenty-one, he is examined for promotion to the rank of paymaster. As assistant-paymaster he is often appointed to the accountant charge of smaller vessels, or, in larger ships, he may act under the paymaster. After service in this rank for about eleven years, he is eligible for the ranks of paymaster, staff paymaster, and ultimately fleet paymaster. Six years' service in each of these ranks is necessary for promotion, which is by seniority. The maximum retired pay for a fleet paymaster is £450 per annum. Retirement is optional at fifty-five, compulsory at sixty. The duties comprise the management of the squadron's accounts relative to pay, clothing, victualling, stores, and generally the rendering of such returns on behalf of the flag-officer or admiral as are required by the regulations. The paymaster is the modern representative of the purser, who, in old days, like the chaplain and surgeon, was a warrant officer only. He now, like other officers of wardroom rank, holds H.M.'s commission.

Account Current, a periodical statement of the debit and credit transactions between parties, in order of date; usually made up in such a form as to show the interest charged or allowed on each item at the date of rendering.

Account Sales, a statement sent by an agent or a broker to the consignor of goods when sold, giving particulars of weight, price obtained, etc., and showing the net proceeds after deduction of expenses.

Accra, seapt., W. Africa, cap. of British colony of Gold Coast. A railway, 180 m. long, connects it with Kumasi. Exports gold dust, gum, palm oil, ivory, timber, and rubber. Pop. 15,000.

Accrescimento, in music, the prolongation of a note for another half of its value, by a dot placed after it.

Accretion. (1.) Of Land. Land formed by alluvial deposit so gradual as to be imperceptible in its progress is accretion. It belongs to the owner of the adjacent soil, even as against the crown. The leading case is R. *v.* Lord Yarborough, King's Bench, 1824, House of Lords, 1828. For actual instances of accretion, see Fens; Po. (2.) Of Title. A man cannot grant a better title than he himself has; but if he makes a grant, and afterwards obtains a title, or a better title than he had, this passes to the grantee by accretion, and validates his title to the subject-matter of the original grant. The maxim is, *Jus superveniens auctori accrescit successori.* The leading cases are Doe Christmas *v.* Oliver, K.B., 1829, and Swan *v.* The Western Bank of Scotland, Court of Session, 1866.

Accrington (anc. *Akerington*), a munic. bor. and mrkt. tn., Lancashire, 23 m. N. of Manchester. Cotton-spinning, weaving, calico-printing, and manufacture of textile machinery. In the district are coal mines and quarries. Accrington returns one member to Parliament. Pop. (1901) 43,095.

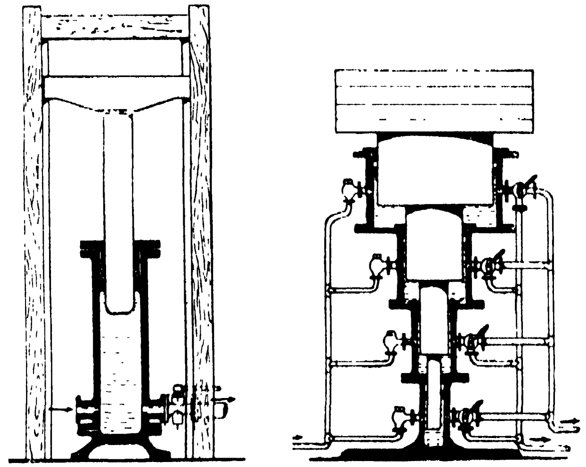
Accumulation. Till the Thellusson Act, 1800, the income of property might by will or deed be directed to be accumulated for any period for which the property itself might legally be tied up and the power of alienation suspended—*i.e.* a life or lives in being and twenty-one years more. Since that act (39 & 40 Geo. III. c. 98) an accumulation of income can only be directed (1) during the life of the settlor and twenty-one years after: or (2) during the minority of a person or persons living at the death of the settlor; or (3) during the minority or respective minorities of a person or persons who, if of full age, would have been absolutely entitled under the settlement. Accumulations contrary to the act go to the person who would have been entitled if such accumulation had not been directed. The act does not apply to a provision for payment of debts or for raising portions for children of the settlor, or of persons taking an interest under the settlement, or to a direction as to the produce of timber or wood upon any lands or tenements. The act did not at first extend to dispositions of heritable property in Scotland, but it has done so since August 14, 1848 (11 & 12 Vict. c. 38, s. 41).

Accumulator, Hydraulic, devised by Lord Armstrong, receives power at a constant rate from the hydraulic pump, and gives it out in large quantities at a time to machines, such as cranes, which work intermittently. It is thus a means of obtaining an artificial head of water. It consists of a vertical cylinder with a heavily-weighted ram, which will give a pressure of about 700 lbs. per sq. in. The inflow and outflow pipes are both at the bottom of the cylinder. When the piston reaches its highest point it automatically stops the pump, and any superfluous water escapes at the top of the cylinder.

In the differential accumulator, various pressures may be obtained as required by changing the area of the piston surface, or by using one of the several different pistons.

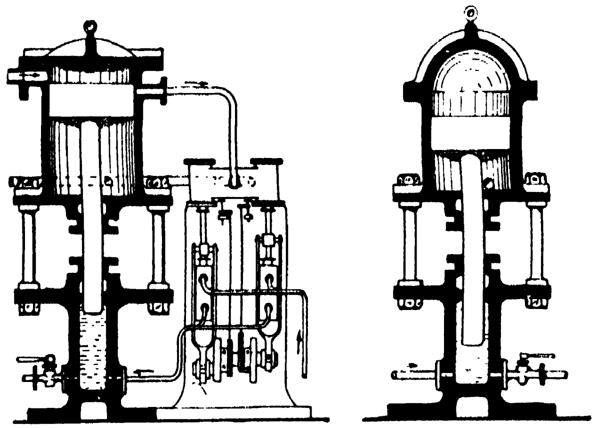
The steam accumulator (A. Betts Brown) consists of a steam cylinder, the piston-rod of which forms the ram of a hydraulic cylinder. Owing to the difference in area of the steam piston and the water ram, a pressure of 50 lbs. on the former may give 750 on the latter.

In the air accumulator (Armstrong), the ram works against compressed air in a chamber, instead of against weights. The pressure within the chamber is from 50 to 100 atmospheres, and this is multiplied, as in the steam accumulator, to a pressure fifteen times as great on the water. See Robinson's *Hydraulic Power and Hydraulic Machinery*; and Hydraulic Machinery.



Hydraulic Accumulator. (Armstrong.)

Differential Accumulator.

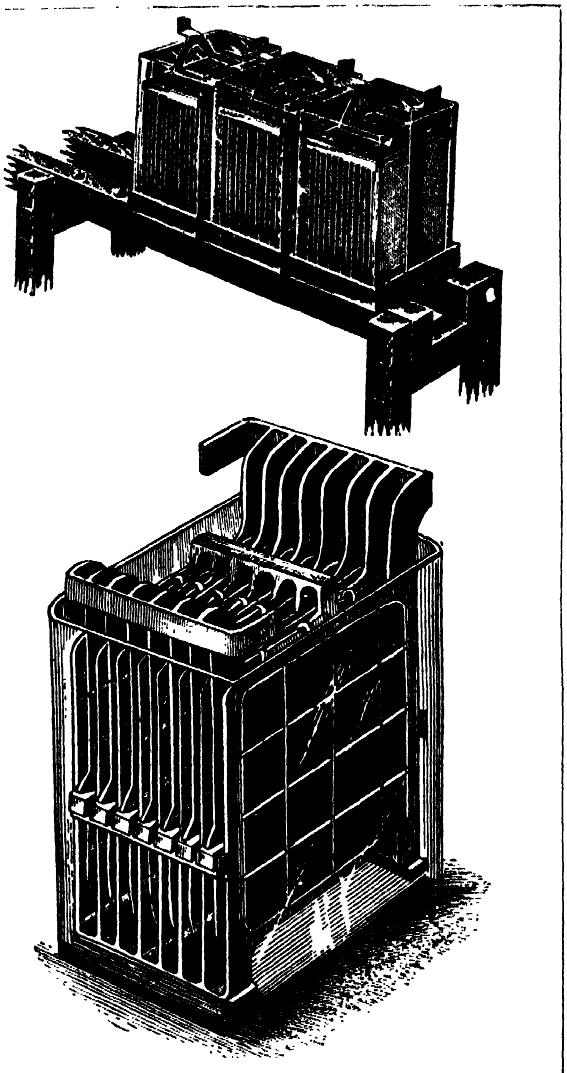


Steam Accumulator. (A. Betts Brown.)

Air Accumulator. (Armstrong.)

Hydraulic Accumulators.

Accumulators, Electric, or Secondary Batteries. When an electric battery is discharged, there occur chemical changes in the liquids and electrodes, caused by the passage of the current through the cell. In some forms of cell all the products of the charge remain in the cell, and the passage of a current in the reverse direction will produce the reverse action and restore the original conditions. Broadly speaking, the current causes a transference of oxygen to one pole and hydrogen to the other, both being brought back to their previous positions and combinations by the reverse current. Such a battery acts as a reservoir or accumulator of electric energy; for, after each discharge, electric energy is again stored in it by driving a reverse current through it from some other source of electric energy. In the process of charging, the electric pressure of the cell must be overcome, and the resistance of the cell absorbs additional pressure. On discharging, there is likewise a loss of pressure, due to the resistance of the cell, and the pressure when discharging is therefore materially lower than when charging (Figs. 1 and 2). The quantity of chemical action taking place is proportional to the quantity of electricity passing in either direction; and in a perfect cell, with no irregular actions, the same quantity of electricity can be derived as is put in; but in practice this is not completely realized, though under favourable conditions the loss is not more than some five per cent.



Electric Accumulator—Battery and Cell.

Theory of Cell.—Though many forms of battery allow of reversal, there are few which are satisfactory. The simple collection of oxygen and hydrogen at the poles is impracticable, since they pass off as gases, and the only battery that has proved satisfactory is the lead battery invented by Planté. In this a plate of pure lead forms the negative and a plate of peroxide of lead the positive electrode, immersed in sulphuric acid and water. On discharging, the lead is converted into sulphate of lead, and the hydrogen conveyed to the positive plate is oxidized by the peroxide of lead. The lower oxide thus formed is attacked by the acid, so that sulphate of lead is produced on both plates, and a part of the acid is removed from the liquid. On reversing the current hydrogen is carried to the negative plate, and reduces the sulphate of lead back to metallic lead, while the oxygen converts the sulphate on the positive plate to peroxide, and the sulphate in both cases returns to the liquid as sulphuric acid.

Discharge: $PbO_2 + H_2 + H_2SO_4 + Pb + O + H_2SO_4 = PbSO_4 + 2H_2O + H_2O + PbSO_4$.

Charge:—$PbSO_4 + O + H_2O + PbSO_4 + H_2 = PbO_2 + H_2SO_4 + H_2SO_4 + Pb$.

The acid becomes continually weaker as the discharge proceeds, and its strength indicates the state of the reservoir.

The action of the cell is similar to that of an ordinary primary battery, but there are important differences. By the use of lead instead of zinc there is formed the insoluble lead sulphate in place of the soluble zinc sulphate or chloride. Therefore the surface becomes covered with the products of the action on both electrodes, and the interior parts of the plates are rendered useless. Consequently both negative and positive plates are constructed of porous, spongy material, presenting an enormous surface to the acid, and solid metal is used only as a framework or carrier. So long as any portion of unchanged material remains in contact with the acid, the E.M.F. is maintained with very gradual reduction. Fig. 2 shows a typical curve of discharge in which horizontal distances represent ampère hours. The cell is practically discharged at 1·8 volts. On charging Fig. 1, the E.M.F. rises rapidly to nearly 2·1 volts, then more slowly to 2·5 volts.

Construction of Plates.—The essential construction is a framework of lead, or an alloy of lead and antimony, containing spongy material. Many forms of grid are in use. The negative plate is now usually a thin skeleton of lead forming many small pockets, into which is pressed a paste of lead oxide and sulphuric acid. On reduction by the current, this forms a porous mass of lead. The frame of the positive plate is made more stoutly, since the oxygen produced at the end of every charge corrodes the frame slowly. It may be made by filling pockets or grooves with paste as before, which are then converted into peroxide; or this may be produced directly by repeated charging, assisted by oxidizing materials, such as sodium nitrate.

Capacity.—The capacity of a cell is determined by the quantity of electricity it will deliver, usually reckoned in ampère hours. It depends on the construction and size of the plates; but instead of using very large plates, several of each kind may be used, with positive and negative placed alternately. All of one kind are connected to a common bar, which forms the terminal of the cell. The capacity is not a constant quantity, for with a large current the acid in the pores of the plate is so rapidly weakened that fresh acid from outside cannot diffuse into the plate sufficiently quickly. Hence the interior portions are not fully discharged, unless the cell is given a period of rest.

Arrangement of Cell.—The alternate positive and negative plates are held about half an inch apart by strips of glass or ebonite, and the whole is clamped together to prevent deformation of the plates. The space allows any loosened material to fall clear to the bottom, and in a large battery some three inches of space are left below the plates for its reception. The acid is 'brimstone' acid, free from metals, with a density of 1·2, or one volume of strong acid to five of water. If too strong, the lead is slowly attacked; while if too weak, the E.M.F. of the cell is reduced. At this strength also the resistance of the acid is at a minimum. The plates are usually contained in glass boxes when the size is moderate, but for large central-station cells lead-lined wooden boxes, or boxes of a lead alloy, are used. Ebonite boxes are employed for motor-car cells on account of lightness, while small portable batteries are generally put in lead-lined wood or ebonite with wooden case. The boxes are supported on glass or porcelain feet, to insulate them from the ground, and these should be wiped clean periodically.

Method of Charging.—It is usual to charge the cells with a definite current depending on the size of the cells; and if this current is exceeded at the end of the charge, the rapid evolution of gas tends to dislodge portions of the active material, especially on the positive plate, and these portions are lost. But rapid charging at the commencement produces no ill effects, and is often adopted to save time; while a reduction of current towards the end favours the complete conversion of the interior parts without great evolution of gas. Too rapid charging and discharging are apt to produce buckling of the plates, since the processes cause a change of bulk of the material, and more separators are required to prevent this.

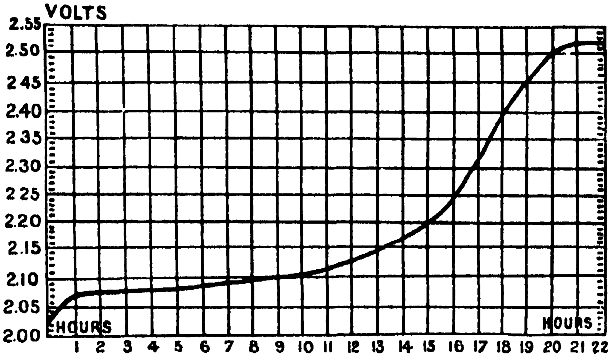


FIG. 1.—CHARGING.

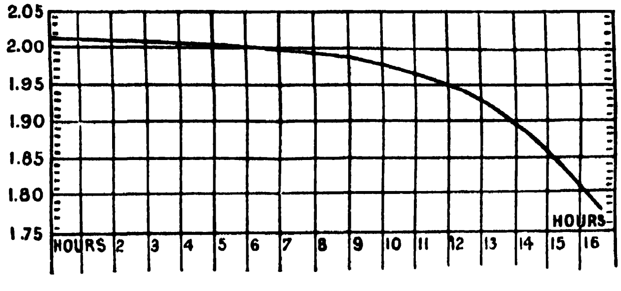


FIG. 2.—DISCHARGING.

The efficiency of the cell, or the relation between energy taken out and energy put in, depends on the care bestowed on the cells. In central stations, with frequent small discharges and charges, it may reach 80 per cent., but 70 per cent. is more usual; while in motor cars 55 or 60 per cent. is not uncommon, a high current and overcharging being the cause of the low efficiency.

Care of Cells.—Batteries deteriorate but little if they are not discharged to the full extent, and are charged immediately after discharge. But if allowed to stand for some time after a discharge, the plates are rapidly attacked by the acid, with the formation of white sulphate of lead. This is difficult to convert, and the material thus 'sulphated' is apt to split off and be lost. The life may be anything from six months to ten years, according to treatment. Frequent exhaustion, heavy currents, and leaving uncharged shorten the life. When worn out, new plates can be inserted at about half the cost of the original battery.

The water slowly evaporates, and distilled or rain water is added as soon as the tops of the plates emerge. Hard water produces a skin on the plates. Fresh acid is rarely needed. If a cell shows a loss of E.M.F., it is probably due to a piece of active material bridging across between the plates and allowing a leakage of current. A slip of wood passed between the plates is the remedy, and a long charge. It will be found that when gas is evolved from the cells a fine mist of acid rises, and the room must be well ventilated. Also all metal and woodwork should be kept well painted, to prevent corrosion.

Sets of Cells.—Batteries are usually required for a system of constant E.M.F., and the number of cells in series is given by E.M.F. of system ÷ 1·85. Thus the full

E.M.F. can be maintained to the end of the discharge. But as the fully-charged cell gives 2·1 volts nearly, a regulating switch is provided, by means of which one or more cells can be cut off when the battery is full, and reinserted one by one as the discharge proceeds.

Accumulators are largely used in electric lighting and traction as reservoirs of power (see ELECTRICAL SUPPLY); also for driving motor cars and tramcars, and for many purposes where their small size, low resistance, and constancy of E.M.F. render them more convenient than primary batteries.

In the above, the lead plate and acid cell alone has been dealt with, since this is the only successful type. Recently, however, Mr. Edison has designed a cell in which finely-divided iron forms the negative plate, and nickel peroxide the positive. The materials are mixed with plumbago, and packed into pockets in a frame of nickel steel. A solution of caustic potash is used, and the action is an oxidation of the iron and partial deoxidation of the nickel peroxide. The E.M.F. on discharge is only about 1·4 volts, and the efficiency is about 60 per cent., but the durability appears to be superior to that of the lead cell. See Wade's *Secondary Batteries*, Niblett's *Storage Batteries*, Treadwell's *Storage Batteries*, and Slingo and Brooker's *Electrical Engineering*.

Aceldama (Aram. 'the field of blood'), so named either because it was bought with the money with which Judas had been bribed (Matt. 27 : 7, 8), or because it was the scene of the traitor's tragic death (Acts 1 : 18, 19). It is traditionally identified with Hakked-Dumm, near the Pool of Siloam, to the S. of Jerusalem.

Acephalous, a rhetorical term applied, in scanning verse, to a line that is short of a syllable at the beginning. Thus, 'A sea that is stranger than death' would be called 'anapæstic trimeter acephalous,' because the first foot is an incomplete anapæst.

Acer, ACERACEÆ. See MAPLE.

Acernus, SEBASTIAN FABIAN (1551-1608), the Latinized name of a Polish poet (Klonowicz), surnamed the Sarmatian Ovid. He wrote *Victoria Deorum*, a satire on the Polish nobility; the epic poem *Flis;* a Latin eulogium of Red Russia in *Roxolania;* etc.

Acerra (anc. *Acerræ*), tn. and episc. see, prov. Caserta, Italy, 9 m. N.E. of Naples; has sulphur springs, and a cathedral rebuilt in 1788 after an earthquake. Pop. (1901) 16,397.

Acetabulum (Lat. *acetum*, 'vinegar'), an ancient Roman sauce-vessel; thence an ancient liquid measure, about half a gill. The word is applied in anatomy to the cup-shaped articular surface of the innominate bone which receives the head of the femur, also to other cuplike structures in animals and fungi.

Acetamide ($CH_3CO.NH_2$) is a white crystalline solid prepared by the action of ethyl acetate on ammonia. It is easily soluble in water, and when heated with acids or alkalis is converted into ammonia and acetic acid, or their salts.

Acetanilide. See ANTIFEBRIN.

Acetic Acid ($CH_3CO.OH$) is formed by the oxidation of alcohol, and is thus present in vinegar. It is chiefly prepared by the destructive distillation of wood (hence called 'pyroligneous acid'), and is purified from the other obtained products by neutralization with lime and subsequent distillation of resulting calcium acetate with sulphuric acid. Acetic acid is a colourless liquid which solidifies, when pure, into a crystalline solid known as 'glacial acetic acid.' It has a sharp smell, and is not itself inflammable, though its vapour burns with a blue flame. It is very stable, and acts as a monobasic acid, forming a series of salts called acetates, chief among which are those of calcium, sodium, lead, iron, and aluminium. These are obtained by dissolving the metallic oxide, hydroxide, or carbonate in the acid. They are soluble in water, and decomposed by heat, giving, as a rule, acetone and a carbonate. From this property calcium acetate is largely used as a source of acetone; and from the ease with which the acetates of aluminium, iron, etc., are decomposed by water-vapour into insoluble hydroxides and acetic acid, these bodies are extensively employed as mordants in dyeing. Basic acetate of copper, or verdigris, and aceto-arsenite of copper, or Schweinfurth's green, are used as pigments, lead acetate for the preparation of chrome yellow, and the alkaline acetates to a small extent in medicine. Acetic acid itself is used as a solvent for gelatin, albumin, resins, oils, etc., for the preparation of the acetates, and in medicine both externally and internally. The strong acid is used externally as a caustic, and its vapour is inhaled as a form of smelling-salts; the very dilute acid is sponged over the body as a refrigerant in fevers. Internally it has the common action of acids, acting as an escharotic, irritant, or stimulant in the mouth or stomach.

Acetic Ether (ethyl acetate, $CH_3CO.O.C_2H_5$, prepared by the action of sodium acetate and sulphuric acid on alcohol) is a colourless liquid with a refreshing, penetrating smell. It is used in medicine and in the adulteration (to improve the flavour) of wine.

Acetifier, an apparatus for hastening the process of acetification, or turning fermented liquors into vinegar, the method consisting essentially in the exposure of a large surface of the liquor to the action of oxygen in the presence of a minute organism, *Mycoderma aceti*, which lives upon the albuminoids, etc., of the liquid. A common form of acetifier is a large vat, into which the liquor is allowed to enter in small quantities at the top, and then trickle down through layers of shavings, to which air is admitted through holes in the sides of the vat.

Acetone (dimethyl ketone, $CH_3CO.CH_3$) is the simplest of the class of substances called ketones. It is present in the products of the destructive distillation of wood, but is mainly prepared by heating calcium acetate. Acetone is a colourless, volatile liquid with a peculiar empyreumatic odour. It mixes with water and alcohol, and acts as a useful solvent; it is used in this respect in the preparation of cordite.

Acetophenone (phenyl-methyl-ketone, $C_6H_5CO.CH_3$) is a solid which crystallizes in large plates, has the odour of the oil of bitter almonds, and is used in medicine in small doses to induce sleep.

Acetyl (CH_3CO) is a univalent radical of which acetic acid, acetyl chloride, etc., are derivatives, the former being the hydroxide, and the latter the chloride.

Acetylene (C_2H_2) is a colourless poisonous gas having a faint odour of garlic. Discovered by Berthelot (1862), it was first brought into commercial use by Willson's discovery (1888) of the modern method of preparing calcium carbide, and is now widely used as an illuminant. It occurs in small quantities in coal gas, and to a greater extent in oil gas. Acetylene can be obtained by forming an arc between carbon poles in an atmosphere of hydrogen, or by the imperfect combustion of coal gas, but is usually prepared by bringing water into contact with calcium carbide, which is a crystalline substance obtained by strongly heating a mixture of lime and powdered coke in the electric furnace. Carbide is now manufactured on a large scale in America and Europe, chiefly by means of water-power—*e.g.* Niagara Falls, Falls of Foyers, Sarpsborg—and is supplied to consumers in air-tight drums. No more than 2 lbs. may be stored in Britain without an annual license (5s.). It must be kept hermetically sealed from the atmosphere, because it rapidly takes up moisture, thus deteriorating in quality and liberating the gas. Theoretically, 1 lb. of carbide yields 5·8 cub. ft. of gas, but the commercial substance rarely yields more than 5 cub. ft. The specific gravity of acetylene is about twice that of coal gas. The presence of impurities, especially compounds of phosphorus and sulphur, often gives it a very powerful and unpleasant odour, which is erroneously ascribed to the gas itself. It is liable to spontaneous explosion when compressed into the liquid state, and it is now illegal to manufacture or keep it in this form. At a pressure of 100 inches of water, or less, it is officially regarded as safe. In contact with copper, acetylene forms a dangerous detonating compound; its action on wet bleaching-powder, sometimes used as a purifying medium, has led to explosions; and its general chemical reactions have not been fully investigated. The gas is prepared in generators, in which water and carbide are brought together in various ways. The best form is that in which the carbide is thrown into an excess of water, for when water is dropped upon carbide intense heat is generated, and the gas is partly transformed into oily compounds, which condense in the pipes. From the generator the gas should be led into a separate gas-holder, large enough to contain a supply for twenty-four hours, and weighted to give a pressure of 3 inches of water; thence through a purifier, in which the gas is exposed to a large surface of dry bleaching-powder, or is passed through sulphuric acid to the main pipes. Taps must be well ground in and lubricated with vaseline, as the gas corrodes brass work. Special burners, by which two jets of flame are thrown against each other, are used. The flame is intensely white. When examined by the spectroscope it is found to resemble sunlight more nearly than any other artificial illuminant. By the use of suitably tinted globes it is possible to produce a light which gives the true colours of objects; but the naked acetylene flame, though better in this respect than lamp, coal gas, or electric light, still confuses some blues and greens. Its extreme whiteness makes the light somewhat trying to the eyes. Acetylene has been used successfully for bicycle lamps, dock lights, and military searchlights, and for church and domestic illumination in country places. The burners ordinarily used in house-lighting, consuming ·7 cub. ft. per hour, give from 16 to 20 candles. The cost of lighting by acetylene is about the same as lighting by coal gas at 5s. per 1,000 ft. The gas is sometimes added to coal gas and oil gas to increase their luminosity; and it is an expensive but powerful heating agent for gas motors and bunsen burners. See Lewes's *Acetylene* (1900).

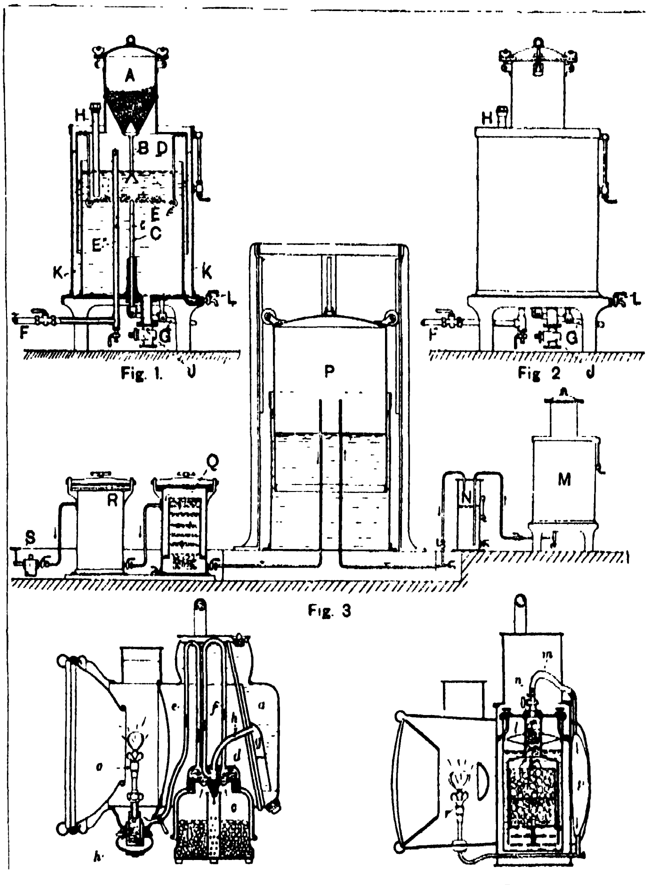


Fig. 1. Fig 2 Fig. 3 Fig 4. Fig 5.

Acetylene.

Figs. 1 and 2, *Generator.*—A, hopper with carbide of calcium; B, valve; C, rod, allowing valve to open when gas is reduced in collector D; E, grid beneath water; G, lever to adjust point of opening and closing of valve; F, pipe for gas; H, pipe for adding water; J, cock to drain generator; K, water-seal; L, cock.

Fig. 3, *Lighting Plant.*—M, generator; N, washer; P, gas holder: Q, purifier, with layers of bleaching-powder, or earth treated with chromic acid; R, dryer, with layers of chloride of calcium; S, pressure governor; T, main.

Fig. 4, *Motor Lamp, "Ducellier" Pattern (French).*—Water in tank (*a*) drips in carbide of calcium (*c*); gas passes through horse-hair filters (*d* and *h*) by burner pipe (*e*) to burner (*o*). Extra pressure of gas acts through pipes *e*, *f*, and *h* on the water surface in trap *g*, forcing it below pipe *h*, and stopping supply.

Fig. 5, *Motor Lamp, "Salisbury" Pattern (English).*—Prepared carbide of calcium in cage or diving-bell (*k*), with neck filled with gas filter of small pieces between layers of cotton wool. This is now placed in water tank (*l*), and rubber tube (*m*) coupled to cock (*n*). As the water rises in *k*, gas passes through (*m*) to rubber gas bag (*p*), which steadies supply to burner (*r*). Excess of gas forces the water below the level of the unused carbide.

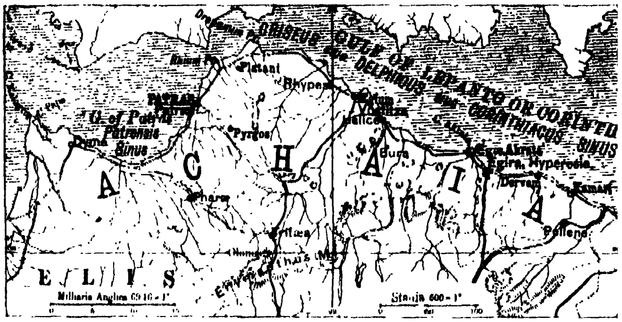
Achæi, or ACHÆANS, a name applied by Homer to the whole of the Greek nation, and so used also by later poets. It probably represents the population of Greece before the admixture of races caused by the Dorian invasion. In historical times the name is restricted to the inhabitants of the north coast of the Peloponnesus (Achaia), who were united in a league of twelve towns, which after 251 B.C. became the chief power of Greece. Its constitution was to some extent based on representation. Finally the league declared war against the Romans, and was crushed by them in 146 B.C.

Achæmenians, a dynasty of ancient Persia; it occupied the throne from about 730 B.C. to 333 B.C., and counted among its kings Cyrus the Great, Cambyses, and Darius the Great. In old Persian inscriptions Darius proudly traces his lineage back to Achæmenes, the founder of the line.

Achaia. (**1.**) With Elis, prov. (nomarchy) of Greece, extending from E. to W. along S. side of G. of Corinth; mountainous; coast low; chief currant-producing region of mainland. Area, 2,028 sq. m. Pop. (1896) 236,251. Chief tn. and port, Patras. (**2.**) In New Testament times the S. prov. of Greece, the N. being Macedonia. Gallio was Roman 'deputy' or proconsul of Achaia (Acts 18: 12).

Achamoth, or ACAMOTH, the Gnostic name for a lower or imperfect manifestation of Wisdom; the form in which spirit becomes subservient to matter, and is thus the basis of the material world.

Achar, used by Hindu philosophers to signify the all-in-all, the source of all matter, and the ultimate end to which matter will return—matter and all its phenomena being merely sensible manifestations of Achar.



Achaia.

Achard, FRANZ KARL (1753-1821), chemist, the first to manufacture sugar from beetroot (in 1801, at Kunern, in Silesia). See his *Europäische Zuckerfabrikation Runkelrüben* (2nd ed. 1812).

Acharnians, THE (from *Acharnai*, the chief tnship. of Attica, lying N. of Athens), a comedy of Aristophanes, produced, B.C. 426, to support the aristocratic or peace party against the democratic or war party in Athens.

Achates, or in full *fidus Achates*, the faithful bosom friend of Æneas in Virgil's epic.

Aché. (**1.**) COUNT D' (c. 1700-75), a French vice-admiral who lost to the British the French possessions on the Malabar and Coromandel coasts of India (1757). (**2.**) ROBERT FRANÇOIS, VICOMTE D'ACHÉ (1757-1809), son of the above, during the French revolution was a leader of the royalist Chouans of Brittany. He escaped to England, returned to France in 1809, and fell in the Chouan insurrection of that year.

Achelous (modern name, ASPROPOTAMO), largest river of anc. Greece, rises in Mt. Pindus, flows S., and, dividing Ætolia and Acarnania, falls into the Ionian Sea opposite the Echinades Is., after a course of about 130 m.

Achenbach, ANDREAS (1815), German painter of the Düsseldorf school, a leader of the realistic movement in German landscape painting—especially sea pieces. Typical works: *Foundering of the S.S. 'President'* (1842); *Hardanger Fjord* (1843); *Pontine Marshes* (1846); *Fish Market in Ostend* (1866); *Flooding of Lower Rhine* (1876).

Achenbach, HEINRICH VON (1829-99), German statesman; professor of law in Bonn University. As under-secretary of state to the Minister for Ecclesiastical Affairs, he defended Bismarck's May Laws in the Reichstag (1872); from 1873 to 1878 Minister for Commerce, Industry, and Public Works; and after his retirement president of W. Prussia, and afterwards of Brandenburg.

Achenbach, OSWALD (1827), a German landscape painter, chiefly of Italian scenes; brother of Andreas. From 1866 to 1872 he taught landscape painting at the Düsseldorf Academy.

Achensee, or L. ACHEN, 20 m. N.E. of Innsbruck, Tyrol, Austria. Alt. 3,050 ft., measures 5 m. by ½ m., and is surrounded by mountains 5,000 to 6,000 ft. high.

Achenwall, GOTTFRIED (1719-72), most important statistician of the 18th century; born at Elbing; lecturer in Marburg (1746); professor of philosophy at Göttingen (1748), and professor of law there later; first formulated the treatment of statistics as a distinct science in *Abriss der neuesten Staatswissenschaft der vornehmsten europäischen Reiche und Republiken* (1749).

Achernar = α Eridani, a white star of 0·5 photometric magnitude, showing a spectrum intermediate between the Sirian and solar types. Its large southern declination of nearly 58° renders it permanently invisible in Europe. The small parallax of 0·043″, determined for Achernar by Sir David Gill, corresponds to a light-journey of seventy-six years, and implies that the star exceeds three hundred times the lustre of our sun.

Acheron, riv., Epirus, and another in Bruttium, S. Italy; more famous as one of the five rivers of the lower world.

Acherusia, name given to several lakes, swamps, and caverns which were supposed by the Greeks to communicate with the lower world—*e.g.* one near Cumæ, in Italy, now the Lake of Fusaro.

Acheval Position, a position taken up by an army on both banks of a river.

Achievement, or HATCHMENT, in heraldry the shield and accessories fully represented; in a restricted sense, a representation of those of a deceased person, exhibited at his obsequies, and framed in black.

Achillas, Greek general and minister of Ptolemy Dionysius, king of Egypt. With L. Septimius he murdered Pompey (48 B.C.), and was assassinated by Ganymede, instigated by Arsinoë, sister of Ptolemy (47 B.C.).

Achillea, MILFOIL or YARROW, hardy plants, two to four feet high, with yellow, white, or pink flowers, widely naturalized in Europe and Asia. There are many species, all easily cultivated, and spreading very freely—some, of alpine habit (*A. tomentosa, rupestris, aizoon*), suitable for rock gardens; others (*A. ptarmica, eupatorium*) for borders. It is highly astringent.

Achilles, son of Peleus and Thetis, the great hero of the Trojan war on the Greek side. His fate, as foretold by his mother, was either a short and glorious or a long and uneventful life. He chose the former lot, and led his followers, the Myrmidons, to Troy. There he was the special terror of the Trojans, until Agamemnon, the chief leader of the Greeks, wronged him by seizing Briseis, a beautiful maiden, who was his prize. He refused to fight, until the death of Patroclus, his bosom friend, at the hands of Hector, aroused him. Thetis brought him special armour from Hephæstus, the god of craftsmanship. He slew Hector and other Trojan champions, but fell himself before Troy was taken, wounded in his heel—his only vulnerable point, so legend says—by Paris. The story of his quarrel with Agamemnon is the main subject of Homer's *Iliad*. Achilles is there depicted as the type of Greek early manhood. In the *Odyssey* he is one of the heroes in the under world visited by Odysseus, and is also one of the characters in Shakespeare's *Troilus and Cressida*.

Achilles, a British first-class cruiser launched in 1863, and classed 'non-effective' in 1901. This ship-name was introduced into the navy in 1744, and is associated with the capture of the *St. Florentine* (1759) and the battle of Trafalgar (1805).

Achilles Tatius. See TATIUS.

Achilles Tendon. See TENDON OF ACHILLES.

Achillini. (1.) ALESSANDRO (1463-1512?), philosopher and physician; born at Bologna; taught at Padua and Bologna; one of the first to dissect the human subject. Achillini was a staunch disciple of Aristotle. The best among his philosophical works (*Opera Omnia*, 1545 and 1568) is *De Intelligentiis*. (2.) GIOVANNI FILOTEO (1466-1538), poet; brother of the above; born at Bologna; wrote *Il Viridario* (1513), *Il Fedele* (1523), and *Annotazioni della Lingua Volgare* (1536).

Achill Island, co. Mayo, Ireland, separated from mainland by Achill Sound (¼ m. wide), which is crossed by a bridge. It is rocky, with precipitous coasts (2,000 ft.); has important fisheries, numerous cromlechs, etc., and the massive stone fort of Dun Ængus. Area, 36,283 ac. Pop. 4,647.

Achish, probably a general title borne by certain rulers of the Philistines, but applied specifically to the king of Gath who sheltered David when he fled from Saul (1 Sam. 21:10 *f.*). A second Achish was contemporary with Solomon (1 Kings 2:39).

Achmet. See AHMED.

Achondroplasia, imperfect development of cartilage, with resulting stunting of bones; a disease of the embryo, in which the bones fail to develop, leading to excessive shortness of limbs and other deformities. When fully grown the patient is only three or four feet high. Dwarfs of this kind are seen in Egyptian sculptures and mediæval paintings. Porak's *De l'Achondroplasie* (1890); Thomson's *Clin. Exam. of Sick Children.*

Achores, pustules on the scalp. See PORRIGO.

Achray, a loch (1¼ m. by ¾ m.) in the basin of the Teith, S.W. Perthshire, 7½ m. w. by s. of Callander, midway between Lochs Katrine and Vennachar. Its beauties have been described by Scott, Coleridge, and Dorothy Wordsworth.

Achroite, a mineral, a variety of tourmaline found in Elba.

Achromatic Lens, a compound lens made of glasses of different refractive indices, such that it refracts light without splitting it into its spectroscopic elements. It thus obviates chromatic aberration. Invented in 1773; perfected by Abbe of Jena. See ABERRATION; DISPERSION; LENS.

Achromatin (Gr. 'not coloured'), those elements in the nucleus of a cell which, when the cell is stained by reagents, do not become so deeply coloured as the chromatin. See CELL.

Achromatopsia. See COLOUR-BLINDNESS.

Achsah, daughter of Caleb. She was promised in marriage to whosoever would take Debir. Othniel accomplished the task, and received her hand (Josh. 15:16-19).

Achtkarspelen ('eight chapels'), comm., Friesland, Netherlands. Pop. (1899) 11,658.

Achtschelling, LUCAS (1616-1707), Flemish landscape painter, pupil of Louis de Wadder, and an ardent student of nature. Many of his pictures are in the churches of Brussels and the museum of Vienna.

Acids, in chemistry a class of substances which often have a sour taste and the 'acid reaction'—*i.e.* they change the colour of litmus from blue to red. Most acids possess both properties. All acids contain hydrogen, which is replaced by metals with the formation of salts. Some acids contain one atom of replaceable hydrogen in the molecule, others two, others three and more: these are called monobasic, dibasic, tribasic acids respectively, and so on. Salts are also formed from acids by neutralizing with basic oxides, hydroxides, or carbonates. Organic acids, except a few derived from cyanogen, such as hydrocyanic acid, contain the group CO.OH, which is called carboxyl; monobasic organic acids have one such group in the molecule, dibasic organic acids two such groups, etc. All acids, inorganic and organic, are soluble in water, in which they are more or less dissociated into ions—the hydrogen ion common to all acids, and an ion peculiar to each acid. Thus the common hydrochloric acid is dissociated in aqueous solution into hydrogen ions, each with its positive charge of electricity, and chlorine ions, each with its negative charge of electricity; similarly, sulphuric acid is dissociated into hydrogen ions and HSO_4 ions, and on further dilution the latter gives hydrogen ions and SO_4 ions. Acetic acid, to take an example of an organic acid, gives hydrogen ions and $CH_3CO.O$ ions. An acid is strong in proportion as it becomes dissociated. The amount dissociated can be determined from the electrical conductivity of the solution. The relative 'strengths' of acids can be determined in other ways: thus, by observing the amount of heat evolved when equivalent quantities of various acids neutralized an equivalent quantity of a base, Thomsen compared their strengths or 'avidities.' For example, hydrochloric acid has the avidity 100, nitric acid 100, sulphuric acid 49, oxalic acid 24, acetic acid 3. Ostwald compared the volume changes which take place on neutralization, and obtained similar results. Other methods—such as the rate at which the acids invert sugar solutions, and the rate at which they effect the catalysis of methyl acetate—are also employed. The simplest method of all—that of the displacement of an acid from its salts by another acid—leads to satisfactory results only when the conditions of such a reaction are attended to. Under one set of circumstances an acid can turn another out of its salts, to be itself turned out by the first under different circumstances—examples of 'reversible reactions.'

As used in medicine, acids differ widely in their action. Externally applied, some of them, such as sulphuric, nitric, and hydrochloric acids, act as caustics, and are never given internally, except in a very diluted form. If swallowed pure—as they sometimes are in error—they act as corrosive poisons. Internally, the above acids, much diluted, stimulate first the flow of saliva, and next that of the gastric juice, which itself contains hydrochloric acid. Nitric acid is also much used as a cholagogue. Insufficiently diluted, when not strong enough to act as corrosives, these acids are gastric irritants, and so interfere with digestion. When preparations containing vinegar are taken to reduce fat, as they often are, the effect is produced by the action of the acetic acid in dangerously affecting the stomach walls. Other acids, such as carbolic and sulphurous acids, are disinfectants. Carbonic and hydrocyanic acids are gastric sedatives, the latter being also the most rapid of poisons. Tannic acid is an astringent, coagulating albumin. Salicylic acid is a valuable antipyretic. See POISON.

Acidalius, VALENS (1567-95), philologist and Latin poet; native of Wittstock, Brandenburg; known for his commentaries on Quintus Curtius, Plautus, and other Latin authors, which gained him great reputation as a critic.

Acidaspis, a Silurian trilobite. See TRILOBITES.

Acidimetry, the process of estimating the quantity of a free acid. Several methods of determination are in use. (1) When acids are mixed with water only, the strength may be determined by taking the specific gravity; (2) by measuring volumetrically the weight of alkali required to neutralize the acid; (3) by a gravimetric process adapted to the particular acid; (4) by loss of weight, after expelling the acid—this method is generally applied in the estimation of carbonic acid. Full details of these methods are given in Fresenius's *Quantitative Analysis* (1876); Sutton's *Volumetric Analysis* (1896); Lunge and Hurter's *Alkali Maker's Pocket-book* (1902).

Acidity. The incomplete oxidation of organic substances in the body results in the production of various acids, such as lactic, oxalic, uric, and other acids. A healthy adult excretes by the lungs and skin about 28 oz. of carbonic acid daily, and the acids excreted by the kidneys are equivalent to about 30 grains of oxalic acid. The excess of acid in the body, or acidity, depends mainly on two causes—excessive formation, the result of incomplete oxidation of the food and the tissues; and deficient elimination of the acid formed. These result from overfeeding, insufficient exercise, sedentary habits, or disease. The skin and mucous membranes are affected by acidity, which shows itself in the skin by attacks of eczema, urticaria, and erythema, and in the mucous membranes by catarrh. In acid dyspepsia there is a regurgitation from the stomach of acid liquid, consisting chiefly of lactic, butyric, and acetic acids. Abnormal acidity of the urine irritates the urinary passages, and causes a deposit of insoluble uric acid in them, leading to the formation of calculi. The treatment of acidity must manifestly depend upon the form and the cause, but active open-air exercise and careful regulation of the quantity and quality of diet are of great importance. Pastry and fermented liquors are particularly hurtful; starchy and saccharine foods should be used sparingly; meat, fish, and poultry may be eaten slowly and in moderation; and skimmed milk and lime-water may be drunk. If any form of alcohol is taken, it should be remembered that pure spirits are more easily obtained than good wines, and, largely diluted with some mineral water, are probably among the least dangerous forms of alcohol. See DIGESTION and DYSPEPSIA.

Aconcagua, the highest Summit of the Andes (23,080 feet).

Aci Reale, or ACIREALE (Sicil. *Jaci*), tn. and episc. see, Catania, Sicily, at the S.E. foot of Mt. Etna, 9 m. N.E. of Catania; has warm sulphur baths, and is visited for sea-bathing. Linen, cotton, and filigree work are manufactured. Pop. (1901) 35,203.

Acis, a Sicilian youth, beloved by the nymph Galatea, was crushed under a huge rock by the Cyclops Polyphemus, who was his rival. His blood was changed by the nymph into the river Acis, at the foot of Mt. Ætna. Handel composed an opera on the subject.

Ackermann. (1.) KONRAD ERNST (1712-71), a German actor of the first rank, both in tragic and comic parts. He married Sophie Charlotte Schröder (1714-92), herself a very able actress. (2.) LOUISE VICTOIRE, *née* CHOQUET (1813-90), French poetess. Her works include *Contes* (1855), *Contes et Poésies* (1863), and *Poésies, Premières Poésies, Poésies Philosophiques* (1874); and, in prose, *Pensées d'une Solitaire*, with Autobiog. (1883). (3.) RUDOLPH (1764-1834), German printseller, and lithographer in London; greatly developed artistic illustration; published *Forget-me-not*, an annual (1825 *ff.*), *Microcosm of London* (1808), *Westminster Abbey* (1812), *World in Miniature*, etc.

Acklin, or ACKLIN'S ISLAND (45 m. by 1 to 2 m.), one of the S. Bahamas (largest of Crooked I. group).

Acknowledgment. See LIMITATION, STATUTES OF; and HUSBAND AND WIFE.

Acland, ARTHUR HERBERT DYKE (1847), second son of Sir Thomas Dyke Acland; M.P. for the Rotherham div. of Yorkshire (1885-99); vice-president of the Council of Education, August 1892 to July 1895. He has published, with C. Ransome, *Handbook of Eng. Politics for the Last Half-Century* (1882), *Skeleton Outline of the Hist. of Eng.* (1882; new ed. 1887), *Outlines of the Political Hist. of Eng. to 1881* (2nd ed. 1881); and, with Benjamin Jones, *Working-men Co-operators* (1884).

Acland, SIR CHARLES THOMAS DYKE (1842), 12th Bart., succeeded his father, Rt. Hon. Sir Thomas Dyke Acland, in 1898; M.P. for East Cornwall (1882-5), and North Cornwall (1885-92); Parliamentary Secretary to the Board of Trade (Feb. to Aug. 1886).

Acland, Lady Christian Henrietta Caroline, generally called Lady Harriet (1750–1815), daughter of Stephen, first Earl of Ilchester, and wife of John Dyke Acland (1770), whom she accompanied to Canada. See *Lippincott's Mag.*, xxiv. 452–8 (1879); Burgoyne's *State of the Expedition from Canada* (1780); *Gent. Mag.*, 1815, ii. 186.

Acland, Sir Henry Wentworth Dyke (1815-1900), Bart. (1890); Radcliffe librarian, Oxford, for more than forty years; regius professor of medicine, Oxford (1857-94). The formation of the Oxford University Museum was largely due to his labours. Among his works are *Oxford Museum*, with letters from Ruskin (1859; repub. 1893); *Memoir on the Cholera in 1854: Village Health* (1884).

Acland, John Dyke (d. 1778), soldier and politician, eldest son of Sir Thomas Acland; M.P. for the Cornish borough of Callington (1774); was a strong adherent of Lord North's policy; accompanied Burgoyne's expedition to America (1775). His portrait was painted by Sir Joshua Reynolds.

Aclinic Line, or Magnetic Equator, an irregular and varying line passing through those points on the globe at which the needle does not dip. See Magnetism.

Aclis (Lat. 'a spear'), a throwing spear or javelin used by several nations of antiquity, including the Greeks and Romans. It was iron-tipped, with a wooden shaft about two feet long, to which was attached a cord.

Acne. (1.) *A. rosacea*, or *gutta rosea*, a congestion of the blood-vessels of the face, resulting in red patches and the formation of pimples. The most severe form occurs on the nose, after long over-indulgence in alcohol, and leads to hypertrophy of the skin. It is treated surgically. A milder chronic flush, often seen in women, is alleviated by general attention to health, and the local application of sulphur ointment. (2.) *A. vulgaris*, the pimples often occurring between puberty and adolescence, is due to poor circulation and nutrition. Tonics, careful dieting, and the local use of sulphur ointment are the best remedies.

Acœmetæ, or Acemites ('the Sleepless Ones'), communities of monks who in the 5th and 6th centuries, in Constantinople and elsewhere, carried on devotions 'without ceasing' day or night. Excommunicated in 534.

Acollas, Emile (1826–91), French professor of law and politician; advocated extreme revolutionary ideas. Chief works: *Manuel de Droit Civil* (1869–74); *Les Droits du Peuple, Cours de Droit Politique* (1873); *Philosophie de la Science Politique* (1877).

Acolytes, youths in holy orders who assisted in the ritual of the early church; now, candidates for the priesthood in the fourth stage of initiation.

Aconcagua. (1.) The most mountainous prov. of Central Chile, between the Pacific and the crest of the Andes, watered by river of same name; bounded on the N. by Coquimbo, and on the S. by Valparaiso and Santiago. Area, 6,332 sq. m. Pop. (1895) 113,165. Cap. San Felipe. (2.) Volcano, the highest summit of the Andes and of the New World, in prov. Mendoza, Argentina. Alt. 23,080 ft. The first ascent was made in 1897, by Zurbriggen. See Fitz-Gerald's *Highest Andes* (1899).

Aconcio, Aconzio, or Acontius, Giacomo (1492–1566), Tyrolese philosopher, theologian, and engineer; reclaimed large tracts of waste land along the banks of the Thames, part of which he received from Elizabeth as a reward. He dedicated to his patroness his *Stratagemata Satanæ* (1565).

Aconite (*Aconitum*), Monkshood, Wolfsbane, or Blue Rocket, a genus of the order Ranunculaceæ, common in temperate regions of Europe and Asia. *A. napellus*, supposed native of Britain, and often cultivated in gardens, is a perennial plant from two to six feet high, and has dark-green, deeply-cleft leaves, and a long branched head of deep-blue flowers; the sepals are petaloid, and resemble a hood, whence the popular name. All parts of the plant are very poisonous. The root has often been mistaken for horse-radish; but while the latter is cylindrical, and is often branched, the aconite root is tapering, pointed, and unbranched. Aconite applied to the skin and mucous membranes produces first tingling, then numbness. In medicinal doses it acts as an antipyretic, lessening the force, frequency, and volume of the pulse, and causing perspiration. It is also used externally and internally for neuralgia, lumbago, and rheumatic pains. Its effects are due to the three alkaloids, aconitine, benzaconine, and aconine, each of which possesses some quality peculiar to itself, and sometimes antagonistic to those of the other two. For fuller details of these, see Dr. Cash's article, *Brit. Med. Jour.*, Oct. 8, 1898. The symptoms of poisoning are first tingling of the tongue and general numbness of the mouth, then cold sweats and giddiness, followed perhaps by insensibility, with failing circulation and respiration. Treatment is first emptying the stomach with either a stomach-tube or an emetic. Stimulants should be given freely afterwards, and the sufferer put into a bed, with hot bottles to the extremities if they are cold. Artificial respiration with friction must be used if necessary, and the medical man will use hypodermic injections of strychnine or digitalis.—Winter Aconite (*Eranthis hyemalis*), a small herbaceous plant of the order Ranunculaceæ, with buttercup-like flowers, grows freely in gardens, thrives well under the shade of trees, and flowers with the snowdrop.

Aconite, with Flower and Fruit.

Acorn. See Oak.

Acorn-shells (*Balanus*), marine crustaceans found in vast numbers attached to rocks between tide-marks. Owing to their white shell, composed of a series of limy plates, and their sedentary habit, they were long supposed to be molluscs; but the life-history proves definitely their relation to the lower Crustacea. Save for the six pairs of two-branched feet, the adult displays few crustacean characters, and the life-history affords a remarkable example of degeneration. The food consists of minute particles, filtered from the water by means of the legs. The most notable difference from the allied barnacle is the absence of a stalk.

Acorn-shell and Section.

Acosta, GABRIEL D' (c. 1594-1640), also known as URIEL D'ACOSTA, a Portuguese of noble birth; born at Oporto; brought up a Roman Catholic; adopted Judaism, but was afterwards excommunicated for opposing the teaching of the rabbis. For the publication of his *Examen dos Tradiçoens Phariseas* (1624) he suffered fine and imprisonment. See his autobiography, *Exemplar Humanæ Vitæ* (1847). Gutzkow made him the hero of a tragedy, *Uriel Acosta*.

Acosta, JOAQUIM (d. 1852), explorer and geographer, who penetrated the northern districts of S. America (1834-45), giving special attention to the history of the early Spanish settlements, as in the book *Compendio Historico del Descubrimiento y Colonizacion de la Nueva Granada* (1848), and *Semenario de la Nueva Granada* (1849).

Acosta, JOSE D' (1539-1600), Spanish Jesuit and historian; only known by his famous *Historia Natural y Moral de las Indias*, written originally in Latin, but first published in Spanish in Seville (1590). It was published in London in English, translated by Edward Grimstone, in 1603, and a French version by Robert Regnault appeared in Paris in 1606.

Acoustics, strictly speaking, is the science of sound in relation to hearing. (For a discussion of the physical characteristics of the aerial vibrations which produce the sensation of noise see SOUND, and for the more purely physiological side of the question see EAR.) The conditions under which an aerial disturbance is audible as sound cannot be described with accuracy. If we confine our attention to musical sounds, or sounds of definite pitch, we know that the number of vibrations per second must lie between two limits; but the limits differ for different ears. Roughly speaking, the lower limit may be set at from 20 to 30 vibrations per second, and the upper limit at about 70,000. Cases have been observed in which the ear was not sensitive to a certain range of high-pitched notes, but could hear notes both of lower and of higher pitch. When the sound has no definite pitch, the condition of audibility seems to be a certain abruptness of change of pressure, such as we have in a tap or a blow. The change may be very slight, but it must be sufficiently abrupt. In judging of the direction from which a sound comes, we require the ears to be at different distances from the source of sound; or, to express it more accurately, the ears must be affected simultaneously by the same disturbance in different phase. For example, if a sound be produced at a point in the plane which passes medially through the head and bisects at right angles the line joining the ears, it is impossible for the hearer to say where the sound comes from.

An important practical branch of acoustics is the construction of musical instruments, the aim being to produce tones pleasing to the ear. It is here that the far-reaching principle of resonance finds its earliest and most familiar illustrations. By suitably-constructed cavities or tubes, within which the air vibrates naturally in definite periods, sounds having these periods are powerfully reinforced. In this way we produce the various qualities of tone associated with trumpets, organ pipes, flutes, and wind instruments generally. It is well to distinguish between true resonance, in which the body, sympathetically vibrating to the original sound, absorbs energy and gives it forth again, and ordinary reflection or echoing, in which the sound is simply thrown back from a surface, such as the walls of a hall, a rock, or a forest. The application of acoustic principles in the construction of a large hall is still little understood. Experience has led to the construction of rectangular halls, and the reason is obvious. A hall with part of its walls in a circular form must of necessity give rise to focal concentration of rays of sound after reflection; and if the hall is large, a person placed at such a focus will hear the original sound and an echo separated distinctly in time. Lord Rayleigh's *Theory of Sound* (2 vols., 2nd ed. 1894-6) is the most complete treatise on the subject. Helmholtz's *Tonempfindungen, or Sensations of Tone* (Eng. trans., 2nd ed. 1885), is one of the classics of scientific literature, and discusses in a masterly manner many of the most profound problems connected with the sense of hearing.

Acoyapo, or SAN SEBASTIAN, tn., Nicaragua, dep. Chontales, Central America. Pop. 6,000.

Acquaviva delle Fonti, tn., Apulia, S. Italy, at the foot of the Apennines, 18 m. s.w. of Bari. Pop. (1901) 11,113.

Acqui, tn. and episc. see, prov. Alessandria, Italy, on the Bormida, 21 m. s.w. of Alessandria, with hot sulphur springs (mentioned by Pliny, xxi. 2); temp. 115°-167° F. The Gothic cathedral dates from the 12th century. Pop. (1901) 13,940.

Acquiescence, a term somewhat vaguely used to express an equitable principle applied both by English and Scottish courts. If, with full knowledge of his rights, a man sees another person about to commit, or in the course of committing, an act infringing those rights, and he stands by in such a manner as to induce that person to believe that he assents to what is being done, he will not afterwards be heard in complaint of the act. In this sense acquiescence may be defined as quiescence under such circumstances as that assent may be reasonably inferred from it. It is an instance of the law of estoppel by words or conduct. See De Bussche *v.* Alt, 8 Ch. D. p. 314; also LACHES and MORA.

Acquired Characters. See HEREDITY and WEISMANN.

Acquittal, the absolving by order of the court of a person tried for a criminal offence. In England there must first be a verdict of not guilty, or a successful plea of pardon or of *autrefois acquit* or *autrefois convict*; and in Scotland a verdict of not guilty or not proven, or a successful plea of pardon or *tholed an assize*.

Acquittance, in English law a release or written discharge of a sum of money or debt due.

Acre, a British and American land measure, equal to 4,840 sq. yds. or $\frac{1}{640}$ sq. m. Forty rods (Rom. *quarentena*; Eng. *furlong—i.e. 'furrow-long'*) by one rod make one *rood*; the acre was made up of 4 roods lying side by side. An early law (33 Ed. I.) defined the acre as 40 perches in length and 4 in breadth; by Geo. IV. c. v. s. 74, the imperial acre was established for land measurement throughout the United Kingdom. The old Scottish and Irish acres were larger than the imperial acre. A table of land measures of the world will be found under WEIGHTS AND MEASURES. The ancient expression 'God's acre' (Ger. *Gottesacker*) referred to the churchyard. The formula 'Three acres and a cow' held before the British cottager as an ideal of prosperity to be attained by political means, originated on a Birmingham handbill, and was much used during the general election of Nov.-Dec. 1885. In 1882 the Rt. Hon. Jesse Collings introduced bills respecting allotments and small holdings, embodying this principle.

Acre, ST. JEAN D' (Turk. *Akka*; O.T. *Accho*; N.T. *Ptolemais*; the *Ace* of Strabo), city and seaport, Syria, on promontory at foot of Mt. Carmel. The city is famous for its many sieges:—(1) 1104, taken by first Crusaders, and retaken by Saracens (1187); (2) 1191, taken by third Crusaders, under Richard Cœur de Lion and Philip Augustus, and handed over to Knights of St. John (Fr. *St. Jean*, whence its modern name), and retaken by Saracens (1291); (3) 1517, captured by the Turks; (4) 1799, besieged for sixty-one days by Bonaparte, who failed to take it owing to the heroic defence made by Sir Sidney Smith and Jezzar Pasha; (5) 1832, taken by Ibrahim Pasha, and held by him for eight years; (6) 1840, captured by combined British, Austrian, and Turkish fleets. The older fortifications, much breached, may be traced outside later ones. Pop. 11,000 (8,000 Moslems; 3,000 Christians, Jews, and others).

Acri, tn. and prov., Calabria, S. Italy. The town is on the Mucone, 20 m. N.N.E. of Cosenza. Pop. (1901) 13,132.

Acrisius, king of Argos, and father of Danaë, whom he shut up in a tower, because an oracle had foretold that her child would kill him. See DANAË and PERSEUS.

Acrobat, literally one who walks on tiptoe, but commonly applied to a person who practises feats of personal agility, such as tumbling, vaulting, and particularly walking, dancing, etc., on rolling balls, pyramids of chairs, etc., and especially on the slack or tight rope, a feat which was popular among the ancient Greeks and Romans. The Chiarinis and Kolter were famous in this line, and, in the 19th century, Farioso, Madame Saqui, Diavolo, and Blondin. See Morton's ed. of Le Roux and Garnier's *Acrobats and Mountebanks* (1890).

Acroceraunian or CERAUNIAN MOUNTAINS, Albania, on Adriatic coast, European Turkey, lat. 40° 15′ N.; highest peak, Tchika (6,300 ft.); forms Cape Linguetta or Glossa (Acroceraunia), 40 m. E.N.E. of Otranto.

Acrochordon, cord-shaped outgrowths of the skin, occurring in feeble and old persons. They may be cut off, or touched with strong caustic.

Acrography is one of the numerous modern methods of reproducing pictures or designs. By means of a hydraulic press a mass of finely-powdered chalk is converted into a coherent block with a slightly shining surface. On this surface the design is drawn with a finely-pointed brush dipped in a gelatinous ink. By means of a velvet pad or light brush the loose chalk is removed from the surface of the plate, leaving the parts covered with the ink, which now stand up on the surface as if the plate were an engraved wood block. After it has been dipped in a solution of silica, the chalk plate is used for the production of a stereotype or electrotype plate by the usual process, and that in turn for reproducing the original picture or design.

Acrolein, or ACRYLIC ALDEHYDE, $CH_2CH.CHO$, is a colourless liquid with a most pungent odour, and violent action on the mucous membrane. It is prepared by distilling glycerin with a dehydrating agent, and its presence is the partial cause of the peculiar odour of burnt fat. On oxidation it yields acrylic acid.

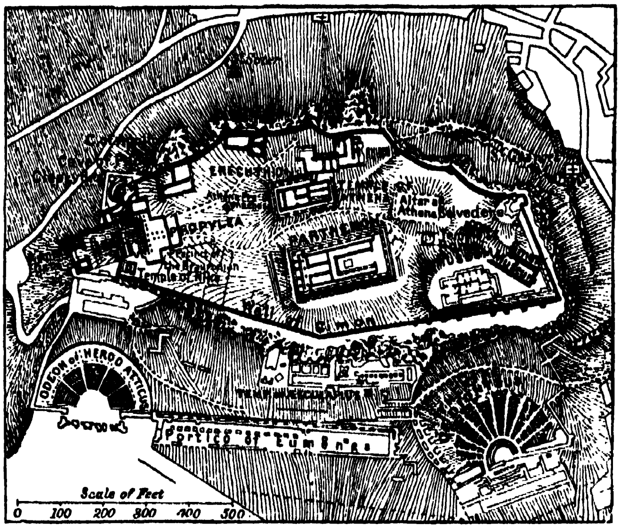
Acroliths, ancient Greek statues of wood, or of ordinary stone, with marble head, arms, and legs. They were frequently covered with thin plates of gold.

Acromegaly, a disease causing general enlargement of the bones, especially those of the head, feet, and hands; usually occurring between the ages of twenty and forty, most frequently in females, and lasting for ten or twenty years before death. The cause is still uncertain, though disease of the pituitary body is generally found associated with it; and no very effective treatment has been discovered. It is often associated with some nerve lesion—*e.g.* atrophy of the optic nerve—but the intellect is generally unimpaired. See Hinsdale's *Acromegaly* (1899).

Acromion, the distal end (*i.e.* the end farthest removed from the point of attachment) of the spine of the scapula or shoulder-blade. It receives the extreme part of the clavicle or collar-bone, and gives attachment to the deltoid and trapezoid muscles. In man it is an enlarged process, called the acromial process, which forms the summit of the shoulder.

Acrophony, a term applied to a stage in the development of alphabetical writing—*viz.* to the use of a picture of an object, or of a symbolical picture of an object, to represent the first syllable of the name of that object, and (later) to represent the first sound of that syllable. See Isaac Taylor's *The Alphabet.*

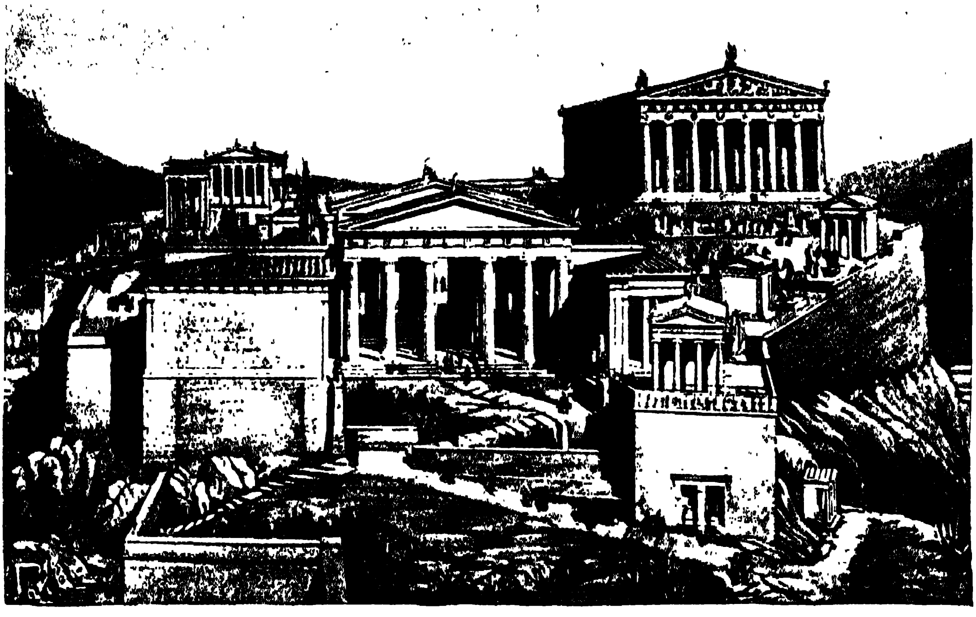
Acropolis, THE (Gr. *akros*, 'lofty;' *polis*, 'a city'), was the name given by the Greeks to the fortified eminences round which so many of their towns were built. The acropolis served also as a sacred enclosure, in which were placed the principal temples and works of art. Among the most famous are the Acropolis of Mycenæ, Tiryns, Argos, Corinth, Thebes, Pergamum, and in particular Athens, the last being generally referred to as 'the Acropolis' without qualification. The Acropolis of Athens (called also Cecropia, from its reputed Pelasgian founder, King Cecrops) is a rocky eminence, precipitous on all sides except the west, rising about 150 ft. from the Attic plain, and enclosing on its summit a plateau of an irregular oval shape, measuring from east to west 1,150 ft., and from north to south 500 ft. Prior to the 5th century B.C. an ancient Pelasgian wall surrounded the plateau; but this had fallen into ruin, except on the north side, and was replaced along the south escarpment by the wall of Cimon. Round the base of the hill, especially on the south, were grouped numerous temples and theatres, the chief of these being the Temple of Æsculapius, the Theatre of Dionysus, and the Odeon of Herod Atticus. The whole area of the summit was occupied by a series of edifices, the most famous and the most important artistically in the world's history. These were the outcome of the creative spirit of Athens when at the height of her fame. Pericles gave the impetus; Phidias, with a band of architects—Mnesicles, Ictinus, Callicrates, and others—were the creators. Among these buildings were the Propylæa, the Pinaco-



Plan of the Acropolis.

theca, the Temple of Nikē Apteros, the Erectheum, the Parthenon, etc. See ATHENS; also Penrose's *Principles of Athenian Architecture* (new ed. 1889); Burnouf's *L'Acropole* (1877); Bötticher's *Die Akropolis von Athens* (1888).

Acropyrum is a genus of grasses of which the well-known weed couch-grass or quitch-grass (*A. repens*) is the most important species. This plant is somewhat difficult to abolish in cultivated land, on account of its creeping, jointed, underground stem. The only way is to follow the plough at each cultivation, and pick out the couch-grass and burn it.



The Acropolis, Athens, as it was in the time of Pericles.

Acrostic, a verse or verses in which the initial letters of the lines, when read in order, spell a name, word, or phrase. The acrostic is of ancient origin, known specimens dating back to the 4th century. Some sacred Greek verses, quoted by Eusebius, bishop of Cæsarea, in the 4th century, are written so that the initial letters spell the phrase, 'Jesus Christ, the Son of God, the Saviour.' The first letters of the five Greek words of this phrase spell the word *ichthus*, 'a fish;' hence the use of the fish as a symbol for the Saviour. The Hebrew form of acrostic, as seen in several of the psalms, is alphabetical. In the 119th Psalm, each of the eight verses of the first division begins with *aleph;* each of the eight verses of the second division begins with the second letter, *beth;* and so on, through the twenty-two letters of the Hebrew alphabet. The best known English acrostics are an ingenious collection by Sir John Davies, called *Astræa*, written to Queen Elizabeth, the initial letters of each forming the words 'Elizabetha Regina.' Addison has a paper (*Spectator*, No. 60) on 'Wit of the Monkish Ages, in Modern Times,' in which he includes the acrostic among 'several kinds of false wit.'

Acroteria, or ACROTERS, small pedestals on buildings, on which are placed statues or ornamental finials; also the statues or ornaments thus placed.

Act. (1.) The division of a drama into acts, unknown to the Greeks, was employed first by the Romans; all the comedies of Plautus and Terence had five acts. Shakespeare never departed from that number; but modern plays have three, four, or five. The conclusion of an act is marked by the fall of the act drop, and by a pause of a few minutes called the *entr'acte*.

(2.) IN LAW. A juristic act has been defined as 'a manifestation of the will of a private individual directed to the origin, termination, or alteration of rights.' (See Holland, *Jurisprudence*, p. 98.) It has other technical meanings, such as a legal document in writing which a party executes as his act and deed. The terms 'act of party' and 'act of law' distinguish a voluntary act from a mere external event, as a bankruptcy, death of an intestate, etc., which involuntarily transfer rights.

(3.) OF BANKRUPTCY. See BANKRUPTCY.

(4.) OF GOD. In English law an accident is said to be due to the act of God when, without human intervention, it arises from natural causes of such a kind or degree that no experience or care which can reasonably be expected could have foreseen or guarded against them, such as storms, tempests and lightning, an extraordinarily high tide, or severe frost, or an exceptional fall of snow or rain. In the absence of a special contract, no person is held liable for damage caused by the act of God. See Nugent *v.* Smith, L.R. 1 C.P.D. 423; Broom's *Legal Maxims;* Pollock, *On Contracts.*

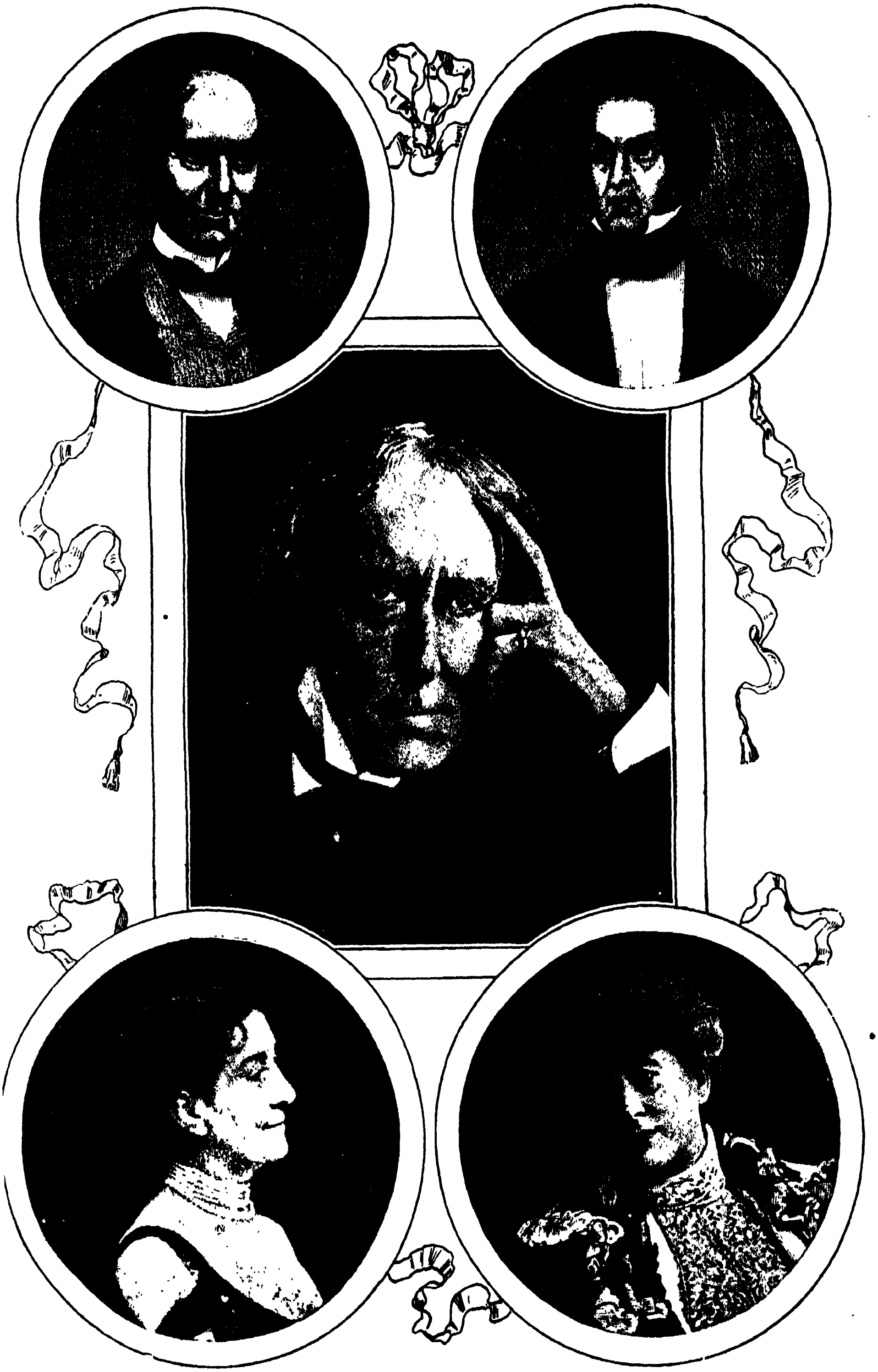
(5.) OF GRACE, an Act of the Scottish Parliament of 1696, c. 32 (amended by 6 Geo. IV. c. 62), compelling creditors to provide for the aliment of imprisoned debtors without means of support. By the Debtors (Scotland) Act, 1880, imprisonment for civil debt was, with exceptions, abolished.

(6.) Of Parliament, a law made by the King in Parliament. It must pass both houses of Parliament, and receive the royal assent, which may be given either in person or by commission. It may be introduced in either house; but by practice and usage, based upon resolutions of the Commons of 1671 and 1678, the House of Lords neither initiates nor amends money bills. An act begins as a bill, and a bill is either public or private. Public bills are introduced by a member by motion for leave. Private bills, which include all bills for the particular interest or benefit of individuals or corporations, are introduced on the petition of the parties interested. Public bills pass through the stages of first and second reading, committee, report, and third reading in both houses, and afterwards receive the royal assent. Private bills pass through the same stages; but after the second reading in each house they are sent to a special committee, and unless the committee find the preamble of the bill proved, it proceeds no further, but is thrown out. When bills have received the royal assent, and become acts, they are more elaborately divided. Public bills become public and general acts, cited by the regnal year or years (and session 1 or 2), and chapter numbers in arabic. Private bills become (*a*) local and personal acts, with the chapter numbers in roman; (*b*) private acts, printed by the King's printer, with arabic italic numbers; and (*c*) private acts not so printed. The acts of the session form one statute; but since 1488 the particular chapters have been given titles, and since 1793 an act comes into force from the date at which it receives the royal assent, unless some other date is specified by the act itself. Acts require no promulgation, though there is a list, sometimes called the *Promulgation List*, of departments and officials to whom copies are sent. Public acts are binding on all, and all are presumed to know what is in them, and the judges take cognizance of them. Since 1850 all acts are public, unless the contrary is stated. In the absence of any contrary intention, public acts extend to Great Britain and Ireland, but not to the Channel Islands or the Isle of Man. They do not affect the crown unless the crown is named. Nearly all acts now receive short titles (a practice which has grown up since 1845), and the Short Titles Act, 1892, provides them where not previously existing. Collective titles are also given to groups of acts dealing with the same subject. Acts are either permanent or temporary, but many (about 100) of the latter are continued every year by the Expiring Laws Continuance Act. Statutes may be repealed, either expressly or by implication, as being inconsistent with more recent legislation. Since Lord Brougham's Act (1850) the repeal of a repealing act does not revive the enactment repealed. In England, acts are always in force until repealed; but by Scots law some old acts of the Scottish Parliament, which have never been repealed, are yet held to have lost their force by desuetude. The first complete authorized edition of the English statutes was printed by the Record Commissioners between 1810 and 1824; but there were several private editions before that. The acts of England extend from 1235 to 1706; those of Scotland from the reign of James I., about 1424, to 1706; those of Ireland from 1310 to 1800; those of Great Britain from 1706 to 1800; and those of the United Kingdom from 1801. See also Adoptive Acts, Interpretation Act, Locus Standi, Poynings's Law, Parliament, Parliamentary Committees, Parliamentary Deposits, Referees, and Statute Law Revision; Hardcastle, *On Statutes;* Maxwell, *On Statutes;* and May's *Parliamentary Practice.*

(7.) Of Sederunt, an enactment or ordinance of the Court of Session. Although at one time their scope was greater, Acts of Sederunt are now practically confined to regulating procedure, and making provision, under statutory authority, for giving effect to certain Acts of Parliament. To pass an Act of Sederunt a quorum of nine judges is required. See Green's *Encyc. of Scots Law.*

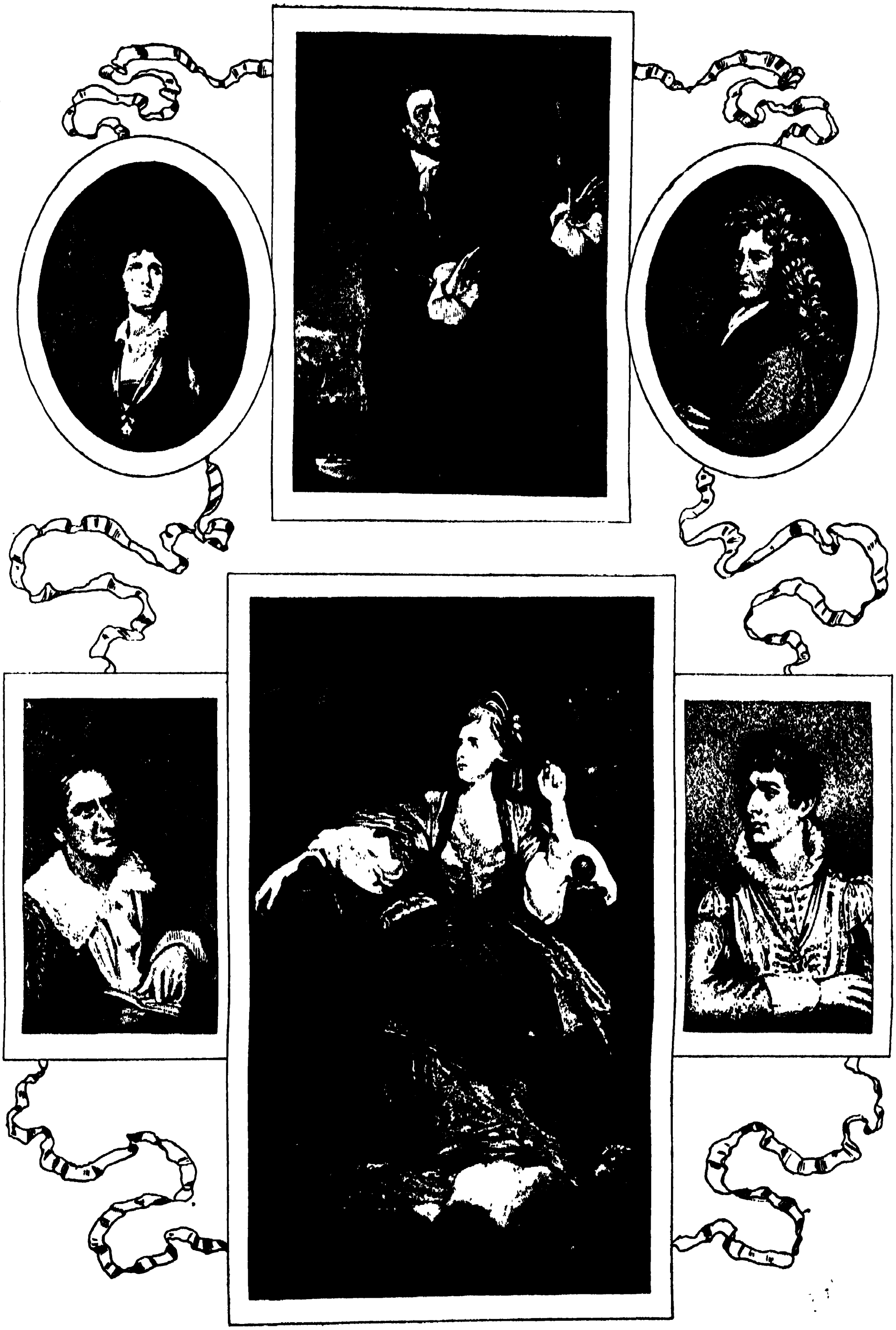
(8.) Of Settlement, The, or, by title, the 'Act for the further Limitation of the Crown, and better Securing the Rights and Liberties of the Subject,' was passed in the session 1700-1, under a Tory ministry. The succession to the crown was an urgent question, owing to William and Mary having had no issue, and owing to the death (July 1700) of the Duke of Gloucester, the Princess (later Queen) Anne's sole surviving child. It cut away the hereditary-right claim of the elder branch of the Stuart house, and gave parliamentary right to the house of Hanover, by providing that, on the death of Anne, and in the absence of issue, the crown should go to the Electress Sophia of Hanover, granddaughter of James I., and her descendants, 'being Protestants.' In eight articles, in addition to the succession arrangement, the act made important provisions:—The sovereign must be in communion with the Church of England; no war should be waged without consent of Parliament for the foreign dominions of the sovereign, if a foreigner (a clause due to the policy and wars of William III.); the sovereign should not go abroad without consent of Parliament (repealed after accession of George I.); the full Privy Council (not a mere committee or clique) should be recognized, consulted, and have weight, and members agreeing to the decisions should sign such resolutions (an artificial attempt, ended in 1705, to secure responsibility of ministers); no foreigner should become a Privy Councillor or a member of either house, or hold commission or office from the crown, or receive a grant of lands from the crown (a clause due to resentment of William III.'s Dutch favouritism); no holder of office or pension under the crown should sit in the House of Commons (a clause designed to prevent the house from being packed with royal nominees and supporters; but, as an implied remedy, really worse than the disease, for had it not been revised in 1705, it would have excluded ministers from the House of Commons, would thus have reduced its control over the executive and policy, and would have hampered the growth of the cabinet as a link between executive and legislature, making it virtually, as in the presidential cabinet in the United States, a mere body of heads of departments); judges should hold their commissions during good conduct—*quam diu se bene gesserint*—should have fixed salaries, and should be removed only on petition of both houses (an important provision towards securing the purity and independence of the bench against royal and executive device and power, as under the Stuarts); no pardon under the Great Seal—*i.e.* from the crown and executive—should be pleaded as a bar to an impeachment by the Commons (a clause the significance of which is contained in its commentary on the impeachments of Danby, Somers, and others). Eighteenth century politicians, especially Whig, saw in the Act of Settlement part of the 'Bible of the Constitution.' See Cabinet, Crown; Stubbs's *Select Charters*, App., for text; Hallam's *Const. Hist. of Eng.*, Ranke's *Hist. of Eng. in 17th Cent.*, Lecky's *Hist. of Eng. in 18th Cent.*, and Bagehot's *Eng. Constitution*, for bearing on party and on political conditions.

(9.) Of Toleration (May 24, 1689), a title given specially to Act 1 Wm. and M. c. 18, confirmed by 10 An. c. 2, relaxing the stringency of the Act of Uniformity, the Five Mile Act, and the Conventicle Act. It gave religious freedom to all dissenters from the Church of England, except to Roman Catholics and Unitarians. The same freedom was extended to Scotland. Other



Charles Matthew. Sir Henry Irving. (Photo by Histed.) W. C. Macready.
Mrs. Kendal. (Photo by Johnston and Hoffmann.) Miss Ellen Terry. (Photo by Lafayette.)

Famous British Actors.



John Philip Kemble as 'Hamlet.'
(After Lawrence.)
Edmund Kean as 'Hamlet.'

David Garrick as 'Hamlet.'
Mrs. Siddons as the 'Tragic Muse.'

Thomas Betterton.
Charles Kemble as 'Romeo.'

Famous British Actors.

Acts of Toleration are 53 Geo. III. c. 160, removing civil disabilities of Unitarians; 9 Geo. IV. c. 17, repealing provisions of the Test Act and Corporation Act; 10 Geo. IV. c. 7, the Roman Catholic Emancipation Act. See Hallam's *Const. Hist. of Eng.*

(10.) Of Union. See Scotland, *History*.

(11.) Of Uniformity. See Uniformity.

Acta (Lat. 'transactions') was a title given to various records, memorials, or minutes published in Roman times. They may be treated under the following heads:—(1.) *Acta populi*, or *acta diurna*, an official journal of important events, both public and private, which was published daily in ancient Rome after 59 B.C. The original *acta* were deposited in the state archives after a certain time. They contained imperial and magisterial notices and decrees, resolutions and discussions of the senate, possibly the results of chariot-races, advertisements of births, marriages, divorces, and deaths. No genuine *acta* are extant, though fifteen spurious fragments have been published by Pighius (1615). (2.) *Acta senatus*, the minutes of the transactions in the senate—the title *acta* is an abbreviation of *commentarii actorum*—first published by Julius Cæsar as consul in 59 B.C. They were kept in the imperial archives, being accessible only to senators; or in separate parts of public libraries, being then accessible only by special permission of the city prefect. (3.) *Acta fratrum Ævalium*, minutes of the Æval brotherhood, a priestly college in ancient Rome. Important fragments covering the period from 14-241 A.D. have been found, and edited by Henzen (1874).

Acta Pilati, or Gesta Pilati ('Acts of Pilate'), the name of an apocryphal work giving, by way of an official report purporting to have been drawn up under Pilate's orders, an account of the trial, crucifixion, and resurrection of Jesus. It is, of course, by no means improbable that Pilate furnished the Emperor Tiberius with some record of his dealings with Jesus; but as it is extremely unlikely that such would ever become public property, the references made by Justin and Tertullian probably attach themselves to some spurious composition designed to fill up the blank. Eusebius speaks of heathen *Acta Pilati* circulated in the Galerian persecution for the purpose of bringing the Christian passion story into disrepute, but seems to know nothing of a Christian writing under that title. The extant Acts of Pilate is written from a Christian standpoint; and although it was known in some form to Epiphanius towards the close of the 4th century, it has no claim to authenticity, but is probably connected in its origin both with the heathen acts (by way of confutation) and with the earlier narrative alluded to by Justin. It now forms ch. 1-16 of the Gospel of Nicodemus. See Pilate.

Acta Sanctorum (Lat. 'The Acts of the Saints'), also Acta Martyrum ('Acts of the Martyrs'), is the title given to a vast collection of legends and histories of all the saints in both the ancient martyrologies of the Eastern and Western Churches and in the calendar of the modern Church of Rome. It was begun in 1643, and the work is still going on. The idea of making this exhaustive collection originated with a learned Jesuit, Heribert Rosweyd, of Bois le Duc, about the end of the 16th century. At his death it was taken up by John van Bolland (1596-1665), and under his guidance a society of Jesuits, called *Bollandists* after their leader, was formed to carry on the work. Sixty-one volumes, most of which contain more than a thousand closely printed pages in double columns, have appeared, with an index (1875). The calendar from January to October has been overtaken, twelve volumes being required for October alone.

Actæon, in classic mythology a famous hunter, whom the goddess Artemis changed into a stag, because he saw her bathing; in this form his dogs tore him to pieces. See Ovid's *Metamorphoses*, bk. iii.

Acte Additionnel. *L'Acte additionnel aux Constitutions de l'Empire* was issued by Napoleon on April 23, 1815, during the 'Hundred Days,' as a concession to Liberal politicians. It contained provisions for individual liberty and freedom of the press, and was an advance upon 'The Charter' of Louis XVIII., June 1814, based on English models.

Actian Games, The, were instituted by Octavius in commemoration of his great naval victory over Antony and Cleopatra (B.C. 31) at Actium. They included musical contests, wrestling, horse-racing, and, in memory of the battle, sea-fights. They were held every fifth year.

Actinaut, any vessel or torpedo which, propelled by self-contained power, can be steered on or beneath the surface of the water by a distant operator through the medium of a ray (Gr. *aktis*) or electric current, without the intervention of wires. Patents for the direction of vessels in this manner have been granted to Messrs. Orling and Armstrong, Lieut. Fiske, U.S.N., Mr. A. A. Govan, and others. See *New Liberal Review*, June 1901.

Acting. The art of acting, in its modern sense, is of comparatively recent development. Indeed, even until Shakespeare's day acting consisted of recitation rather than impersonation, and for long afterwards the nature of the stage—a promontory jutting out into the audience—forbade anything like histrionic realism. Realism was almost impossible in the huge theatres in which Betterton and Garrick, Mrs. Siddons and John Kemble, Kean and Macready played their parts.

But even in the 17th and 18th centuries the art of acting had come to have its two schools—the school of 'nature,' aiming at least at realism; and the school of 'art' or artificiality, whose chief object is impressiveness. John Philip Kemble was the personification of 'art' at his best, and 'artificiality' at his worst—stilted or stately, solemn or severe. Edmund Kean was the personification of 'nature'—fresh, unconventional, individual, but often crude and violent to excess. The majority of players, however, are not to be thus labelled. Mrs. Siddons, more stately than even Kemble, could be almost as unrestrained as Kean. Kemble's Brutus cannot have been more majestic than Irving's Charles the First. It may perhaps be said that the greatest actors are to be found among those who have been least fettered by the trammels of tradition.

The true actor, according to M. Coquelin, can assume his *rôle* at a moment's notice. He has no need to attune his mind to it by preliminary meditation. Whether it be Romeo or Lear, provided only he is word-perfect, he can step on to the stage and produce the impression he desires. M. Coquelin holds, too, with Diderot, and against Horace, that an actor should not feel his part. Are Diderot and Coquelin right? Mr. William Archer, in his *Masks and Faces*, proves that they are not. The weight of testimony is all against them. The vast majority of really great actors and actresses have placed on record their conviction that, in order to produce their greatest effects, they had to identify themselves body and soul with the characters they impersonated. Mrs. Siddons prepared herself for her great scene as Constance by deliberately concentrating her mind on her imaginary woes, remaining within earshot of the stage, that she might the better experience the queen's ecstasy of anger on hearing the 'sickening sound of that march to which the French and English enter the gates of Angiers.' Salvini deliberately devoted several hours to solitary brooding before his appearance on the stage; and on being asked once at a social gathering in America to give a short scene from *Othello*, he was obliged to refuse, on the ground that he could not do so acceptably without going through the whole play! Mrs. Kendal (to add a more modern instance), in order to achieve the stony rigidity of Claire in *The Ironmaster*, would shut herself up in her dressing-room and fix her thoughts 'upon all the old, unhappy, far-off things she could think of—the pains, losses, and disappointments of her life.' Talma, the great French actor, tells us how, as it were subconsciously, he stored each new feeling experienced in real life for exploitation in due course in the theatre. Sensibility, then, we may take it, is in nearly all cases essential to great acting, though it must not go unbridled. '*Le cœur chaud, la tête froide*,' the motto of M. Albert Lambert, a modern French actor, happily expresses the requisite compromise between emotionalism and self-control.

Can acting be taught? Yes and no. That is to say, some of the various qualities enabling one to shine in the art may be acquired and improved by dint of study under an expert. Grace of carriage, appropriateness of gesture, the management of the voice, may well be learned from one's elders and betters; but the dramatic instinct, without which these things are as nothing, is, of course, a gift of nature. Like the poet, the actor is born, not made. Histrionic 'academies' have seldom justified their existence, least of all in England. The Paris Conservatoire has come nearest to being a success; but, as Macready said after visiting it in 1843, its tendency is 'to perpetuate the mannerism of the French stage ......Genius would be cramped, if not maimed and distorted, by such a course.'

It seems safe to prophesy that the art of acting, while it will always have its devotees, will always have its decriers. Even in ancient Greece, where actors enjoyed all civil rights, and the greatest dramatists appeared in their own plays, the 'profession' did not escape condemnation. Solon and Plato both pronounced the career unworthy. On the whole, however, in Greece the calling was held in higher esteem than it has ever been since. Actors seem to have had their disabilities in every other country, and at all times. The son of an actor (as of an executioner) is ineligible in China for the mandarinate; and in France the rites of Christian burial were denied to Adrienne Lecouvreur. In England the stage has had its ups and downs. Dr. Johnson was spokesman for a large section of his race when he gave out his sneer about clapping a hump upon your back and calling yourself Richard III.; while from Cardinal Manning, hardly less typical an Englishman though a prelate of the Church of Rome, it drew that uncompromising phrase about 'the prostitution of a body purified by baptism.' On the other hand, our greatest actors have been signally honoured. The name of Garrick is conspicuous in Westminster Abbey. Mrs. Siddons, John Kemble, Kean, and Macready were on terms of intimate friendship with the greatest in the land. The dignity of knighthood is universally considered to sit well upon the shoulders of Henry Irving.

Though devoted primarily to the question as to how far an actor should be able to enter into the feelings of the character he is impersonating, Mr. Archer's volume, *Masks and Faces*, contains a good deal of general information about the art of acting. *The Art of Acting*, by Mr. J. A. Hammerton, is in part a skilful *résumé* of the best critical opinion, in part a symposium contributed to by living actors and actresses of note. See Diderot's *The Paradise of Acting*, and the article DRAMA.

Actiniaria, the true sea anemones; species without evident hard parts, which do not form colonies, and possess some slight power of locomotion.

Actinic Rays are the invisible rays which are given off by a highly-heated body, and which are more refrangible than the visible rays. They were first recognized by their photographic properties, but are most easily demonstrated by means of fluorescing materials. A fluorescent substance has the property of absorbing these invisible rays and giving them forth again as visible rays of a different refrangibility. For example, let a ray of sunlight be passed through a prism so as to be drawn out into a spectrum of rainbow tints, and let the spectrum so formed fall on a strip of canary glass or paper painted with a solution of sulphate of quinine, or a fluorescent screen of a substance like platino-cyanide of barium. At once the spectrum will appear to be extended well beyond the violet end, the invisible actinic rays being transformed into visible rays. For this reason the actinic rays are frequently called the ultra-violet rays. They differ from the violet rays in their shorter wave-length and more rapid frequency. See FLUORESCENCE, LIGHT, RADIANT ENERGY, and SPECTRUM.

Actinograph, a self-recording actinometer, the record being made by the chemical effect of the sun's rays on sensitized paper.

Actinolite, a kind of amphibole, distinguished by its dark-green colour. It occurs in large bladed crystals in metamorphic rocks, often forming whole rock masses known as actinolite rock or actinolite schist. It is often finely fibrous, and is abundant in Scotland, the Alps, Scandinavia, and all regions of archæan rocks.

Actinometer, an instrument for determining the amount of heat received from the sun on a surface of definite size in a given time. Herschel's actinometer, invented about 1824, consists of a large cylindrical thermometer bulb with a very open scale, so that small changes may be readily observed. The bulb is of transparent glass filled with a deep-blue liquid, which is expanded when the sun's rays fall on it. When an observation is taken, the instrument is shaded for one minute and read off; it is then placed for one minute in sunshine, and its indication recorded; it is finally shaded again, and a reading made. The average of the two readings in the shade, subtracted from that in the sun, indicates the expansion of the liquid produced by the sun's rays in one minute of time. Leslie also showed how his differential thermometers could be used for the same purpose. In other forms of apparatus the chemical action of radiation is used. The best modern instruments for measuring solar radiation are constructed on quite a different plan—the absorbing body being a blackened wire, whose change of temperature is measured by its change in electric resistance. The generic name for this type of instrument is bolometer; so called by Langley, who has used it with great skill in the measurement of solar radiation.

Actinomycosis (Gr. 'ray-fungus'), a chronic infectious disease, caused by the penetration into the tissues of a vegetable parasite, the *Actinomyces bovis*, or ray-fungus of the ox. The disease is common among cattle, and occurs also in the pig. It was first recognized in the ox by Bollinger in 1876, and is known in Britain as 'woody tongue,' and in America as 'big jaw.' The fungus, in the case of cattle, is probably taken in with the food; the chief source is believed to be infected grasses, particularly those belonging to the genus Hordeum. Seventy-five per cent. of recorded cases in man have been in persons—such as farmers, millers, farm labourers, grooms, and others—whose occupation leads them to deal with cereals.

The seat of infection in man and animals is the mouth or the neighbouring passages, though almost any tissue and any organ of the body may be affected. In actinomycosis of the mouth and pharynx, the fungus is supposed to penetrate by means of carious teeth. The lower jaw is the most frequently affected, but the disease may involve the tongue, upper jaw, bones of the skull, and the vertebræ. When the disease attacks bone it produces periostitis, suppuration, and necrosis. In the tongue, actinomycotic nodules of fibrous tissue are formed under the mucous membrane, which becomes ulcerated. This is followed by atrophy of the muscular fibre and great hardness of the organ. Finally, suppuration occurs, and the pus discharged contains a large number of minute whitish or yellowish specks or granules, sometimes visible to the naked eye, the largest of which have a diameter of $\frac{1}{25}$ of an inch. In actinomycosis of the intestine, the large intestine is more frequently attacked than the small. Ulcers are formed, the peritoneum becomes involved, and abscesses result, which may open externally or discharge into the bladder, liver, etc. The liver is usually affected by extension from the intestine, and the lung may be primarily affected by the inhalation of infected vegetable dust. Treatment is largely surgical, with care of the general health. Iodide of potassium, in doses of 40 to 60 grains daily, is considered by some to have quite a specific action. Others do not report so favourably. See Bérard, *Assoc. Française pour l'Avancement des Sciences* (1897).

Actinozoa, or ANTHOZOA, a division of the Cœlentera, or hollow-bodied animals, including the sea anemones, the corals, and allied forms. All are characterized by the fact that the life-history is simple, and does not include a jelly-fish stage. There is a distinct gullet, connected with the body wall by divisions or septa, and the mouth is surrounded by tentacles. Digestive filaments are present on these septa, and the stinging cells are often very well developed.

Action, a civil proceeding in a court of law for the determination of the rights of the parties. Whenever a legal right has been infringed, whether by the breach of an agreement or by the infliction of an injury, a cause of action arises. The cause of action consists of all the facts which the plaintiff must prove in order to succeed in his claim. In certain cases actions may also be brought where no right has been infringed, but where the assistance of the court is required to determine the rights of different persons in the circumstances which have arisen, as in the case of the administration of the estates of deceased persons. Every one has a right to bring an action except a felon, an outlaw, or an alien enemy, though persons under disability, such as infants and lunatics, have to be represented by some one else, such as a guardian or a committee; and every one is liable to have an action brought against him, except the sovereign, foreign sovereigns, and foreign ambassadors.

In England actions are brought in the High Court of Justice, in the Chancery Courts of Lancaster and Durham, in county courts, and in inferior courts of record of local jurisdiction. In Scotland they are brought in the Court of Session, the sheriff courts, and in small debt courts.

An action in the *High Court* is defined by the Judicature Act, 1873, as a civil proceeding commenced by writ, or in such other manner as may be prescribed by rules of court. It includes an originating summons, but not divorce or bankruptcy proceedings, which are commenced by petition. It begins with the issue of a writ of summons, followed by service of the writ, appearance thereto, summons for directions, pleadings or not as directed, trial in open court, verdict, and judgment. In actions of slander, libel, false imprisonment, malicious prosecution, seduction, and breach of promise of marriage, either party has the right to a trial by jury. In all other actions in the High Court there is no right to have a jury, although the judge has power to direct a trial by jury if he thinks right. The old division of common law actions into real, mixed, and personal is obsolete, and the most important division now is into actions of contract (or *ex contractu*) and actions for tort (or *ex delicto*). But in many cases actions are called after the nature of the relief sought, as an administration or a partition action, an action for specific performance, a foreclosure of redemption action, etc. In the Palatine Courts of Lancaster and Durham the proceedings, etc., in actions are much the same as in the High Court. For county court actions, see COUNTY COURTS. In inferior courts, such as the mayor's court, the procedure is special, but only in matters of detail.

In Scotland, in the Court of Session, an action may be brought to have practically any question of right or status determined and the proper remedy applied. Actions are generally classified according to the nature of the remedy asked for, or, as it is expressed, according to their conclusions. Upon this footing they are divided into declaratory actions, to have the nature or extent of some right defined; recissory actions, to have a deed or contract rescinded or set aside; petitory actions, such as actions on contracts for the payment of money; possessory actions, such as actions for interdict against interference with the possession of land; competitions, or actions to have the rights of several claimants to the same property determined; actions connected with diligence, in which, for example, execution against the property of a debtor is asked for. Another division is based upon the jurisdiction of the Ecclesiastical and Admiralty Courts, which now belong to the Court of Session. Thus consistorial actions—such as divorce, bastardy, and nullity of marriage —deal with matters formerly belonging to the Consistorial Courts; and actions relating to ships deal with matters formerly belonging to the Court of Admiralty. In the Court of Session an action is commenced by summons, which is accompanied by a condescendence, or statement of facts, and by pleas-in-law. The defender is cited by delivery to him of a copy of the summons, condescendence, and pleas-in-law, and if he enters appearance, he has time to deliver defences in the same form as the condescendence and pleas-in-law; and after the record has been printed, it is revised and adjusted before the Lord Ordinary, and the record is closed. When no material facts are at issue, the case is debated, and judgment given; otherwise a proof is taken, either before the Lord Ordinary (alone or with a jury) or by commission, counsel are heard, and judgment given. As to proofs, the Lord Ordinary, with the consent of the parties, or for cause shown, may dispense with a jury in any case; but proof may be taken by commission, except in cases appropriated to jury trial by the Judicature Act, 1825, and in consistorial actions. In practice, proofs are taken before a jury in actions of damages for accidents, defamation, or nuisance, actions as to public rights of way, and certain actions of reduction. Actions in the sheriff courts are begun by petition, and the general outline of the procedure is similar to that in the Court of Session. In small debt courts the proceedings are summary, and the only documentary pleading is the summons.

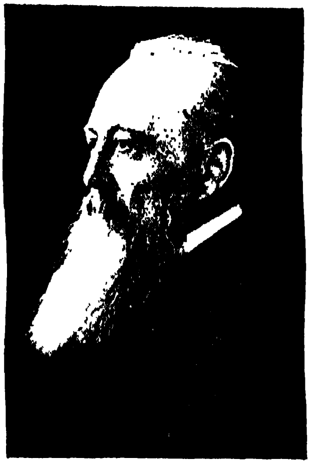
Action, PREPARING FOR (Navy). It is the captain's duty to take care that all the guns are ready for firing, and that the mechanism of the quick-firing and machine guns is in working order. At the earliest opportunity after commissioning, he is to have a 'quarter bill' hung up in a conspicuous and public part of his ship, containing the names of officers and men, and their respective posts in the vessel. 'General quarters' are directed to take place once a week, and exercise of arming and manning boats, and resisting torpedo attacks, once a month. There is an allowance of powder and projectiles to be expended in the course of every three months, to keep the men in constant practice. Previous to action all temporary bulkheads, woodwork, etc., should be dispensed with. The water-tight doors are in charge of the engineer officer, who is responsible for their efficiency, and for their being closed when not in use. In an action they would be closed as a matter of course. In the wardroom, or some other convenient place, the surgeons lay out their tables and instruments. The fire mains and hose are also made ready, and ammunition is brought from the magazines. To repel a torpedo attack, the torpedo nets would be got out if the ship is not under way.

Actium, tn. and prom. on the w. coast of Greece, s. of the mouth of the Ambracian Gulf. Off the point, on Sept. 2, 31 B.C., the fleet of Antony and Cleopatra was completely defeated by that of Octavian, who thus gained control of the whole Roman empire. Here also the Turkish corsair, Khair-ed-Din Barbarossa, defeated in 1538 the allied Spaniards, Venetians, and Papal forces.

Acton, CHARLES JANUARIUS EDWARD (1803-47), born at Naples. He entered the *Academia Ecclesiastica*, Rome; was made cardinal in 1842. See Cardinal Wiseman's *Recollections of Four Popes* (1858), pp. 475-80.

Acton, SIR JOHN FRANCIS EDWARD (1736-1811), born at Besançon, where his father (an Englishman) was a physician. He served first in the French, then in the Tuscan navy, and was generalissimo and prime minister at Naples during the French revolution. After Napoleon's successes in the north of Italy in 1798, Acton fled with the king and queen to Palermo. He was soon restored to power, but his arbitrary rule caused a reaction against the royal family. On the demand of France he was removed in 1804, but shortly afterwards was reinstated. When the French entered Naples in 1806, he fled with the royal family to Sicily, and died at Palermo.

Acton, JOHN EMERICH EDWARD DALBERG-ACTON, LORD (1834-1902), grandson of above; born at Naples; raised to the peerage as Baron Acton of Aldenham (1869); appointed to the chair of modern history, Cambridge (1895); died at Tegernsee, Bavaria. Lord Acton was a historian of almost incomparable learning, and had profound influence, as a liberal Catholic, upon English religious thought. His writings include *The War of 1870; Wolsey and the Divorce of Henry VIII.* (1877); *Schools of Hist. in Germany* (1886). He was for a time editor of *The Home and Foreign Review*, *The Weekly Chronicle*, and *The N. Brit. Review*. He planned *The Cambridge Modern History*, 1903, etc., written by several scholars in co-operation. His vast library was left at his death to Mr. John Morley, who presented it to the University of Cambridge. See *Letters of Lord Acton to Mary Gladstone* (1904), with introduction by Herbert Paul.



Lord Acton, 'a historian of almost incomparable learning.'
(Photo by Elliot and Fry.)

Acton Burnell, THE STATUTE OF (1283), also called *De Mercatoribus*, was enacted by Edward I. and his council—not in a full Parliament. It provided for the recovery of merchants' debts by ordaining that, on the debt being acknowledged before royal officers in specified towns, distraint for debt might be enforced in default of payment. In 1285 the statute was made more explicit, and was extended in area of application by the *Statutum Mercatorum*. See Cunningham's *Growth of English Industry and Commerce* (2 vols. 1890-2).

Actors' Benevolent Fund, THE, established 1882, provides financial assistance to distressed actors, actresses, theatrical managers, and stage managers, and to their children, or to their widows and orphans. Its office is at 8 Adam Street, Adelphi, W.C., but business is also transacted through twenty-seven provincial centres.

Acts, THE SIX, passed Nov.-Dec. 1819, were designed by Lord Sidmouth, Home Secretary, and his associates, to cope, through vigorous administrative process, with popular excesses (*e.g.* at Manchester, August 1819) that were due to economic conditions, to reactionary government, and to the demands of political reformers such as Cobbett and Hunt. The acts expedited trial for riot and sedition, increased the penalty for libel, regulated and restricted the press, prohibited the training of persons in the use of arms and military exercises, prevented seditious meetings, and empowered magistrates to search for and seize arms. The argument of necessity was adduced. See Spencer Walpole's *Hist. of Eng. since 1815.*

Acts of the Apostles, our most trustworthy source for the early history of the Christian Church. The book falls roughly into two parts: the first (ch. 1-12) narrates the spread of the church from Jerusalem outward to Judæa, Samaria, and Antioch, the central figure being St. Peter; while the second portion (ch. 13-28) carries the story to Asia Minor and Europe, being in the main a fragmentary biography of St. Paul, and detailing his missionary labours in company with Barnabas, and subsequently with Silas and others. It is generally admitted that the writer of the Acts is identical with the author of the third Gospel (Luke); but there is no little diversity of opinion regarding the date of the book. Baur subjected it to a most thoroughgoing criticism, and, in accordance with his general theory of two opposing parties in the early church—the Petrine or Judaistic, and the Pauline or Universalistic—as also in view of certain supposed discrepancies between the Acts and the Epistle to the Galatians (*e.g.* Acts 15 and Gal. 2), assigned it to the 2nd century, maintaining that it was not so much a literal history as an ideal representation designed to unite the parties by ignoring or minimizing their differences. The theory in this extreme form has, however, been abandoned even by Baur's later adherents; while such recent critics as Blass and W. M. Ramsay advocate the traditional authorship and date. The more extreme criticism has at least brought out the fact that the Acts is a unity, artistically planned and executed; but this must be understood as being quite consonant with the writer's having had at his disposal, and having made considerable use of, one or more written sources. See *Acts*, 'Camb. New Testament;' also *Acts*, Clark's 'Bible Class Handbooks;' Baur's *Church Hist. of First Three Cents.* (Eng. trans. 1879), which, while antiquated, is always inspiring and brilliant; W. M. Ramsay's *St. Paul, the Traveller and the Roman Citizen* (1895); and the various commentaries—*e.g.* Holtzmann's (3rd ed. 1901), gives abundant literature.

Actuary. In the Roman empire the *actuarii* were clerks who recorded the *acta* or deeds of the senate and other bodies, and who kept the military accounts; and hence the English word actuary originally denoted a registrar or clerk. Later it was applied to an officer appointed to record the proceedings of a court, in which sense it is still used in the Convocation of the Province of Canterbury; and then to the managing secretary or accountant of a public company, in which sense it is now obsolete, except in the case of a few banks still retaining an official with this title. At the present day the word means an official in an insurance company whose duties are to deal with statistics, deduce therefrom rates of mortality, and, by combining these with rates of interest, to calculate premiums for all kinds of insurances; also to estimate the liability of the company under its contracts, and advise what sum is required to meet these, how much may be safely regarded as surplus, and in what manner this surplus may be divided among the policy-holders as bonus; and generally to perform calculations of all kinds, and advise on all questions of accounting and finance. He has also, as a rule, to deal with many legal questions; and must have a certain amount of medical knowledge, in order to understand and benefit fully by the advice of the company's medical officer as to the acceptance or rejection of lives proposed for insurance. In 1819 the profession was recognized by government, by the creation of the office of Actuary to the Commissioners of the National Debt, an office which has been continued ever since. Though consulting actuaries were formerly deemed sufficient for the work of small companies, the growth of insurance business now necessitates a regularly-appointed actuary, with several fully-qualified assistants, on the staff of most companies. Many actuaries, in addition to holding a permanent appointment, undertake a certain amount of private work, and add considerably to their incomes by their consulting practice—partly in connection with friendly and benefit societies among the working classes, and pension, superannuation, and widows' funds of railway companies, banks, and churches, which all require periodical investigation; partly in connection with the purchase and sale of, or grant of loans upon, reversionary or life interests; and partly in connection with probate purposes, an actuary's valuation being required in respect of any reversionary interest forming part of the estate of the deceased. According to the law of Scotland, the heir in possession of an entailed estate has, in certain circumstances, the right to bar the entail and acquire the estate in fee on paying compensation to certain of the subsequent heirs. The amount of the compensation must be equal to the expectant value of the interests which are defeated by the breaking of the entail, and the court usually remits to an actuary the duty of ascertaining these values.

In the United Kingdom there are two corporations empowered under royal charters to examine candidates, and grant diplomas as actuaries. The *Institute of Actuaries* was founded in 1848, and incorporated in 1884. Its headquarters are at Staple Inn Hall, Holborn, London. It issues the *Journal of the Institute of Actuaries and Assurance Magazine.* The *Faculty of Actuaries in Scotland* is a similar body, founded in 1856, and incorporated in 1868, with its headquarters at 24 George Street, Edinburgh. Fellows of these two corporations are entitled to the letters F.I.A. and F.F.A., respectively, after their names. International congresses have been held at Brussels in 1895, at London in 1898, at Paris in 1900, and at New York in 1903, one of the most important results of these congresses being the adoption of a uniform system of notation for all countries.

Acupressure, a method of closing a blood-vessel devised by Sir J. Y. Simpson (1869), who passed a needle under the tissues and tied it in such a way as to press upon the artery. It is now almost obsolete.

Acupuncture, the insertion of needles into the body to a depth of one or two inches, generally until they pierce a nerve, where they are left for half an hour, to relieve lumbago and sciatica. It has been a specific surgical operation of the Chinese from very early times.

Acuto, Giovanni ('John of the Needle'), the Italian alias of Sir John de Hawkwood.

A.D., *Anno Domini*—in the year of our Lord—the chronological era now universally used in Christian countries, beginning with the supposed date of the birth of Christ.

Ada, tn., N. Hungary, on the r. bk. of the Theiss, some 8 m. s. of Zenta. Cattle, fish, and cereals. Pop. (1900) 12,104.

Ada-Bazar ('island-bazaar'), tn., Anatolia, Asia Minor, on the Sakaria, 24 m. E. of Ismid; silk, tobacco, and walnut wood. Ada-Bazar stn. (5½ m.), on Anatolian Ry. Seat of an Armenian bishopric. Pop. 18,000 (Moslems, 10,000; Christians, 8,000).

Adagio (It.), as a time indication in music, signifies that the movement should be played slowly and expressively. The word is also used as the title of a piece of music, or as the name of a movement in a symphony or sonata, etc.

Adair, Sir Robert (1763-1855), diplomatist; M.P. for Appleby and Camelford (1802-6); afterwards on diplomatic service at Vienna, Constantinople, and Brussels. He published *Hist. Memoirs of a Mission to the Court of Vienna* (1844); *The Negotiations as to the Dardanelles, 1808-9* (2 vols. 1845); and *Letter to the Electors of Westminster in 1793.*

Adalbert (c. 1000-1072), German ecclesiastic; appointed archbishop of Bremen and Hamburg in 1043 by the Emperor Henry III. Over his successor, Henry IV., he exercised such influence as to be the virtual ruler of the empire. He introduced Christianity among the Wends, and endeavoured, ineffectually, to found an independent patriarchate in the north. See Dannonberg's *Adalbert* (1877).

Adalbert, Heinrich Wilhelm, Prince of Prussia (1811-73), the son of Prince Wilhelm, uncle of Friedrich-Wilhelm IV.; born at Berlin; entered the army; visited Great Britain, Russia, Turkey, Greece, Brazil, etc.; took special interest in the formation of the German navy, and was made admiral in 1854; published *Aus meinem Reisetagbuch, 1842-3* (1847) *Denkschrift über die Bildung einer deutschen Flotte* (1848). See his *Biography* by Admiral Batsch (1890).

Adalbert, St. (1.) An early English saint (*c.* 700), probably a grandson of Oswald, king of Deira. He is supposed to have been the first archbishop of Utrecht. (2.) 'The Apostle of Prussia;' became bishop of Prague, his native place, in 982; devoted himself to missionary work in N. Germany and Poland. He was murdered (997) in Pomerania while preaching to the Prussians. In 1880 his bones were found in a vault at Prague, and were reburied in the cathedral.

Adalia, or Antalia (anc. *Attalia*, founded by Attalus II.; the *Satalia* of the middle ages), a port of Anatolia, Asia Minor, at the head of the Gulf of Adalia. Exports timber, horses, cattle, and grain. Total trade value amounts to over £250,000 annually. Pop. 30,000 (Moslems, 24,000; Christians, 6,000).

Adam and **Eve,** the first human pair, are represented in the well-known story (see Gen. 1 *ff.*) as having been created by God and placed in the garden of Eden, where they lived in a state of happy innocence until the fall. To obtain anything like an adequate view of the relations and implications of this Biblical story, we must first of all subject it to literary analysis. It is now generally accepted that the narrative is a combination of two different accounts of the creation of man. (See Hexateuch.) The greater and by far the more picturesque portion, from ch. 2:4*b* onwards, is attributed to a writer who is distinguished as J (*i.e.* the Jahvist); while ch. 1-2:4*a* is assigned to P (*i.e.* the Priestly Code). The latter always speaks of the Deity as *Elohim* (God), while the former uses *Jahveh* (the LORD); the use of the combination *Jahveh-Elohim* (the LORD God), in J's account, being explained on the hypothesis that some later compiler or editor added Elohim to Jahveh, in order to make the transition less abrupt. But, apart from this, and from other marked differences of form and style, the two writers diverge considerably in regard to the substance of the story. P speaks of man (Heb. *'adam*) as having been created on the same (sixth) day as the animals: Elohim makes him in His own image, a male and a female; He blesses him, and gives him dominion over all other created things. J's narrative is much more detailed: it tells how Jahveh (-Elohim) formed the man (*ha-'adam*), placed him in Eden, and subsequently fashioned the woman out of a rib taken from the man's side. Both accounts, however, agree in representing man as the crown of creation, and imply that he possesses a community of nature with God, and a capacity for fellowship with Him. In P there is nothing corresponding to J's account of the serpent, the fall, or the expulsion from paradise, the former writer's more concise and abstract representation being (though it stands first) a product of later theological and philosophical reflection.

The Sacred Tree with Eagle-headed Deities (*Assyrian Sculpture*).

Origin of the Paradise Story.—It is naturally upon J's account, not P's, that the main interest centres. The story of the garden of Eden, having been taken as the historical basis of the doctrine of sin, has become in consequence the objective of the most trenchant attacks from the side of modern science. Before proceeding to consider these attacks, or the place of the fall in theology, let us ask what, if any, light is thrown upon the narrative by (1) philology, and (2) the study of comparative religion. (1.) The supposed proper name *Adam* is identical with the Hebrew word *'adam*, meaning 'man.' In the English version of the Old Testament, Adam, the proper name, is used in passages where the generic term, 'the man,' would be undoubtedly more accurate. In some instances the name seems to waver between the proper and the generic usage; but there are indubitable instances of each—*e.g.* 'Adam' in Gen. 5 : 3-5, 'the man' in ch. 2 generally. The question then is, whether the common name became specialized into the proper, or whether the proper name was of independent origin, and merely happens to coincide with the common. Attempts to prove the latter alternative have decidedly failed to carry conviction. But since we have the Assyrian *admû*, meaning 'child,' and since, according to Sayce, *adam* is the common Babylonian word for 'man,' we may safely conclude that *adam* was originally a generic term that subsequently became a proper name. J's narrative employs the word in the sense of 'man,' or 'the man' as opposed to 'the woman.' Eve (Heb. *Havvah*) is, as the narrator (or editor) suggests in Gen. 3 : 20, connected with the Semitic root *ch-v-h*, 'to live,' and means 'life,' or the 'living one.' It is unquestionably used as a proper name, and may, in a somewhat changed form, be a reminiscence of the original or of some other legend. (2.) It has been supposed that the paradise story of Gen. 2 *ff.* is of Babylonian origin; but as yet investigators have not gathered from the cuneiform inscriptions any narrative sufficiently resembling the biblical account to be deemed the source of, or even a fair parallel to, the latter. Doubtless there are points of similarity between Gen. 2 *ff.* and certain elements in Babylonian mythology—*e.g.* the garden with its four rivers finds a parallel in the Babylonian isle of the blessed, which also has four streams, and the tree of life may be compared with the herb of life which grew on the island—but there are good reasons for doubting that the four rivers and the tree of life (not tree of knowledge) are original to J. Then there is a Babylonian seal-cylinder which shows a fruit-tree with two human figures and a serpent, and which has been supposed to represent the temptation; but this theory is now abandoned (see King's Printers' *Aids to Students of Bible*, Tablet 28, and notes by Sayce). We may mention that the cherubim which, according to Gen. 3 : 24, guard the gate of paradise correspond to the Babylonian and Assyrian figures of winged genii which protected houses (see King's Printers' *Aids*, Tablets 31–36). Finally, the serpent plays a great part in the mythology, not only of the Babylonians, but of many other peoples. The tree of life is also a widely-disseminated conception. Hence, even if these parallels and analogies were much more striking than they really are, the literature of Babylonia and Assyria has furnished as yet nothing to be compared, for richness of colouring or detail, with the paradise story of J. Nor have researches into other literatures brought to light any but obviously quite fortuitous resemblances to the biblical narrative.

The Writer's own Purpose.—It remains to inquire what the writer thought of his own narrative. Did he imagine that he was writing actual history? or shall we credit him with constructing a skilful allegory, or merely a picturesque story? Perhaps to neither of these questions can we give an unqualified yea or nay. Let us note, first, that the writer seems to be well aware that his story moves in a world other than the real—a world in which, for example, God is hardly more, and the serpent (an actual animal) hardly less, than human; and, again, that the serpent and the tree of knowledge (to say nothing of the tree of life, a somewhat irrelevant element) seem decidedly to indicate some older tradition lying at the basis of the narrative as we now have it. Taking these in connection with the fact that the writer speaks of 'the man' and 'the woman' rather than of 'Adam' and 'Eve,' our most probable conclusion will be that he found some popular tradition, richly laden, doubtless, with mythical elements, and idealized it—*i.e.* retold it so as to make it expressive of moral and spiritual truths. In his hands, therefore, the grosser and more fantastic features of the myth would be purged away; and, while preserving its dramatic form and quality, he permeated it with such truths about human nature as his own moral experience and environment suggested. It is just these embodied truths or ideas which constitute the real and permanent value of the story, and the psychological insight, the knowledge of human nature, displayed by the writer, must strike every attentive reader as remarkably penetrating and true. To note a few examples: the formation of the woman from the man's rib expresses her subordination to the stronger; her weaker character is also indicated by the serpent's choosing her as the immediate victim of his deceit; the connection between sin and shame and between sin and suffering is implied in the hiding from God and the expulsion from paradise respectively; while the fact that the serpent is not asked to explain its action may signify that the writer did not consider it a moral agent, thus registering a clear distinction between man and even the most 'subtil' of the animals.

Scientific and Theological Relations.—If the above be a fair statement of the case, it is plain that the objections of modern science to the paradise story of man's creation and fall are beside the mark. It follows, further, that discussions about the unity of the human race, and related questions, are entirely out of place in this connection. (See CREATION.) The parallelism between Adam and Christ which Paul draws in Rom. 5, and of which he found suggestions in Jewish contemporary theology, need not be considered as more than didactic, and loses nothing if we suppose Adam to be, in Paul's view, the typical head and representative of unredeemed human nature, as Christ is of regenerated mankind.

Later Developments.—The story of Adam and Eve has proved a fruitful theme for speculation in many directions. Leaving aside the theories of doctrinal theology as to the effects of the Fall, we find the story of Adam's creation retold in the Talmud with much of the mythical grossness and dualism which the writer of Gen. 2 *ff.* was so careful to exclude. Thus, Adam is represented as a man-woman of monstrous size, a terror to the angels. Having cast him into a sleep, God took parts of all his members, which, when scattered abroad, developed into human beings. Again, Adam's first wife was Lilith—the word occurs in Isa. 34:14; not 'screech-owl,' but 'night-monster,' as in R.V.; 'harpy,' 'succuba'—who, becoming the mother of demons, flew away. Her place was taken by Eve, created from a rib. Adam was afterwards tempted by an envious seraph, Sammael, and, in consequence of his sin, driven forth to wander up and down in the earth. The Koran tells the story with other mythical variations. Also, in several of the Gnostic systems Adam occupies an important place, being made the earthly representative of the Demiurge. Finally ought to be mentioned the fact that the beautiful garden, and the innocence and, later, the tragic experiences of its occupants have proved fruitful themes for pictorial and literary treatment—*e.g.* Michael Angelo's beautiful fresco in the Sistine Chapel of the Vatican, and Milton's *Paradise Lost*. For literature, see GENESIS.

Adam DE LA HALLE (1240–88), called '*Le Bossu d'Arras*' (Hunchback of Arras), author of *Le Jeu de Robin et de Marion*, the oldest French dramatic pastoral, or primitive comic opera, was a *trouvère* of Arras in Picardy, who found his way to the court of Charles of Anjou at Naples, where his piece was played in 1283. From another of his works, *Le Jeu de la Feuillée* (? 1262), a true mediæval medley of fantasy and satire, we glean hints of his early life. In 1282 he followed Robert II. of Artois to Italy. A complete edition of his works was published by Coussemaker (1879); there is an edition of *Le Jeu de Robin et de Marion* by E. Langlois (1896). See also Petit de Julleville's *Les Comédiens au Moyen Age* (1885), Strong and Barnett's *Hist. Reader of Early French* (1901), etc.

Adam OF BREMEN, born in the 11th century, in Upper Saxony, missionary, traveller, and canon of Bremen, is chiefly remembered by his historical and geographical writings, relating to N.W. Europe during the first millennium of the Christian era. His principal work, *Gesta Pontificum Hammenburgensium*, was edited by Lappenberg as vol. vii. of the *Monumenta Germaniæ*.

Adam, ADOLPHE CHARLES (1803–56), French musical composer, chiefly of comic opera, born and died at Paris. The *Postillon de Longjumeau* (1836) and the ballet *Giselle* (1841) were his most popular works.

Adam, ALBRECHT (1786–1862), a celebrated Bavarian military painter, lithographer, and engraver. His most important pictures are *The Battle of Moscow*, and *Episode at the Battle of Zorndorf*. The chief characteristics of his works are historical accuracy, detail, and good movement.

Adam, ALEXANDER (1741–1809), schoolmaster, born near Forres; became assistant-master at the High School, and rector, 1768–1809. Among his pupils were Scott, Brougham, and Jeffrey. He introduced the study of Greek into the school curriculum, and wrote a *Latin and English Grammar* (1772), which, being written in English instead of in Latin, was prohibited by the Town Council (1786). His most celebrated work was the *Roman Antiquities* (1791). See *Life* by Henderson (1810); Lockhart's *Life of Scott; Memorials of the High School*, by W. S. Dalgleish (1857).

Adam, MADAME EDMOND (1836), daughter of a physician at Verberie, department Oise, best known by the name of her second husband, Edmond Adam, prefect of police and life senator (d. 1877). Under the name of her first husband, 'Messine,' she published (1858) her *Idées Antiproudhoniennes sur l'Amour, la Femme et le Mariage;* and thereafter, as 'Juliette Lamber,' *Mon Village* (1860), and other works. In 1879 she founded *La Nouvelle Revue*, in which appeared her various studies of European society, *La Société de Paris*, *La Sainte Russie*, etc., written under the pseudonym 'Paul Vasili.'

Adam, JEAN (1710-65), poetess, was born and spent most of her life near Greenock. Left an orphan in early youth, she became nursery-governess and housemaid in a manse. After the publication of indifferent poems on religious subjects (*Miscellany Poems*, by Mrs. Jane Adams [*sic*], Glasgow, 1734), she started a girls' school, which, however, had soon to be closed; and Jean, after wandering about the country for some years as a hawker, died in the Glasgow poorhouse.

Adam, JOHN (1779-1825), Anglo-Indian statesman, son of William Adam of Blair-Adam. Going to India in 1796, he became secretary to the Marquis of Hastings, and was during part of 1823 acting governor-general of India. See the *Asiatic Journal*, Nov. 1825.

Adam, LAMBERT SIGISBERT (1700-59), French sculptor; in 1723 gained the Prix de Rome. He became a member of the Academy in 1737, and a professor in 1744. His works, which are chiefly symbolic, adorned the gardens of St. Cloud and Versailles, and the Château de Choisy. In 1754 he published a *Recueil de Sculptures antiques*, taken from examples discovered at Rome.

Adam, ROBERT (1728-92), architect, son of William Adam (d. 1748), also an architect; was born at Kirkcaldy. In 1754 he visited Italy with Clérisseau, and going to Dalmatia made studies of Diocletian's ruined palace at Spalato (see his *Ruins of the Palace of Diocletian*, 1764). On his return he was made architect to the king and queen (1762), but resigned the office on becoming M.P. for Kinross-shire (1768). In 1769, Robert and his brother James, who acquired a considerable reputation for the classical elegance of their designs, began the building of the Adelphi in London. Among their chief works are the Register House and the University at Edinburgh; the screen to the Admiralty Office, and Lansdowne House in Berkeley Square, London; and Lord Mansfield's mansion, near Hampstead. Robert is buried in Westminster Abbey. They published *Works in Architecture* (1773-8), to which a posthumous volume was added in 1822. See Heaton's *Furniture and Decoration in 18th Century England* (1892); Batsford's *Architecture of R. and J. Adam* (1880); art. in *Architect. Rev.*, Aug. 1900.

Adam, WILLIAM, of Blair-Adam (1751-1839), nephew of Robert Adam; lawyer, politician, and friend of Sir Walter Scott. Entered Parliament (1774); was counsel in impeachment of Warren Hastings, and defended Viscount Melville (Lord Dundas); lord commissioner of the Scottish Jury Court (1816).

Adam, WILLIAM PATRICK, of Blair-Adam (1823-81), son of Sir Charles Adam; Liberal member for Clackmannan and Kinross (1859-80); a lord of the Treasury (1865-6 and 1868-73); Privy Councillor and First Commissioner of Works (1873-4); Liberal Whip (1874-80); governor of Madras (1880); died at Ootacamund, India.

Adam-Salomon, ANTONY SAMUEL (1818-81), French sculptor, deserted a commercial for an artistic career, and went to study in Paris, where he achieved a brilliant success with a bust of Béranger. He also executed busts of numerous well-known persons, including Rossini, Lamartine, George Sand, and Delphine Gay. The Duke of Padua's tomb is his work.

Adam Scotus ('The Scot,' or 'The Premonstratensian'), d. 1180; entered the order of Premonstratensians (1158); became ultimately bishop of Whithorn in Galloway, and left numerous works.

Adam's Apple, the protuberance in the throat caused by the thyroid cartilage.

Adam's Bridge, a ridge of sand and rocks, about 30 m. long, between the islands of Rameswaram and Manaar. It formed at one time a portion of an isthmus which connected India with Ceylon, and is referred to in the *Ramayana* as the bridge over which the god Rama passed to invade Ceylon. A railway across is projected.

Adam's Needle. See YUCCA.

Adam's Peak (7,420 ft.), called by the natives SAMANELLA, an isolated granite mountain on S.W. edge of the central highlands, Ceylon, and a place of pilgrimage for Buddhists and Moslems. At the summit is a depression in the rock, said by the former to have been made by Buddha's foot, and by the latter to be the scene of Adam's penitential exercise after his expulsion from Eden, when he stood for 1,000 years on one foot. A curious shadow has been noticed by many travellers at sunrise on the peak. The shadow, instead of lying on the ground, appears to rise up like a veil in front of the observer: it is due to the formation of thin wreaths of mist. See *Philosoph. Mag.*, Jan. 1887.

Adamant (Gr. 'invincible') does not refer to any mineral in particular, but is used rhetorically to signify a substance of incomparable hardness. It has been identified with the lodestone, emery stone, and the diamond.

Adamawa, a Central African state under the dominion of the Fula. North of Yola, on the Benue, the capital of the state, Adamawa stretches N. towards Bornu, and N.E. towards the Shari; on the S.E. it forms part of French territory. Its area is perhaps 100,000 sq. m. The central and northern part is a block land, rising to 4,250 to 6,500 ft. East of this the country is occupied partly by isolated groups of mountains, partly by undulating plains. The mean ann. temp. is 76°. Rain begins in June, and is very frequent in July and August, accompanied by heavy thunderstorms. The dry north-east wind (Harmattan) blows from November to May. Arabs, Kanuri, Haussa, and Yoruba also dwell in Adamawa, the two latter races being engaged in industries and trade. The native negroes are ten times as numerous as the aliens. Islamism is the dominant religion; the masses are pagan. Gum-arabic, rubber, ivory, skins, kola nuts, and a few slaves are exported in exchange for cotton cloth, silk, copper, salt, sulphur, and beads. Cotton, indigo, and henna, as well as cereals and vegetables, are cultivated. The territory of Adamawa has been divided by treaties between Britain, Germany, and France, without regard to natural boundaries or tribal divisions. See Passarge's *Adamaua* (1895).

Adamello (11,661 ft.), the central point of the vast glacier-covered region that rises between (W.) the Italian Val Camonica (watered by the Oglio) and (E.) the Austrian valleys of the Sole (watered by the Noce) and the Sarca. It lies between the Adda valley (W.) and the Adige valley (E.). First climbed in 1864 by Julius Payer, the Arctic explorer.

Adamites, an Antinomian Gnostic sect in N. Africa in the 2nd century, who professed to return to the innocence of Eden, abstained from marriage, and rejected clothing. The doctrine reappeared among a section of the Brethren of the Free Spirit, or Beghards, of the 14th century, some of whom lived naked and had wives in common; among a section of the Bohemian Taborites, who were cut to pieces by Ziska, leader of the Hussites (1421); and in 1848-9 there was a small sect in Austria, the nocturnal meetings of which were attended without clothing.

Adamnan (*c.* 625-704), Irish saint, and abbot of Iona (*Hii*)—ninth in the succession of that office from Columba, whose life he is credited with having written—was born in Donegal, a scion, like his great predecessor, of the powerful local tribe of the Neills or O'Donnells (the clan Domhnaill). In 679 he was appointed abbot of Iona. In 686 Adamnan came to the court of Northumbria to beg for the release of certain Irish captives, and remained with King Aldfrith for a time, and (if tradition is to be believed) was there converted to the Roman usages in such matters as the date of celebrating Easter, the tonsure, etc. On completing his work, *De Locis Sanctis*, he presented it to Aldfrith. This book (subsequently reproduced by Bede in an abridged form) is of note as containing one of the first Western accounts of Palestine. Like Ælfred's *Voyages of Othere*, it professes to be an account, dictated by a stranded voyager (Arculfus, a Frankish bishop) on our coasts, of his earlier adventures. At the National Assembly of Tara in 692 there was enacted the 'Law of Adamnan,' or 'Law of the Innocents,' which freed Irish women from compulsory military service. The same assembly —one composed almost equally of churchmen and laymen —also decreed to the abbot of Iona and his successors an annual Irish tribute. Adamnan afterwards visited Ireland once again before his death at Iona in 704, Sept. 23, the day whose saint he is in the older Irish calendars. The Latin *Life of Columba*, now generally accepted as Adamnan's, is almost the only record outside Bede's History of one of the most attractive portions of the life of the early church in Scotland. Although the *Vita Columbæ* was not printed before 1601 (by Canisius, in *Lectiones Antiquæ*, vol. i. pp. 674 *et seq.*), many editions have appeared since—*e.g.* by Surius (1617), Messingham (1624), Colgan (1647), the Bollandists in their *Acta Sanctorum* (1698), Basnage (1725), Pinkerton (1789), and by Reeves, for Irish Archæological Society (1857). The latest is that of Fowler (Ox. 1895). The work *De Locis Sanctis* owes its first publication (by Gretser, 1619) indirectly to Casaubon. There have been later editions—Paris (1672), and Ratisbon (1734). Adamnan also appears as a participant in one of those extraordinary and abundant mediæval Irish saints' visions whose general scheme grotesquely prefigures Dante's. There is a 12th century MS. of this, but we cannot ascribe the piece to Adamnan himself. O'Donovan, in his *Irish Grammar* (1845), printed portions of a 14th century variant of the legend. See *Historians of Scotland*, vol. vi. (1874); H. Cotton's *Fasti Ecclesiæ Hibernicæ* (1849); A. P. Forbes's *Kalendars of Scottish Saints* (1872); Montalembert's *Les Moines d'Occident* (1866), Eng. trans. by Mrs. Oliphant (1867).

Adams, CHARLES FRANCIS (1807-86), American statesman, son of John Quincy Adams; served (1831-6) in the legislature of Massachusetts; elected to Congress for that state in 1858. Appointed ambassador to London in 1861, he displayed great tact and diplomatic skill in the complications arising out of the civil war. He returned to Massachusetts in 1868, and was an arbitrator in the *Alabama* claims tribunal at Geneva (1870-2). He published *The Life and Works of John Adams* (10 vols. 1850-6); *John Adams's Letters to his Wife* (2 vols. 1841); *Diary of John Quincy Adams* (12 vols. 1874-7).

Adams, FRANCIS (1796-1861), a physician in Aberdeenshire; Greek scholar. His chief works are *Hermes Philologus* (1826); *The Seven Books of Paulus Ægineta*, with commentary (1844-7); and editions of *Hippocrates* (1849) and *Aretæus* (1856).

Adams, FRANCIS WILLIAM LAUDERDALE (1862-93), grandson of the above; born at Malta; emigrated to Australia in 1883, where he worked as journalist and author. His works include *Australian Essays* (1886); *Songs of the Army and the Night* (1888); *The New Egypt* (1893); *Tiberius: a Drama* (1894).

Adams, JOHN, the principal survivor of the mutineers of the *Bounty*. His real name was Alexander Smith. See BOUNTY, MUTINY OF THE.

Adams, JOHN (1735-1826), American statesman, second president of the United States, born at Braintree (afterwards called Quincy), Massachusetts. He represented Massachusetts in the first Congress, and became one of its most active leaders. Adams proposed the appointment of Washington as commander-in-chief, and was a member of the committee which framed the Declaration of Independence. Appointed commissioner to France (1777-9), to Holland (1782), and ambassador to Britain (1785-88). On his return to America he became vice-president under Washington, whom he succeeded as president (1797). See his *Defence of the Constitution of the U.S.* (1787); *Observations on Paine's 'Rights of Man,' in a Series of Letters by Publicola* (1792); *Works*, ed. by grandson, C. F. Adams (1850-6); *Life* by J. Q. and C. F. Adams (1871). See also *Biography* by Morse (American Statesmen Series, 1884); *Our Presidents*, by V. F. Townsend.

Adams, JOHN QUINCY (1767-1848), American statesman, and sixth president of the United States, eldest son of the above; born at Braintree, Massachusetts. He became a member of Congress in 1803. He was successively ambassador to the Hague (1794), Berlin (1797), St. Petersburg (1809), and St. James's (1815). In 1817 he became Secretary of State to President Monroe, and in 1825 was elected president. At the end of his term (1829) he was defeated by Jackson, and in 1830 returned to Congress. Adams had a wide knowledge of international law, and is claimed as the real author of the Monroe doctrine, which received its most explicit enunciation in President Monroe's seventh annual message to Congress. Publications: *Letters on Silesia*, written during a tour through that country in the years 1800, 1801 (1804); *Diary, 1795-1848*, ed. by his son, C. F. Adams, in 12 vols. (1874-7). See *Biography* by Morse (American Statesmen Series); *Our Presidents*, by V. F. Townsend.

Adams, JOHN COUCH (1819-92), astronomer, born near Launceston, Cornwall; senior wrangler (1843); discovered simultaneously with Leverrier that the irregularity of the motions of Uranus were due to another planet, afterwards observed by Galle at Berlin, 1846, and called Neptune. In 1858 Adams was appointed professor of mathematics, St. Andrews, and, later, Lowndean professor of astronomy, Cambridge. See *Life* by Glaisher (1896-8).

Adams, SAMUEL (1722-1803), American statesman and champion of the cause of independence; was called the Cato of America; was elected to the legislature of Massachusetts (1765), and was a signatory of the Declaration of Independence (1776). He was successively lieutenant-governor and governor of Massachusetts. See *Lives* by Wells (1865), Morse (1884), and Hosmer (1885).

Adams, SARAH, *née* FLOWER (1805-48), hymn writer; author of 'Nearer, my God, to Thee' (1840). Her principal work is *Vivia Perpetua*, a dramatic poem (1841). Her sister, ELIZA FLOWER, wrote the music of the popular chorus, 'Now pray we for our country.' Both sisters were early friends of Browning. See *Macmillan's Mag.*, Jan. 1898.

Adams, THOMAS, Puritan preacher, who held charges in Bedfordshire, Buckingham, and London between 1612 and 1653. His works were collected and printed by Joseph Angus and Thomas Smith (3 vols. 1862). Southey named him 'the prose Shakespeare of Puritan theologians.' He died before the restoration.

Adams, William (1575-1620), English navigator, born at Gillingham, near Chatham. From 1600 till his death he resided in Japan. See vol. i. of *Purchas, his Pilgrimes*, and *Diary of Richard Cocks* (Hakluyt Soc. 1883).

Adams-Acton, John, sculptor, born (1836) at Acton, Middlesex; secured R.A. gold medal for *Eve supplicating Forgiveness at the Feet of Adam.* Subsequent works include *The Lady of the Lake*, *Statue of Mr. Gladstone* (St. George's Hall, Liverpool), *Bust of Mr. Bright* (National Liberal Club), *Statue of Napier of Magdala.*

Adamson, John (d. 1653), born at Perth; professor in St. Andrews University; professor and then principal (1625-53) of Edinburgh University; editor of *The Muses' Welcome* 'to the high and mighty Prince James' (1618), containing poems by the author and many of his contemporaries.

Adamson, Patrick (1537-92), Scottish prelate; born at Perth. He went to France as a tutor (1566), where he suffered imprisonment for referring in a Latin poem to Queen Mary's son as king of France and England. He returned to Scotland (*c.* 1572), became minister of Paisley, chaplain to the Regent Morton, and in 1576 was appointed by the regent to the as yet unabolished archbishopric of St. Andrews. From this time he was at open war with the General Assembly, until his excommunication in 1588 on various charges. He was the author of many religious works, and ranks high as a Latin poet.

Adamson, Robert (1852-1902), professor of logic and rhetoric in Glasgow University. His chief philosophical works are, *Roger Bacon: The Philosophy of Science in the Middle Ages* (1876); *The Philosophy of Kant* (1879); *The Philosophy of Fichte* (1881).

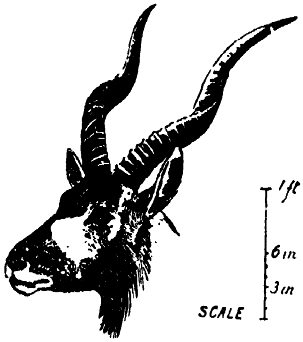
Adamson, Thomas, master gunner in Charles II.'s artillery; edited (1680), with additions, *England's Defence: a Treatise concerning Invasion*, by Digges.

Adana, vilayet in S.E. of Anatolia, Asia Minor. Pop. 405,000. Also chief tn., on the r. bk. of the Sihun, 528 m. S.E. of Constantinople; present terminus of railway from Mersina. Pop. 32,000 (Moslems, 14,500; Christians, 17,500).

Adanson, Michel (1727-1806), botanist, was born at Aix in Provence; studied in Paris; published *Hist. naturelle du Sénégal* (1757); *Familles des Plantes* (1763); *Cours d'Histoire naturelle fait en 1772* (ed. by Payer, 2 vols. 1844-5); *Hist. de la Botanique et Plan des Familles naturelles des Plantes* (2 vols., ed. by his son, A. Adanson, and Payer, 1864). See Cuvier's *Eloge Hist.* (1819).

Adansonia. See Baobab.

Adaptation. One of the most striking characters of living things is their fitness for their surroundings. This fitness is never absolute, but where it is specially marked in any species, the members of that species tend to increase in number, such increase being at the expense of other forms less well-fitted for the given environment. Characters which obviously render an organism well suited to its peculiar environment are termed adaptive characters, or adaptations. But it is clear that organisms not nearly related may have a common environment, wherefore the term 'adaptive character' has a secondary significance in addition to that indicated above, and implies that the particular character is of no value in classification, but has been acquired as a consequence of a certain method of life. Thus, parasites tend to lose locomotor organs and sense organs, are usually hermaphrodite, and invariably prolific. But the possession of these common characters does not indicate that all parasites are nearly related; they are rather to be described as adaptations to the parasitic mode of life. In general, it may be said that every organism possesses two sets of characters—(1) those whose use it is often difficult to define clearly, which it has inherited from its ancestors, and which are of supreme importance in classification; and (2) those which are adaptations to a particular mode of life, which have been acquired during the evolution of the stock, and are of no importance in classification. It is one of the great problems of systematic biology to distinguish between these two sets of characters, and to determine whether a given character is or is not of adaptive nature. The study of natural history in the broad sense is the study of adaptation; but Kerner's *Natural History of Plants* (trans. by Oliver, 1894) may be mentioned as a book which will afford an insight into the modern method regarding the subject. Otto Schmeil's *Text-book of Zoology* (trans. by Rosenstock, 1900) is similarly an attempt to point out the chief adaptations visible in the more familiar animals.



The Addax Antelope.

Adar, the twelfth month of the sacred (and the sixth of the civil) Hebrew year—February-March.

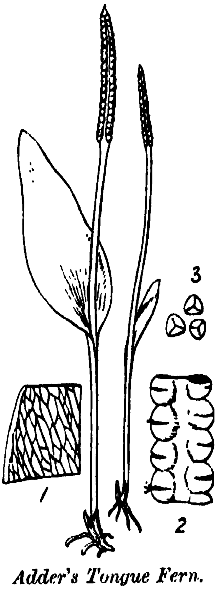
Adascheff, or Adaschev. (**1.**) Alexis (d. 1561), Russian statesman and soldier, who distinguished himself at the taking of Kazan (1552). He was the minister of Ivan IV., but fell into disgrace, and died in prison at Dorpat. (**2.**) Daniel Adascheff, his brother, conducted a victorious campaign against the Tartars. He suffered imprisonment along with Alexis, and was executed at Moscow (1561).

A.D.C. See Aide-de-camp.

Adda, or Ada, a port on the Gold Coast, on the r. bk. of the Volta, about 6 m. from its mouth, 62 m. E.N.E. of Accra. Pop. 8,000.

Adda, riv. of Italy, rises in the Bernina Alps, flows into L. Como; then S. through the Lombard plain, to enter the Po a few miles above Cremona. Length, 190 m., of which 77 are navigable.

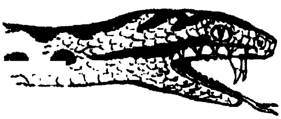
Addax (*Addax nasomaculatus*), an antelope allied to the gemsbok, but having horns which ascend in an open spiral, instead of being straight, as in the latter. The horns are present in both sexes, are ringed throughout the greater part of their length, and, measured along the spiral, reach a length of nearly three feet. The addax is a desert animal, inhabiting N. Africa and Arabia, and is



Adder's Tongue Fern.

1, Part of frond; 2, fertile spike; 3, spores.

of a general yellowish-white tint, the head, neck, and mane being brown, save for a white band and spots on the muzzle. The height is rather over three feet.



Head of Adder.

Adder, or VIPER (*Pelias berus*), the only British venomous snake, readily recognized by the black zigzag line down the back and the black mark on the head. It attains a length of over two feet, feeds chiefly upon mice, and is viviparous. Its bite, although producing much local and constitutional disturbance, rarely proves fatal, unless to very weak persons and children. If bitten, the wound should be immediately sucked, or washed with ammonia, to get rid of the unabsorbed venom; deep incisions made, causing a free flow of blood; and ligatures applied to stop circulation; while stimulants may be given at short intervals.

Adder's Tongue (*Ophioglossum vulgatum*), a small fern distributed throughout the N. Hemisphere, the Cape, and New Zealand. It forms each year one leaf, which divides into a flat, ovate, sterile portion, and an elongated, narrow, unbranched, spore-bearing part.

Addington, HENRY. See SIDMOUTH, LORD.

Addiscombe College, Croydon, Surrey, established (1809-61) for the education of cadets for the Indian army. Among those educated there were Sir Henry Lawrence, Lord Napier, Lord Roberts. See Col. Vibart's *Addiscombe College, its Heroes and Men of Note* (1894).

Addison, JOSEPH (1672-1719), one of the most influential of English writers; born at Milston, near Amesbury, Wiltshire, where his father was rector. He was elected in 1689 to a demyship at Magdalen; and of that college he was a fellow from 1698 till 1711. Though in politics a Whig, Addison early made the acquaintance of Dryden, to whom he indited verses, and to whose *Virgil* (1697) he contributed an essay on the *Georgics*. In 1699, Charles Montague (afterwards Lord Halifax) obtained for Addison a travelling pension of £300 a year, after which Addison spent eighteen months in France (meeting Boileau, Malebranche, and others), a year in Italy, and some time in Switzerland. He continued his travels to Germany and Holland till late in 1703, when his father's death recalled him to England. Addison's first preferment—a commissionership of appeal in the excise—came in 1704; thus endowed, he entered upon the composition of *The Campaign*, which launched him on his career of state service—a career which, thanks to the magnanimity of Swift, whose close friendship he won when in Ireland as secretary to the lord-lieutenant (1709), was not altogether broken even by the Tory triumph in 1710. This Irish visit marks also the opening of Addison's true literary vein. He had just started for Dublin when (Apr. 12, 1709) Steele began *The Tatler*, and in No. 18 his first contribution appeared. But it was only with the more famous *Spectator* (March 1, 1711-Dec. 6, 1712) that Addison really found himself, and left the imprint of his genius upon our literature. Under George I., Addison again became secretary to the lord-lieutenant of Ireland; then a commissioner for Trade and the Colonies; and finally (1717) Secretary of State, a post resigned in March 1718, owing to ill-health. He had been M.P. for Malmesbury since 1710, and this he remained till his death. On Aug. 3, 1716, Addison married Charlotte, Countess of Warwick, who bore him a daughter (1719). He died that same year (June 17) at Holland House, and was buried in Westminster Abbey. Apart from his Latin poems, Addison's writings fall under the heads of political journalism, verse, and miscellaneous prose. The first embraces *The Whig Examiner* (Sept.-Oct. 1710), an opposition sheet to *The Examiner*, in which first Prior, and afterwards Swift, fought under the Tory flag; *The Late Trial and Conviction of Count Tariff* (1713), a squib on the treaty of Utrecht; *The Freeholder* (55 numbers, 1715-16); *The Old Whig* (1719), a reply to Steele's *Plebeian*; etc. Of verse, besides *The Campaign*, a number of hymns are still remembered. But neither his opera, *Fair Rosamond* (1706), nor the celebrated *Cato* (1713), lives either as poetry or drama. *The Drummer*, a prose comedy, shares their oblivion. But in the sphere of the social essay Addison's art was consummate. To an unfailing tact of style he added a perception of character not at all dramatic, but marked

Joseph Addison. (*After Kneller.*)

by well-bred humour and nice discrimination. Addison's works were first collected by Tickell in 4 vols. (1721). Notable editions: Bishop Hurd's, 6 vols. (1811), re-edited in Bohn's Library, 6 vols. (1856); and Green's, 6 vols. (1898). Reprints of the *Spectator* are many. *Life* of Addison by Lucy Aikin (1843), and by Mr. Courthope (Eng. Men of Letters Series) (1884). See also Beljame's *Le Public et les Hommes de Lettres en Angleterre au XVIIIe Siècle* (1897).

Addison's Disease is associated with tubercular infiltration of the suprarenal bodies, and their adhesion to neighbouring parts, and is characterized by depression of the circulation and respiration, increasing weakness, and generally, though not always, by discoloration or browning of the skin. The disease was first described by Dr. Addison (1793-1860). The pigmentation begins usually on the face, neck, and hands. After death the adrenals are found adherent, and usually enlarged and nodulated; they are changed into a dense, grayish, translucent fibroid material enclosing opaque, yellow, cheesy masses, manifestly tubercular. The abdominal sympathetic nerve is nearly always implicated. Before the use of extract of the suprarenal gland, the disease was invariably fatal; but since the use of the extract several cases are said to have been cured, and many have temporarily improved. The permanent efficacy of this treatment is doubted by many. Some cases die with no obvious change in the suprarenals, but with marked changes in the abdominal sympathetic. Rest, careful dieting, and general hygiene must not be neglected. The gland may be given hypodermically, or by the mouth in the form of raw adrenal gland, as a tincture, or in tabloids containing the dried extract of the glands of sheep.

Additional Forces Act. Owing to the imminent danger of the invasion of the country by Napoleon in 1803 and the following years, the 'Additional Forces Act,' passed by Pitt, legalized the formation of second battalions to the regular regiments then serving abroad. The United Kingdom was divided up into districts, which were required by the act to furnish quotas of 3,000 men each. The act was repealed after the death of Pitt; but it is worthy of note that it embodied the chief features of the successful localization scheme initiated by Cardwell in 1872.

Addled Parliament, the name given to the second Parliament of James I. of England, which sat from April 5 to June 7, 1614. The royal purpose of getting supplies was supported by court politicians known as 'undertakers;' but Parliament insisted on redress of grievances, especially court interference in elections and the control of customs duties by the king, whence the dissolution before any act was passed (hence the nickname), and the imprisonment of the opposition leaders. See S. R. Gardiner's *Hist. of England from 1603 to 1649.*

Addo Bush, a tract of rough bush land (250 m. long) near Algoa Bay (50 m. N.E. of Port Elizabeth), adjoining the Zitzikamma and Knysna forests. It is still the habitat of some of the wilder animals.

Addorsed (in heraldry), said of figures placed back to back.

Address of Letters and Telegrams. See POST OFFICE, REGULATIONS OF.

Adductors, those muscles which draw a limb toward the middle line of the body, or which bring together the shells of bivalves.

Adelaer, CURT SIVERTSEN (1622-75), Danish admiral, born at Brevig in Norway. As a youth he took part in the famous battle of the Downs (1639) under Van Tromp, and in 1645 entered the Venetian service, during the republic's warfare with the Turks. On his return to Copenhagen, in 1663, he was made an admiral, in 1666 admiral-general, and ennobled. He died of the plague while in command of the fleet, on the outbreak of the war with Sweden. See Bruun's *C. S. Adelaer* (1871).

Adelaide, cap. of S. Australia, 6 m. E. of St. Vincent G., and 7½ m. by rail from Port Adelaide, was founded 1837, and named after the queen of William IV. It stands on a large plain (alt. 154 ft.), bounded on E. and S. by the Mt. Lofty range (alt. 2,333 ft.), at a distance of 4 to 8 m. N. Adelaide, the residential quarter, is separated from S. Adelaide, the business quarter, by a park ¼ m. wide, through which runs the Torrens R. Pop. within 10 m. radius of the post office is (1901) 162,094. Public buildings are Government House; town hall; the houses of legislature; St. Peter's Cathedral (Anglican), and the (R.C.) Cathedral of St. Francis Xavier; the Adelaide University; the viceregal summer residence at Marble Hill (alt. 2,000 ft.), 12½ m. from the city. The Adelaide Exhibition was held in 1887, to celebrate the jubilee of the colony. The Botanic Gardens (40 ac.) are adjacent to the Botanic Park and Zoological Gardens (84 ac.). New waterworks (1899) bring water from the Onkaparinga R., near Clarendon. The transcontinental telegraph line runs from Adelaide to Palmerston—*i.e.* Port Darwin—and a transcontinental railway is proposed. For shipping, see PORT ADELAIDE.

Adelaide, QUEEN (1792-1849), daughter of George, Duke of Saxe-Meiningen; married William IV. (then Duke of Clarence) in 1818. She was careful not to interfere in politics, yet to her influence was attributed the dissolution of the Melbourne ministry in 1834. She did much to raise the social and moral level of the court, and after the accession of Victoria she devoted herself to benevolent works.

Adeler, MAX, pseudonym of CHARLES HEBER CLARK (1841), American journalist and writer. He was for ten years secretary of the Manufacturers' Club of Philadelphia, and, as editor of their magazine, *The Manufacturer*, has written some important papers on economic subjects; but he is best known by his humorous books, which, from their quaintness, exaggeration of ordinary points, and startling bathos, are of the pure American type. His works include *Out of the Hurly Burly*, *Elbow-room*, *Random Shots*, and *Desperate Adventures*.

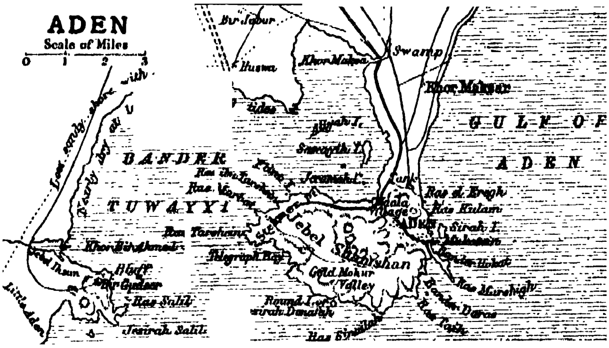
Adelphi Theatre, originally known as the SANS PAREIL, first opened its doors on Nov. 27, 1806, its founder being a successful tradesman named John Scott, whose daughter wrote almost all the pieces produced, and acted in them as well. In 1819 the house was named the 'Adelphi.' In 1821 Robert Keeley, the comedian, made *Tom and Jerry, or Life in London*, the 'rage' of the town. In 1825 the actors Yates and Terry were the managers, and their company included T. P. Cooke and John Reeve. After a few years Charles Mathews took Terry's place. But, with the retirement of Scott, luck seemed to have deserted the theatre. In 1838, Madame Céleste, who helped perhaps more than any other player to popularize the highly romantic pieces which gave birth to the expressive phrase 'Adelphi drama,' made her first London appearance at this theatre. In 1844 Céleste and Benjamin Webster became the lessees. In 1858 the old house was pulled down, and its successor was opened with Dion Boucicault's *Colleen Bawn*; his *Octoroon* followed in 1861. From this time till 1868 J. L. Toole was connected with the Adelphi. The attractions provided were largely American importations, the most notable being Joseph Jefferson's *Rip Van Winkle*. During a great part of 1868, *No Thoroughfare*, by Charles Dickens and Wilkie Collins, held the boards. Chatterton succeeded Webster at the opening of the Seventies; the event of his management was a Carl Rosa season in 1873. The fortunes of the house sank steadily during the reign of Chatterton and his successor Clark. In 1879 Messrs. A. and S. Gatti became its proprietors, and opened with the *Crimson Cross*, by Saville Rowe and E. Manuel, the company including Adelaide Neilson. In 1883 Robert Buchanan's *Storm-Beaten* was produced. It was followed by *Rank and Riches*, by Wilkie Collins. Mr. G. R. Sims's *Last Chance* and M. V. Sardou's *Daniel Rochat* were produced in 1885. Mr. Sims continued for twenty years to write for the Adelphi stage, in collaboration generally with Mr. Henry Pettitt until the latter's death (Dec. 1893). Their most popular melodrama was probably *Harbour Lights*, with which the name of Mr. William Terriss is linked in the minds of old Adelphi playgoers. He continued to be the ideal hero of Adelphi drama until his tragic death on Dec. 17, 1897, when he was stabbed while entering the theatre. In June 1897 Madame Bernhardt chose the Adelphi for her London season, and produced, among other pieces, *Lorenzaccio*, *Spiritisme*, and *L'Etrangère*.

Adelsberg (in Slav. *Postojna*), tn. and summer resort of Carniola, Austria, 40 m. by rail S.W. of Laibach, with vast stalactite caves, the habitat of a newt-like amphibian (*Proteus anguinus*) with rudimentary eyes. Pop. (1900) 3,636.

Adelung. (**1.**) JOHANN CHRISTOPH (1732-1806), German philologist and lexicographer; wrote *Grammatisch-kritisches Wörterbuch der hochdeutschen Mundart* (1774-86); *Mithridates oder allgemeine Sprachenkunde* (1806), completed by J. S. Vater. (**2.**) His nephew, FRIEDRICH VON ADELUNG (1768-1843), was an eminent philologist, Oriental scholar, and student of Russian history.

Ademption. See LEGACY.

Aden, British possession and strongly-fortified port on the S.E. coast of Yemen, Arabia, 105 m. E. of the Strait of Bab-el-Mandeb, 1,300 m. from Suez, and 1,650 m. from Bombay. It comprises the peninsula of Aden proper (21 sq. m.), the peninsula of Little Aden (15 sq. m.), and the district of Shaikh Othman (34 sq. m.), on the mainland. The peninsula of Aden is an irregular oval, 5 m. long E. to W. and 3 m. wide, connected with the mainland by a narrow sandy isthmus 1,350 yds. wide. The peninsula of Little Aden is a mass of granite 6 m. in length by 3 m. in breadth. Between them is the harbour, Aden West Bay, 8 m. E. to W. by 4 m. N. to S., and 3½ m. wide at its entrance. The town, or Aden Camp, is on the E. side, opposite the fortified island of Sira. The climate is hot, but not unhealthy; mean annual temperature, 83° in the shade, from 76° in January to 91° in June. The mean annual rainfall is 2·45 to 3 in. Snakes and scorpions are numerous. The outer harbour affords anchorage in 19 to 28 ft. of water; the inner harbour is dredged to a depth of 26 ft. Solyman the Magnificent fortified Aden, and it was afterwards occupied successively by the Portuguese and the Turks, until captured by the British in 1839. The pop.—(1837) 6,000; (1901) 41,222—is of a cosmopolitan character. Aden, along with Perim I., is under the government of Bombay. It is a port of call for all P. & O. liners. The imports include coal, cotton and silk fabrics, live stock, grain, provisions, tobacco, etc., to the value of 2¾ millions sterling; the exports, coffee, gums, spices, ivory, ostrich feathers, hides, pearls, etc. = 2¼ millions sterling.



Adenalgia and **Adenitis.** See GLAND.

Adenoid Growths of the lymphatic tissues of the upper throat occur chiefly in children from four to fourteen years. The child breathes only through the mouth, suffers from nasal catarrh and slight deafness, and is stupid and sluggish, with a characteristic facial expression. Cure is effected by a simple operation of removal.

Aderno, tn., Catania, Sicily, on S.W. slope of Mt. Etna, 22 m. by rail N.W. of Catania; there are two Norman structures of Roger I.—a keep and a monastery (1157). Aderno stands on the site of *Hadranum*, famous for its temple of Hadranus. Pop. (1901) 25,689.

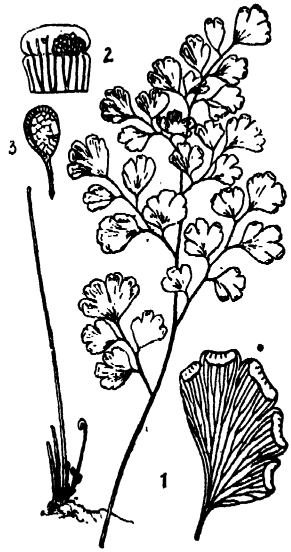
Adersbach Rocks, columns of Cretaceous sandstone, in a valley close to the Bohemian frontier, not far from Braunau. Varying widely in size, they generally resemble one another in shape, and cover an area of about 4 by 1¼ m. The softer parts of the sandstone have been worn away by water, leaving the harder cores.

Adherence, ACTION OF, in Scots law, an action which may be raised by husband or wife if one deserts the other without cause and remains away for four years. The action generally contains conclusions for aliment as well as adherence. It is barred by cruelty or infidelity on the part of the pursuer.

Adhesion, in physics. See COHESION and FRICTION.

Adhesions of organs within the body arise from the growing together of surfaces, usually as the result of inflammation. Thus, the lungs may be bound to the thoracic wall after pleurisy; peritonitis may result in coils of the intestine becoming matted; or the heart or stomach may be drawn to an abnormal position. Adhesions may interfere with the normal movements of organs, strangulating intestines, or destroying important vessels and nerves by pressure; on the other hand, post-mortem examinations frequently reveal adhesions which have caused no inconvenience.

Adiabatic. See STEAM-ENGINE and THERMODYNAMICS.



Adiantum (*Maidenhair Fern*).
1, Part of frond; 2, involucre laid open; 3, capsule.

Adiantum, a genus of ferns with marginal sori which run across the veins of the leaf, and are covered by an indusium formed by the edge of the frond. One, the maidenhair fern, *A. capillus Veneris*, is British.

Adiaphora (Gr. 'indifferent things'), in ethics, such actions as lie between the spheres of good and evil. The Stoics gave currency to the word in this sense, and Cicero, *De Finibus* (iii. 16), translates it by '*indifferens*.' The Adiaphoristic controversy troubled the Reformed Church in Germany for a few years subsequent to 1548. In that year the Emperor Charles v., desiring to heal the breach between Catholic and Protestant, prescribed a certain rule of faith and ritual as binding on all, till some permanent form should be determined upon by a general council. Thereupon the Elector Moritz of Saxony urged Melanchthon and his followers to declare what portions of the document they were willing to accept, and they decided, in the Leipzig Interim, to regard certain customs and tenets (*e.g.* the use of candles, pictures, Latin hymns, but notably the doctrine of justification by faith) as indifferent—*adiaphora*. This was more than the stricter followers of Luther would allow, and there ensued a bitter controversy.

Adige (Lat. *Athesis*, Ger. *Etsch*), riv., Austria and Italy, rises in the Rhætian Alps in Tyrol (alt. 5,005 ft.). After a swift descent to Glurns, it traverses the Vintschgau eastwards, but at Meran it bends S., flows past Botzen, Trent, and Roveredo, nearly as far as the S. end of Lake Garda; thence S.E. past Verona to Badia, and finally E. to the Adriatic (parallel to the Po). In its lower course the Adige is connected with the Po by several canals, and is itself canalized through alluvial deposits. Length, 250 m., of which 120 are in Italy; it is navigable up to the confluence of its chief trib., the Eisach, a distance of 190 m. See Penck's '*Die Etsch*,' in the magazine of the German-Austrian *Alpenverein* (1895).

Adi Granth, the sacred books of the Sikhs, first edited in the 16th century. See Trumpp's *Adi Granth* (1877), and *Die Religion der Sikhs* (1881).

Adigrat, ADIGHERAT, ADDI GARAHT, or ATEGERAT, tn., Tigré, cap. of prov. Agamé, Abyssinia, about 90 m. S. of Massowah, at the summit of Abyssinian plateau; important market at the centre of several routes. Alt. 8,500 ft. Mt. Aleghia (10,496 ft.) is near it. Pop. 2,000.

Adipocere is a white or yellow waxy substance that is formed in corpses buried in the absence of air. It is probably a collection of the fatty acids present.

Adipose Tissue. See FAT.

Adirondacks, group of mts. in N. of New York State, U.S.A., a part of the Appalachian system, made up of isolated peaks of Archæan crystalline rocks, small groups and short ranges. It abounds in lakes, and its streams are interrupted by rapids and falls. It is heavily forested, except where the timber has been removed by fire or by the lumbermen; and considerable parts of the region, amounting altogether to 1,357,576 ac., or more than 2,000 sq. m., are owned by the state as a forest reserve. The highest peak is Mt. Marcy, with an alt. of 5,344 ft. The region, which is noted for its wild beauty, is a favourite resort in summer.

Adis Abeba, or ADDIS ABBEBA (FINFINI), cap. of Shoa, and down to 1901 the cap. also of Abyssinia, in the midst of mountains, near one of the sources of the Blue Nile. Founded in 1885 as a pleasure resort, it is an important place of trade. Here peace was signed with the Italians in 1896. Pop. 10,000.

Adis Alam, or ADDIS HALEM, cap. of Abyssinia since 1901, lies about 40 m. W. of Adis Abeba.

Adit, a horizontal shaft or opening into a mine from the side of a hill.

Adjournal, in Scots law, the notification of a single sitting of the Court of Justiciary, or a single day's proceedings.

Adjudication. See BANKRUPTCY.

Adjuration. See OATH.

Adjustment of Average. See INSURANCE, MARINE.

Adjutant, a regimental staff-officer who assists the officer commanding a regiment or a corps in carrying out the details of military work. The adjutant of a battalion of infantry is usually one of the senior subalterns; but to brigade divisions of artillery, infantry depôts, and to units of the auxiliary forces, a captain is often appointed. The tenure of office in the case of the regular forces is limited to four years. The adjutant has charge of the regimental office, with its books, records, and correspondence. He is responsible for the issue of all regimental orders, keeps the roster for duties, and also generally acts as prosecutor at courts-martial on men of his corps. He superintends the drilling and musketry instruction of young officers and recruits, and keeps a watchful eye on the way all military duties are performed. Though the captains of companies are responsible for the discipline, drill, and administration of their commands, the adjutant must see that everything is conducted on a uniform system, and ensure that the views of the commanding officer are carried out. Candidates for the appointment of adjutant of militia, yeomanry, and volunteers have to pass an examination in military duties, and their tenure of office is limited to five years.

Adjutant (*Leptoptilus dubius*), an Indian bird belonging to the same family as the storks, characterized by its naked flesh-red neck and throat, and the large throat-pouch. Owing to its practically omnivorous habits, it is protected as an efficient scavenger.

Adjutant-general, the senior staff-officer at headquarters, ranking next to the commander-in-chief. He is charged with the discipline, training, exercise, and inspection of the forces, and is responsible for the efficiency of the *personnel* of the army.

Adjutators (wrongly termed 'Agitators') were representatives elected by the regiments of the Puritan (Independent) army in 1647 to force from Parliament, which was strongly Presbyterian, satisfaction of the demands of the army before being disbanded. See Gardiner's *Hist. of the Great Civil War*; Carlyle's *Cromwell*.

Adjuvant, part of a prescription intended to aid the action of the base or principal drug.

Adler, FELIX (1851), born at Alzey, in Germany; went early to the United States; professor of Hebrew and Oriental languages and literature in Cornell University (1874-6). He established the Society of Ethical Culture, New York (1876), and published *Creed and Deed* (1877), and *The Moral Instruction of Children* (1898).

Adler, FRIEDRICH (1827), German architect, travelled extensively in Europe and Asia Minor, and returned to teach at Berlin. He has carried out some important designs, including those of the Christuskirche and Thomaskirche at Berlin, and has made valuable researches into ancient architecture in connection with excavations in the Peloponnesus. Among his works are *Baugeschichtliche Forschungen in Deutschland* (1870-79), *Die Baugeschichte von Berlin* (1861), and *Die Weltstädte in der Baukunst* (1872).

Adler, GEORG (1863), German economist, professor at the University of Freiburg in Germany; has published *Karl Marxsche Kritik* (1886), *Internationaler Arbeiter-Schutz* (1888), *Staat und Arbeitslosigkeit* (1894), *Die Social-Reform im Altertum* (1898), *Geschichte des Socialismus und Communismus* (1900), and other works.

Adler, HERMANN (1839), born at Hanover; succeeded his father, Nathan, as chief rabbi of the United Hebrew congregation of the British empire in 1891. He is president of the Jews' College, and one of the vice-presidents of the Mansion House Council for the Dwellings of the Poor. He has published *Ibn Gabirol, and Scholastic Philosophy* (1864), *Jewish Reply to Dr. Colenso* (1865), *A Volume of Sermons on the O.T.* (1869), *Can Jews be Patriots?* (1878).

Adler, Jakob Georg Christian (1756–1834), Danish Orientalist; one of the best Arabic scholars of his day; author of an interesting treatise on the Cufic MSS. in the University of Copenhagen (1770), and of the celebrated *Novi Testamenti Versiones Syriacæ simplex, philoxeniana et hierosolymitna* (1789). In 1789-93 he edited *Abulfida's Chronicles* in Arabic.

Hermann Adler, Chief Rabbi of the Jews in the British Empire.
(*Photo by Kruger, Huddersfield.*)

Adler, Nathan Marcus (1803-90), chief rabbi, was born at Hanover. Having filled the office of chief rabbi of the duchy of Oldenburg and later of Hanover, he was in 1844 elected chief rabbi of London, where he played an important part in the reunion of the English congregations. He published a Hebrew commentary on the Chaldee paraphrase of the Pentateuch, *Nethinah Lager* (1874; 2nd ed. 1877). See *Jewish Quarterly Review*, July 1890.

Ad libitum ('according to taste'), a musical term authorizing the use of discretion with regard to the *tempo* of the passage; or, in concerted music, indicating that the part thus marked may be omitted. Also a common expression, meaning 'to an indefinite extent.'

Admetus, king of Thessaly and husband of Alcestis, who died to deliver her husband from death, but was rescued from Hades by Heracles. See Euripides's *Alcestis*, Browning's *Balaustion*, Meredith's *Phœbus with Admetus*, and Lowell's *Shepherd of K. Admetus.*

Administration. The function of the state termed administration should be carefully distinguished from the function termed executive. (See Executive.) The special feature of administration is that it cannot be bound by hard-and-fast rules, but, while observing, it may be, legal limits, must work according to the exigencies of particular circumstances. It is just because so much discretion must necessarily be left to the administrator that, in communities in which popular feeling is strong, there is always manifested a tendency to make administrative posts elective. Just as obedience and discipline, so important in the executive official, are best secured by nomination and appointment; so confidence and freedom of action, essential to the administrator, are assured by popular election. The community naturally desires to have a direct voice in the choosing of officials to whom so much latitude must necessarily be given. This tendency is strikingly manifested in the political history of England. The attempts of the popular element to obtain control of the finances have been not only successful but salutary; for finance is essentially a matter of administration, and, in spite of its obvious weaknesses, an elective body like the House of Commons is better qualified to perform it than the best permanent official. On the other hand, the great officials in the public service have an executive as well as an administrative character, and therefore every attempt to make them directly elective has failed. The present system, by which the crown appoints to great offices only such persons as are acceptable to the representative body, is a happy compromise. The same principle will be found at work in local government, and many of the difficulties in Continental government arise from neglect of it.

The growth of administrative duties has led to the appearance, in modern politics, of a special class of public officials, known as 'Ministers,' or 'Ministers of State.' In popularly-governed countries, such as Great Britain, these officials cannot remain in office if their policy is disapproved of by Parliament. They are sometimes described as 'responsible ministers'– *i.e.* ministers responsible, not to the head of the state (for all officials are responsible in that sense), but to Parliament. They must be carefully distinguished from the host of minor officials who, in such countries as France and America, are sacrificed to the 'spoils system' on a change of government. These men are dismissed by their official superiors, not because their policy is distasteful (for they have none), but simply in order to reward party services.

In bureaucratic and autocratic governments it is very difficult to say what constitutes a minister of state. The chief officials, having no responsibility to Parliament, cannot insist on their views being adopted by the head of the state; therefore they can hardly be said, as in the case of ministers in England and France, to be entrusted with the exercise of the prerogative. Perhaps the nearest definition will be that a minister of state, in such a government, is an official who has direct access to the head of the state, and is controlled, in the exercise of his discretion, only by the head of the state. To this we may perhaps add that a minister, as distinct from a mere councillor, must be at the head of a recognized department of state, having subordinate officials under him. This is certainly the view of eminent writers (*e.g.* Bluntschli), but it will become an untrue definition if, as has often been suggested, the prime minister in the cabinet of a great state ought to be entirely free from all detail duties or supervision of subordinates.

Of the burning question which turns on the proper limits of the administrative action of the state this is not the place to speak. (See article on State.) But it may be again noted that the real difficulty of this question lies in the fact that administration involves not merely the carrying out of definite rules, but the exercise of individual discretion. The average man does not dislike the state authority which represents the impersonal force of law, but he is apt to resent the substitution of the discretion of a state official for his own. See Bluntschli's *Theory of the State* (1892); Goodnow's *Comparative Administrative Law* (1893); Hervieu's *Les Ministres....dans les Differents États* (1893); Sidgwick's *Elements of Politics* (1891); Bagehot's *The English Constitution* (4th ed. 1896).

Administration Action, an action instituted for the purpose of having the estate of a deceased person administered under the direction of the Chancery Division of the High Court of Justice, to which the administration of the estates of deceased persons is assigned by the Judicature Act, 1873. Where the amount or value of an estate does not exceed £500 a county court has now jurisdiction. Formerly any person interested under a will, or on intestacy, could, as a matter of right, commence an administration suit involving frequently great delay and cost; but now the court has power either to order a general administration, or to determine any particular questions without a general administration, as may appear necessary. A further check on administration proceedings is the power which the court now has to order a plaintiff to pay the costs of any action unnecessarily or improperly launched. See Daniell's *Chancery Practice.*

Administrator, in law, is a person appointed by the Probate Division of the High Court - (1) when a person dies intestate; (2) when a person dies having made a will, but having left no executor. He is then called administrator *cum testamento annexo*. (3) If an executor dies without having distributed the estate, an administrator *de bonis non* is appointed—*i.e.* of the property not yet distributed. The nearest of kin will generally be appointed administrator, but in default of any other person a creditor can obtain letters of administration. Application for a grant of letters of administration must be made within six months of the intestate's death; otherwise any person assuming to act as administrator will be liable to a penalty of £100, and 10 per cent. on the value of the property taken possession of or in any way administered. The functions of an administrator are in the main the same as those of an executor; but while the latter can do many acts before obtaining probate of the will, the former, who derives his title from the court, can do nothing before administration is granted to him, except perhaps acts necessary for securing property of a perishable nature, and what are called acts of necessity or humanity—*e.g.* feeding animals, etc. An administrator is allowed a year from the death of the intestate before he is obliged to distribute the estate, so that he may have time to deal with all claims against it. He should as soon as possible advertise in the *London Gazette* and newspapers for persons to pay their debts to, and make claims against, the estate; and until he has done this he cannot safely distribute the property. The office of an administrator, unlike that of an executor, does not upon death devolve upon his legal representatives, but a new administrator must be appointed. An administrator cannot claim any remuneration for his services or loss of time, but he is entitled to charge his expenses against the estate. See Williams, *On Executors*.

Admirable Crichton, THE. See CRICHTON, JAMES.

Admiral, chief executive officer, having permanent rank which fits him to command a squadron or fleet. Du Cange says that the Sicilians were the first to use the word with a specific meaning, and that they borrowed it from the nations farther east. It has been in use among maritime countries since the 13th or 14th century. There is reason to suppose that the title of admiral was in general use among the French before it was known in the English service; for in a convention executed at Bruges, in March 1297, Sir William Leybourne is styled 'Admiral of the Sea of the King of England,' although his official designation at home was 'Captain of the King's Sailors and Mariners.' It was not, in fact, until 1300 that the title was accepted by the English. In that year Gervase Alard, who was in charge of the Cinque Ports fleet in Edward I.'s expedition to Scotland, is described in the wardrobe accounts as Admiral of the Fleet. After that date the designation of 'Captain and Admiral,' and less frequently 'Admiral and Captain,' is commonly found in records of the British navy. In its earliest application the title was only used for the official in supreme command of all the naval forces, and it was not until 1311 that it became of general use in application to all commanders of fleets and squadrons. The functions of admiral had previously been discharged by officers in the king's service known as 'Guardians of the Sea,' 'Leaders and Constables,' 'Justices,' 'Captains and Keepers of the Sea.' The office of Lord High Admiral seems to have been first created about 1406, and vested in John, Earl of Somerset. Owing to feeble legislation and poor administration in regard to the fleet and mercantile marine, the merchants had been reduced to undertake the safeguarding of the seas for themselves in previous years, and for that purpose a body of mercantile admirals had come into existence. Their powers and duties ultimately were merged in the Earl of Somerset, by whom they were all superseded. (See ADMIRALTY.)

As British fleets grew larger and more numerous, it became necessary to appoint more than one admiral. At first the functions of the subordinate officers of the rank were limited to particular waters, etc.; but presently a systematic subdivision of the rank was recognized, and a vice-admiral and a rear-admiral were appointed. Three flag-officers, however, were not for long sufficient for an increasing navy; and it was then found convenient to divide the whole fleet of the country into three squadrons, which were distinguished according to the colours worn by them, and which, at the beginning of the 18th century, were known as the Red, the White, and the Blue—the Red being the senior squadron. For each of these squadrons 3 flag-officers were appointed, so that in respect of each squadron there were then one admiral, one vice-admiral, and one rear-admiral. The senior admiral, however—*i.e.* he who was in a position to command all the other flag-officers—was called, not Admiral of the Red, but Admiral of the Fleet. There were thus 9 flag-officers in all, ranking in order of seniority—Admiral of the Fleet, Admiral of the White, Admiral of the Blue; Vice-admiral of the Red, Vice-admiral of the White, Vice-admiral of the Blue; Rear-admiral of the Red, Rear-admiral of the White, and Rear-admiral of the Blue—the last being the junior. But towards the middle of the 18th century 9 flag-officers were found insufficient, and additions were made to each class, with the exception of that of Admiral of the Fleet; so that in the year 1798 there were as many as 9 Admirals of the White, 13 Admirals of the Red, and so on. In 1801, at a time of further increase of flag-officers, the new rank of Admiral of the Red, intermediate between that of Admiral of the Fleet and that of Admiral of the White, was established for the first time; though, owing to the ignorance of the Admiralty authorities, it was officially announced that the king had been pleased 'to revive' the rank. A few years later the anomalous measure of increasing the number of admirals of the fleet was also adopted. The authorized number of flag-officers of each rank on the active list of the navy in 1901, the relative rank of military officers, the extreme age for compulsory retirement, and the full pay and half (and retired) pay, are given in the accompanying table. Flag-officers are compulsorily retired after seven years' non-service at sea, while admirals and vice-admirals have the option of retiring at sixty, and rear-admirals at fifty-five.

No.	Naval Rank.	Ranking with	Retd at	Full Pay.	Half Pay.
3	Admirals of the Fleet	Field-marshal	70	£2,190	£1,222 15 0
10	Admirals	General	65	1,825	766 10 0
20	Vice-admirals	Lieut.-general	65	1,460	593 2 6
35	Rear-admirals	Major-general	60	1,095	456 5 0

Admiral (butterfly). See RED ADMIRAL.

Admiralty, the administrative and supreme executive body of the royal navy. The gradual growth in the powers of the Admiralty may be traced from the earliest days of British naval history. Until the beginning of the 15th century the naval affairs of the country were conducted by the King's Council. The functions, though not the title, of admiral had been acknowledged (see ADMIRAL); but the want of a centralized controlling authority was made manifest by the disasters which in the latter part of the 14th century had befallen British commerce. From 1406 until 1628 there followed successive lords high admirals. The office was then put into commission; and its powers have, with but one or two short intervals, been ever since vested in the Admiralty authorities, now known officially as the 'Commissioners for Executing the Office of Lord High Admiral of the United Kingdom of Great Britain and Ireland,' etc. It is to Henry VIII., however, that we may definitely attribute the reorganization, or rather the establishment, of the Board of Admiralty. The naval business of the country had so far increased as to necessitate new measures in regard to its conduct. Henry VIII., while leaving to the admiral-in-chief his executive functions, gave him an advisory council, which became known as the Admiralty Board, and created on April 24, 1546, a Navy Board to undertake the civil administration that had hitherto devolved upon the 'keeper of the king's ships.' Subsidiary branches to deal with dockyards, victualling, ordnance, etc., were established; and a surveyor of ships, a treasurer of marine causes, a comptroller of ships, and a clerk of the ships were appointed. Under Edward VI. the constitution was further reorganized. The Admiralty Board and Navy Board were kept distinct, and it was not until 1832 that Sir James Graham succeeded in putting an end to the dual control. Under James I. a council of officers, consisting of men of rank, was established to assist Buckingham, who was then lord high admiral. These officials may be regarded as the forerunners of the Admiralty Board as at present constituted. During the commonwealth affairs were managed by committees of the House of Commons. At the restoration, James, Duke of York, became lord high admiral, and appointed three commissioners to act with the treasurer of the navy, the comptroller, the surveyor, and the clerk of the acts. Charles II., through his Privy Council, assumed for himself the administration of the navy, and conducted it until his death. When James, Duke of York, came to the throne as James II., he did the same until 1688. It was due to his tenure of the office, or at any rate to his influence, that the victualling and transport, which had hitherto been controlled by the Navy Board, were handed over to the separate control of the Victualling Commissioners, who were established in 1683, and the Transport Board, which was constituted in 1689. James was possessed of a very high administrative ability; endeavoured to see that the dockyards were conducted honestly; that relief to seamen was given, as it should be, from the 'Chatham Chest;' that the commissioners lived within reach of one another, published the times of their meetings, and received reports on the conduct of officers on their return from a voyage. In 1690 an act was passed confirming the powers of the commissioners; and it was followed, two years later, by a resolution of the House of Commons petitioning the king to appoint commissioners of known maritime experience. The constitution of the Admiralty as it stands at present is due to these two measures. In 1701 the office of lord high admiral was revived, but since 1709 it has been in commission, except during a short period from May 1827 to September 1828, when it was held by the Duke of Clarence, afterwards William IV. The great naval victories of the 18th century, under Rooke, Shovel, Byng, Anson, Rodney, Hawke, Howe, and others, drew attention away from the internal workings of the Admiralty administration. In 1782 there were thirteen different departments, whose business was being carried on in different and distant quarters. The corruption was by no means confined to subordinate officials. It spread to such an extent throughout the various branches of the department that, in the case of the King *v.* Owen and Mardle (July 1801), the attorney-general stated that depredations upon the naval stores amounted to £500,000 per annum. In 1801 Lord St. Vincent went to the Admiralty as First Lord, and made many enemies through his zeal and unflinching integrity. During his tenure of office the Commission of Naval Inquiry was appointed, and laid the foundations of improvement in the civil administration of naval affairs. It was not, however, until several years afterwards that any reform was carried out. In 1832 Sir James Graham, who had become First Lord of the Admiralty two years before, succeeded in bringing about the abolition of the Navy Board and Victualling Board as separate departments. The duties were transferred to five 'principal officers' under the direct control of the Board of Admiralty, each department being placed under a superintending lord, who represented it at the Board. These officials consisted of the surveyor of the navy, the accountant-general and the storekeeper-general, the comptroller of victualling and transport, and the physician-general of the navy. The organization as it stands at present will be best understood from the above table. See Sir R. J. Hamilton's *Naval Administration*; Clowes's *The Royal Navy*; Oppenheim's *Administration of the Royal Navy, 1509-1660.*

Relation of the Lords of the Admiralty to the Various Departments.

First Lord.	Civil Financial Secy.	Accountant-general. Director of Contracts. All departments as regards financial questions.	Finance.
	Civil Lord.	Director of Works. Accountant-general (pay and allowances). General of Greenwich Hospital.	Works and Civil Personnel.
	Comptroller.	Director of Naval Construction. Director of Dockyards. Engineer-in-chief (material). Director of Naval Ordnance (material). Director of Stores (excepting coal). Expense Accounts Branch.	Material.
	Junior Sea Lord.	Director of Transports. Director-general of Medical Department. Director of Victualling. Director of Stores (coal). Accountant-general (allowances, table money, etc.). Chaplain of the Fleet (chaplains and naval instructors). Intelligence Department (affecting above).	Personnel of the Navy and all Fleet Organization.
	Second Sea Lord.	Admiral-superintendent of Naval Reserves (personnel). Engineer-in-chief (personnel). Chaplain of the Fleet (naval schools). Manning the Navy. Intelligence Department (mobilization). D. A. G. Royal Marines.	
	First Sea Lord.	Admiral-superintendent of Naval Reserves (ships). Hydrographer. Director of Naval Ordnance (gunnery and torpedo training establishments). Naval Intelligence Department. Discipline.	

Admiral Sir John Fisher, G.C.B., First Sea Lord of the Admiralty.

(From a photograph by J. Russell & Sons.)

Admiralty Buildings. The Admiralty Office was the personal office of the lord high admiral, and the chief business was often conducted at the private residence of the lord high admiral for the time being—as, for instance, at Warwick House, Holborn, belonging to the Earl of Warwick; and by the Earl of Northumberland at his house in Queen Street, Covent Garden. At various times the office was situated at Derby House, Cannon Row, Westminster, and at Pepys' House in York Buildings. In 1722 Thomas Ripley built, on the site of old Wallingford House, Whitehall, the present office for the Board of Admiralty. The Lords Commissioners moved into the building in 1725. The building itself and the internal decorations possess a great deal of historical interest. The *Mermaid*, sloop of war, brought six hundred mahogany planks from Jamaica for the doors and woodwork of the interior; and there are not a few pictures and prints, mainly of maritime interest, such as paintings by W. Hodges, R.A., and J. Webber, R.A., made from sketches during their voyages with Captain Cook. Very considerable additions to the Admiralty buildings between Whitehall and St. James's Park were begun in the last years of the 19th century; and there is now, for the first time, room under one roof for nearly the whole of the departmental offices. Nevertheless, the offices of the Medical Director-general, of the Director of Works, of the Civil Engineer-in-chief, of the Royal Marines, and of some other branches, are still housed elsewhere.

Admiralty Court, a court of great antiquity, in which the lord high admiral or his representative exercised limited jurisdiction over matters arising on the high seas. As an instance court, it had an original jurisdiction, both civil and criminal. It also acted as a prize court, but did so only under special commission issued from time to time, until 1864, when, by the Naval Prize Act of that year, the determination of prize cases was made part of its regular jurisdiction. As a criminal court, the instance court had jurisdiction over all offences committed on the high seas which were outside the jurisdiction of the courts of common law—such as murder, piracy, and felony on the high seas. In 1836, when the Central Criminal Court was established, the criminal jurisdiction of the Admiralty Court was transferred to it, the judge of the Admiralty Court being made a member; while by the Admiralty Offences Act, 1844, all offences committed within the jurisdiction of the Admiralty were made triable, as if they had been committed within the country where the offender was in custody. The Admiralty Court had also authority to administer discipline in the royal navy; but since the Naval Discipline Act, 1866, that authority has been exercised by naval courts-martial. On the civil side the jurisdiction of the instance court seems to have been restricted to civil wrongs done on the high seas, to salvage on the high seas, to contracts of respondentia and bottomry, to suits for seamen's wages in cases where there was no contract on which an action could be brought in the other courts, to the restoration of goods piratically seized, and to the cases of Admiralty droits. The law which it administered was the general maritime law, which was based on such codes as the Laws of Oléron, the Gotland Sea Laws, and the Consulate of the Sea. These codes themselves were no part of the law of England; but as they contained much that was valuable with regard to maritime usage, the judges of the Admiralty Court were to a considerable extent guided by them, and much of their substance thus became incorporated in English maritime law. In modern times the jurisdiction of this ancient court was extended and defined by the Admiralty Courts Acts of 1840 and 1861, by the Naval Prize Act already referred to, and by the Merchant Shipping Act, 1854—the provisions of the latter being now re-enacted in the Merchant Shipping Act, 1894. It is also, by the County Courts Act, 1868, the court of appeal from county courts in cases decided under their Admiralty jurisdiction. In the reconstitution of the courts by the Judicature Acts, 1873 and 1875, the functions of the Admiralty Court were transferred to the High Court of Justice, of which one division, called the Probate, Divorce, and Admiralty Division, consists of two judges who, in addition to probate and divorce business, exercise the jurisdiction formerly exercised by the Admiralty Court. The most numerous classes of Admiralty actions are those relating to damage by collision, to salvage, towage, and pilotage, and to disputes between co-owners of ships. A limited Admiralty jurisdiction was conferred on county courts by the County Courts Admiralty Jurisdiction Act, 1868, and has been extended by subsequent measures. In Scotland the old Admiralty Court has been abolished, and its various powers are now exercised by the Court of Session, the Court of Justiciary, and the sheriff courts. It has recently been laid down by the House of Lords that the maritime law of Scotland is the same as that of England. In Ireland, Admiralty actions are brought in the King's Bench Division of the High Court of Justice. In England, Scotland, and Ireland the ultimate court of appeal for Admiralty, as for other cases, is the House of Lords.—*Vice-Admiralty Courts* are Courts of Admiralty in British possessions which have a jurisdiction similar to that of the Admiralty Division. Under the Merchant Shipping Acts they have various powers—*e.g.* to remove masters of ships, to fine for flying improper colours on board ship, and to apportion salvage awards. They have also jurisdiction in prize, piracy, and certain other cases. Appeals from Vice-Admiralty Courts lie to the Privy Council.

Admiralty Division. See SUPREME COURT.

Admiralty Droits. Derelict ships and other property picked up at sea by British ships, if not claimed, are deemed 'droits of Admiralty.' The property in abandoned goods and ships was vested from an early date in the lord high admiral, and a system grew up by which the finders of derelict property at sea were entitled to nine-tenths of the value, while the Lord High Admiral took the remaining tenth. In 1673, when the Duke of York resigned the office of Lord High Admiral, and it was placed in commission, Charles II. endeavoured to appropriate to the crown the tenths of all prizes; but the Admiralty succeeded in maintaining the customs which had been previously observed. On the reorganization of the Admiralty in 1832 the commissioners again maintained their claims; but in 1854, with the Merchant Shipping Act, the collection of these droits was handed over to the Board of Trade, by which all proceeds are now paid into the public exchequer. See *Black Book of the Admiralty* (Rolls Series).

Admiralty Gulf. **(1.)** Inlet, N.W. coast, W. Australia, containing Osborne I., and having Port Warrender at its head. **(2.)** ADMIRALTY INLET, E. arm of Puget Sound, Washington, U.S.A., connecting it with Strait of Juan de Fuca. **(3.)** ADMIRALTY ISLAND, between Chichakov and Baranov Is. and mainland of Alaska; lat. 58° 20′ N., long. 134° 30′ W. **(4.)** ADMIRALTY ISLANDS, group, Pacific, N.E. of New Guinea, between lat. 2° and 3° S., long. 146° and 147° E.; belong to Germany; largest nearly 60 m. long. The islanders are short, and have dark-brown skins and crisp, curly hair. **(5.)** ADMIRALTY SOUND, 43 m. long, a S. extension of the Strait of Magellan penetrating Tierra del Fuego.

Admittance. See COPYHOLD.

Admittendo clerico, an English writ, issued by the bishop instead of the sheriff, to establish the right of the crown as patron of a benefice.

Admonitionists, the supporters of a Puritan memorial called *An Admonition to the Parliament,* issued by two clergymen about 1572; and also of a second document, which similarly urged the advantages of the Presbyterian method of ecclesiastical government as opposed to that of the Church of England.

Adobe (Span., Anglicized into *doby,* pl. *dobies,* in New Mexico), the sun-dried brick of ancient Egypt, Asia, N. Africa, and Spanish America.

Adolphus, or ADOLPH (?1255-98), king of Germany, the son of the Count of Nassau, was elected king of the Romans on the death of Rudolph of Hapsburg (1292); but disgusted with the German princes, he formed an alliance with Edward I. of England. He accepted sums of money from England, but failed to supply the help against France to which he had pledged himself in return. For seizing Meissen and other districts Adolphus was summoned before the assembled princes, and, refusing to obey the summons, was deposed in 1298. In the same year he was killed in a battle with his successor, Albrecht.

Adonai, Hebrew name for God. *Adon* means 'lord,' and *Adonai,* plural in form, is probably a 'plural of excellence.' The final *i* means 'my,' but the original possessive signification came to be ignored, as in monsieur, madonna. See JEHOVAH.

Adoni, or ADWANI, tn., prov. of Madras, India, 64 m. from Bellary; has cotton and silk manufactures, especially carpets. Pop. (1901) 30,416.

Adonijah, a son of David, king of Israel, was the next heir to the throne on the death of Absalom, but was set aside in favour of Solomon, who caused him to be put to death (1 Kings 2:22) on the charge of conspiring for the crown.

Adonis, a beautiful youth beloved by Aphrodite. He was slain by a boar, and the goddess's grief was so great that Pluto, the god of Hades, allowed him to spend six months of every year on earth. There is no doubt that he represents the Phœnician deity Thammuz, adopted by the Greeks. The mourning for Adonis was a regular rite in many Greek and oriental cities. His story is told by the poet Bion, trans. by A. Lang. See also Theocritus, Idyll xv., trans. by Calverley; Shakespeare's *Venus and Adonis.* —ADONIS GARDENS, small jars containing lettuce and other quickly-growing plants, used by the Greeks in their annual festival of Adonis; typical of short-lived beauty. Plato (*Phæd.,* 276) and Shakespeare (*1 Henry VI.,* i. 6) allude to them; and Isa. 17:10 (R.V. margin) reads 'plantings of Adonis.'—ADONIC VERSE consists of a dactyl and a trochee, and was so called because the songs sung at the festival of Adonis were written in this metre.

Adonis, a small genus of the Ranunculaceæ. *A. autumnalis* (pheasant's eye), found in cornfields in the warmer counties of England and Ireland, is about 12 in. high; flower terminal, small, and bright scarlet with a black centre; flowers in autumn. A larger-flowered variety is cultivated in gardens as *Flos Adonis. A. vernalis* has large yellow flowers, opening in early spring.

Adoptianism, a heretical doctrine regarding the person of Christ, allied to the tenets of Nestorius, which, towards the close of the 8th century, was maintained in Spain by Elipandus, archbishop of Toledo, and by Felix, bishop of Urgel. These held that Christ was the Son of God only in His divine nature; in His human nature He was, like the rest of humanity, but a child of God, becoming the Son by *adoption.* Charlemagne summoned various synods (Ratisbon, 792; Frankfort, 794; Aix-la Chapelle, 799) to deal with Felix and his teaching. Adoptianism was condemned, and Felix deprived of his bishopric. Its ablest opponent was the English monk Alcuin. See Kurtz's *Church History,* ii.

Adoption, or the admission of an alien to the full rights and privileges of a *gens* or family, is a practice of very ancient date. Its primary motive was that of strengthening the influence of the clan; and it is to this custom that Sir Henry Maine traces the beginning of civilization, for it was by this means that tribal life developed into federal and national life. The law of adoption fills an important chapter of Roman law. A person *alieni juris* (*i.e.* under the *patria potestas* of another) entering a new family was adopted by means of a threefold fictitious sale (*mancipatio*). If the stranger was *sui juris* (his own master, free of *patria potestas*), he entered the new family by arrogation, which in ancient times was effected by a vote in the *comitia,* who jealously watched such proceedings, lest the last of a *gens* should arrogate himself, and its *sacra* be lost. Simpler modes of arrogation and adoption were employed in later times, especially by Justinian, who decreed (lib. I. tit. xi.) that unless the adopter was an ascendant, the person adopted should not pass out of his natural family. (See Sandars, *Institutes of Justinian,* Introd.) Exogamy, the custom of taking a wife from an alien tribe, still invariable in some savage races, is one form of adoption; and among the Somalis of N.E. Africa such exogamous marriages, which are only of occasional occurrence, are avowedly made for the purpose of obtaining immunity from the blood-feud existing between the rival tribes. 'Blood-brotherhood' between men of different race, symbolized by an exchange or transfusion of blood, is held to make them thenceforth actual kinsmen. In the life of modern civilized society, adoption has usually no other significance than that of benevolence, but the original idea is still faintly adumbrated when the object in view is to continue a certain line of descent.

Transferred into religious usage from its usual and legal significance, the term adoption is employed by Paul to designate the new filial relation subsisting between Christians and the Father. In the Bible the word does not occur outside the letters of Paul; it is rare in Greek literature, but is found with extraordinary frequency in inscriptions of the Hellenistic period.

Adoptive Acts, those Acts of Parliament which come into force only where they have been adopted by the ratepayers or by the local authority, empowered to do so by the acts themselves. The Vestries Act (1831), the Lighting and Watching Act (1833), the Baths and Wash-houses Acts (1846-82), the Burial Acts (1852 1900), the Public Improvements Act (1860), the Infectious Diseases Notification Act (1889), the Public Health Acts Amendment Act (1890), the Museums and Gymnasiums Act (1891), the Public Libraries Act (1892), and the Private Street Works Act (1892), are adoptive acts.

Adoration, an act of worship. In the Roman Catholic Church there are three kinds of worship: (1) *latria,* the worship of the Deity alone; (2) *dulia,* the honour paid to angels and to saints directly, or indirectly through the veneration of relics, pictures, images; (3) *hyperdulia,* the special honours paid to the Virgin Mary: also the following special services *Adoration of the Cross,* a ceremony practised every Friday; *Adoration of the Pope,* the homage paid by the cardinals on his election; and *Adoration of the Host,* the supreme act in the celebration of the mass. In Christian art and archæology an *adoration* is a representation of the adoration of the infant Jesus by the Magi. It has been the subject of many pictures.

Adour (ancient *Aturus*), riv., France, drains the W. half of the N. slopes of the Pyrenees, and flows to the Bay of Biscay; passes through Dax and Bayonne; receives on the right the Midouze, on the left the Gave de Pau. It is navigable about 80 m. up. Length, 207 m.

Adra (*Abdera* or *Abdora* of the Phœnicians), port in Almeria, Spain, 8 m. from Berja, on Mediterranean; great cane-sugar industry. Pop. (1900) 11,246.

Adrar. See Rio de Oro.

Adrastus, a legendary Grecian hero, king, first of Sicyon, and afterwards of Argos, who, with six other heroes, waged the celebrated war of the 'Seven against Thebes,' in which Adrastus alone escaped. A second venture, led by the seven sons of the heroes, the 'war of the Epigoni,' was successful, and Thebes was razed to the ground. (Apollodorus, iii. 6, 7; Pausanias, i., iii., ix.)

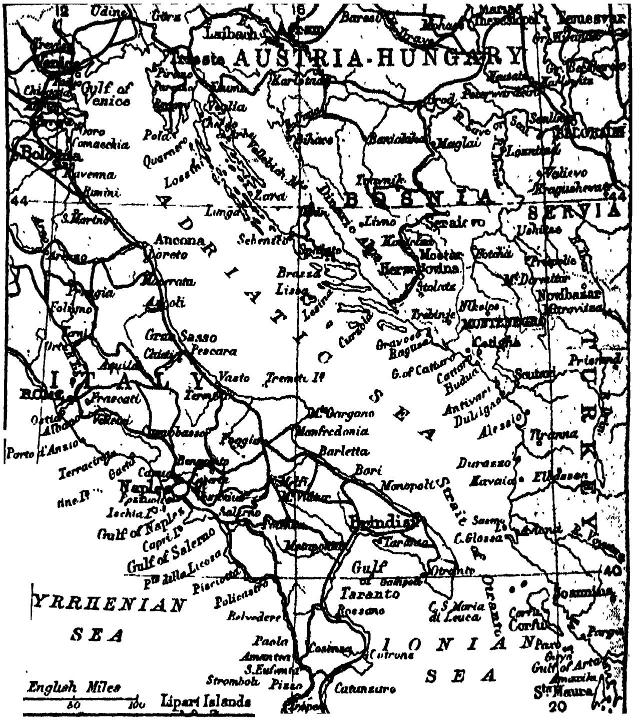
Adria, tn., Rovigo, Italy, in the Po delta, 20 m. by rail S.W. of Chioggia; was an important seaport of the Etruscans, and formerly on the Adriatic, to which sea it gave its name, but from which it is now 14 m. distant. Here, in 213 B.C., the Romans built a large port, which flourished until after the 12th century. Pop. (1901) 15,711.

Adrian, city, Michigan, U.S.A., co. seat of Lenawee co., 30 m. W. of Toledo. Pop. (1900) 9,654.

Adrian, Emperor of Rome. See Hadrian.

Adrian, Popes. Adrian I. (772-95) received aid from Charlemagne against Didier, king of the Lombards, and was visited at Rome by the great monarch, whom he afterwards eulogized in Latin verse.—Adrian II. (867-72) took part in the struggles between Louis II. and Charles the Bald, and freely used against his opponents the terrors of excommunication. During his term of office the schism between the Eastern and Western Churches began.—Adrian III. (884-5) passed a decree restraining the Emperor Charles III. from interfering with the papal election.—Adrian IV. (1154-9), Nicholas Breakspeare (d. 1159), was the only English Pope. He was born at Langley, near St. Albans; entered a French house as a menial, but rose to be its abbot. The canons' complaints of his severity resulted in his election as cardinal (1146), and in his mission to the Scandinavian kingdoms; after which, owing to his success as Apostle of the North, he was made Pope (1154). Adrian's pontificate was a constant struggle for the supremacy which Frederick I. stubbornly claimed. See *Dublin Review*, art. by Casartelli, January 1902.—Adrian V. (1276) held office only for a month.—Adrian VI. (1522-3) had held office as canon of St. Peter's, professor of theology, dean of the Church of Louvain, bishop of Tortosa, cardinal (1517), tutor to Charles V., ambassador to Ferdinand of Spain, and regent of Spain during the minority of Charles V. He tried to arrest the progress of the reformation in Germany, and was unpopular in Rome.

Adrian, St. (A.D. 300), one of the soldier-saints of the early Christian Church. A member of the Prætorian guard, he was converted through his admiration for the steadfastness of certain Christian martyrs, and was beheaded after torture. His wife, Natalia, was canonized with him, their day of commemoration being Sept. 8.



The Adriatic Sea.

Adrian di Castello (1460?-1521?), Italian cardinal, who was English Ambassador at Rome, and held the bishopric of Hereford and of Bath and Wells. He was implicated in the plot to poison Leo X., and was degraded (1518). Adrian wrote poems and philosophical works.

Adrianople (Turk. *Edirne;* anc. *Uskudama* or *Orestia*), town in Turkey in Europe, capital of the vilayet of the same name, situated on the l. bk. of the Maritsa, at its confluence with the Tunja. It is an important centre of commerce. Manufactures silk, perfumery, various textiles; and in the neighbourhood excellent wine is produced. The principal edifices are the beautiful mosque built by the Sultan Selim II., the Serai (palace), the bridge Michael (built by Byzantine emperors), and a great bazaar. The name dates from the second century, when the Emperor Hadrian enlarged and beautified the town (hence *Hadrianopolis*). It was the capital of the Ottoman empire until 1453—*i.e.* previous to the capture of Constantinople. It was occupied by the Russians in 1829, and here, in September of that year, was signed the treaty of Adrianople, which concluded the war between Russia and Turkey. In the Russo-Turkish war of 1877-8 it was again besieged. Pop. 81,000.

Adriatic Sea (*Mare Adriatico*), or Gulf of Venice, an arm of the Mediterranean, extending from Venice for 460 m. S.E. to the Strait of Otranto (less than 40 m. wide), lies between the low, sandy beaches of Italy on the W. and the rocky cliffs, islands, and inlets of Dalmatia and Albania on the E. Its general breadth is about 90 m. The depth on the S. is from 550 to 860 fathoms, shoaling to 4 fathoms inshore and 36 fathoms in the centre of the N. part. The colour is green, darker than that of the Mediterranean;

the water is very salt. Tides are almost absent; in Venice spring tides rise one or two feet. A current runs up the E. coast and down the W. Navigation is easy for steamers, but frequent heavy gales, with absence of sea-room, make it dangerous for sailing vessels. The Italian coast is well populated, with many small harbours artificially enlarged for the busy trade in agricultural produce. The Dalmatian coast is inhospitable; provisions and even fresh water are scarce. The chief industry is fishing; the sponge fishery has been recently improved by artificial propagation. The chief ports are Brindisi, Ancona, and Venice; Trieste, Pola, and Fiume; Corfu, Zante, Vostitza, Patras, and Kalamata. The chief steamship lines are P. & O., Austrian Lloyd, Florio-Rubattino, Italian Steamship Navigation Company, Leyland, and Burns and M'Iver. The annual wedding of the Doge to the sea on Ascension Day, a ceremony instituted in 1174, symbolized the maritime basis of Venetian prosperity. See *Mediterranean Pilot*, vol. iii., bibliography by Gavazzi; *Riv. Geog. Italy*, iv. (1897), p. 266; Faber's *The Fisheries of the Adriatic* (1883).

Adua, ADOA, or ADOWA, tn., Tigré, Abyssinia, 150 m. N.E. of Gondar and 108 m. S.W. of Massowah. It is an important place for the trade between the coast and the interior. Here Menelik inflicted a crushing defeat on the Italian forces in March 1896. Alt. over 6,300 ft. Pop. 3,000.

Adularia, a clear, transparent, glassy form of potash felspar (see ORTHOCLASE) which is found mainly in the crevices of crystalline schists and gneisses, often in beautifully perfect crystals. It has sometimes a pearly, opalescent reflection or play of colours, and may be included under the semi-precious stones. Also known as *moonstone*. See Streeter's *Gems and Precious Stones*.

Adulis, tn. and ter. claimed by French on W. coast of Red Sea, 30 m. S.S.E. of Massowah; comprises Sula (anc. *Adulis*), with its bay (Annesley B.), and the islands of Dessi and Ouda. In the Abyssinian war (1868) it was the British base.

Adullam, a cave, or rather 'stronghold,' on the Philistine border of Judah, in which David and four hundred refugees and outlaws took shelter. (See 1 Sam. 22.) Hence ADULLAMITES, a term applied to those Liberals—Lowe was the most notable of about forty—who in 1866 seceded from Russell and Gladstone on the question of parliamentary reform, and voted with the Conservatives. The group was known also as 'the Cave.'

Adulteration ('to debase,' 'to corrupt,' 'to render impure'), a term generally applied to the practice of adding cheaper substances to articles of commerce, or of abstracting from them one or more of their valuable ingredients, for the purpose of making a greater profit. It is not possible to define what constitutes adulteration in such a way as to meet all cases, and no attempt to do so has been made in the Sale of Foods and Drugs Act or in its amendments. The purpose of these enactments is to protect retail purchasers of food and drugs from being defrauded; they do not protect the wholesale buyer, or refer to the sophistication of such articles of commerce as oil, paint, white lead, soap, paper, or coal, which are bought for manufacturing or trade purposes. The common adulterants or impurities are described in connection with the commercial products into which they are introduced. The practice of fraudulent adulteration existed in ancient times; in Athens and in Rome the purity of wine was safeguarded by laws and inspection. In England various measures were taken, from 1267 onward, to prevent the many crude ways in which food and drugs were corrupted—the bakers, 'pepperers,' brewers, and vintners being the chief offenders; and in 1850 the *Lancet* Sanitary Commission instituted extensive investigations into the composition of the various articles of food sold in the metropolis. In 1855 Dr. Hassall published his *Food and its Adulterations*, which included the reports of the commission. Matters were found to be so unsatisfactory that in 1855 a select committee on the adulteration of food was appointed. Dr. Hassall stated in his evidence that he had examined over three thousand samples of the principal articles of consumption and of many drugs, and that extensive adulteration was present in almost all cases in which it was both practicable and profitable. The committee reported 'that adulteration widely prevails; and not only is the public health thus exposed to danger, and pecuniary fraud committed on the community, but public morality is tainted.' As the result of this inquiry, an Act for Preventing the Adulteration of Articles of Food and Drink was passed in 1860; but it was a useless measure, and no prosecutions were made under it. A second act (1872) was repealed after inquiry by another parliamentary committee, when the Sale of Food and Drugs Act, 1875, was passed. This act, with an amendment (1879), the Margarine Act, 1887, and the Sale of Food and Drugs Act, 1899, are those under which proceedings are now taken. For the purpose of these acts, the expression *food* includes every article used for food and drink by man, other than drugs or water; any article which enters into, or is used in the preparation of, human food; flavouring matters and condiments. The term *drug* includes medicines for internal and external use. The acts specify that no person shall mix, stain, colour, or powder any article of food, or drug, with any ingredient so as to render the article injurious to health, with intent that the same may be sold in that state, under a penalty not exceeding £50 for the first offence; and every offence after the first shall be a misdemeanour for which the person, on conviction, shall be liable to imprisonment for a period not exceeding six months with hard labour. No person shall sell, to the prejudice of the purchaser, any article of food, or drug, which is not of the nature, substance, and quality of the article demanded, under a penalty not exceeding £20 for the first, £50 for the second, and £100 for any subsequent offence. No person shall sell any compound article of food, or compounded drug, which is not composed of ingredients in accordance with the demand of the purchaser, under a penalty not exceeding £20. No person shall abstract from an article of food any part of it, so as to affect injuriously its quality, substance, or nature, without making disclosure of the alteration. No person shall be guilty of an offence if he have supplied to the purchaser a notice, by a distinctly written or printed label on or with the article or drug, stating that the same is mixed. The acts further provide for the appointment of public analysts by local authorities; and that any medical officer of health, inspector of nuisances, inspector of weights and measures, or any police constable, may purchase samples under their direction. Any individual may submit any article of food, or drug, to the analyst, and be entitled, on payment of a fee of 10s. 6d., to have it analyzed and reported upon. After the purchase is completed, the seller must be notified of the intention to have the article analyzed. The purchaser must offer to have it divided, there and then, into three parts, each part to be securely fastened and sealed: one part is then to be given to the seller, another to the analyst, and the third is to be retained for future reference. Samples may be sent by post to the analyst. Any person refusing to sell any article exposed for sale to any authorized officer is liable to a penalty not exceeding £10. Prosecutions under the acts must be instituted within twenty-eight days from the time of purchase. The summons must state particulars of the offence alleged, and the name of the prosecutor, and must not be made returnable in less than fourteen days from the day on which it is served. A copy of the analyst's certificate must also be supplied to the defendant. If the defendant can produce a written warranty or invoice to the effect that he purchased the article in question as the same in nature, substance, and quality as that demanded of him by the prosecutor, he may be discharged from the prosecution; but if he proposes to make this a defence, he must send a copy of such warranty or invoice to the prosecutor within seven days after service of the summons, and give the name and address of the person from whom he received it. In the act of 1899 power is given to the Local Government Board or the Board of Agriculture to take samples, in default of a local authority appointing an analyst and putting the acts into force. Should any question arise as to the accuracy of the analyst's certificate or test, either party may request that the third sample be sent to the Inland Revenue Laboratory for analysis. The *British Pharmacopœia*, produced under the authority of Parliament, is the standard by which an opinion is formed as to the purity of drugs. Clauses in the acts refer to the adulteration of special articles. Margarine must not contain more than 10 per cent. of butter fat. Whisky, rum, and brandy may be sold diluted with water to 25 per cent. under proof, and gin to 35 per cent. under proof. Tea must be examined by the commissioners of Customs at the port of landing. Under the Margarine Act, 1887, the word butter means the substance made exclusively from milk or cream, with or without salt or colouring matter; margarine means all substances prepared in imitation of butter, whether mixed with butter or not. Every package containing margarine must be branded with the name on the top, bottom, and sides, in printed capitals of large size; and retailed parcels must be similarly labelled. The Select Committee on Food Products Adulteration, in their report of July 1896, show clearly that, where the act has been vigorously worked, adulteration has diminished. The number of samples analyzed rose from 14,700 in 1877 to 49,500 in 1898. From 1877 to 1881 the percentage found adulterated was 16·2. In 1898 the percentage was 8·7. Bread is now rarely, if ever, adulterated. The same may be said of sugar, tea, and oatmeal; but milk, coffee, butter, honey, and jams are still largely sold impure. There is no doubt that the adulteration of food-stuffs is less prevalent now than it was thirty years ago, and is not of such a gross character. The addition of alum to bread, of starch or chalk to milk, and of arsenic and lead compounds to colour confectionery, is never heard of; though it has been asserted that large quantities of China clay go to confectioners, and is used to stiffen the 'icing' of cakes. Many admixtures are openly stated as such by the labels on the packets. Some forms of adulteration are claimed to be improvements on the natural article, and are said to be practised in accordance with the taste of the public. The colouring of cheese and butter with annatto is quite harmless; but the public would no doubt prefer to have their pickles and preserved peas of an inferior colour rather than of an attractive green, due to the presence of copper. Starch and sugar are mixed with cocoa, and the natural fat is removed from it, to make it more palatable and digestible. Chicory is put into coffee because most people prefer it, and sulphuric acid is added to vinegar to make it keep. Many other excuses are given, not the least common being that the adulterant does no harm; but the bulk or weight is always increased materially by the addition of a much cheaper substance. Great harm is done by the addition of water to milk: infants fed on such milk are not sufficiently nourished, and the water is often impure, and productive of disease. Lard, adulterated with cotton-seed oil and refuse beef-fat, was largely imported into the United Kingdom between 1880 and 1890. The economic aspects of adulteration are interesting, and although accurate figures cannot be given, the following are based on recent returns. At least 450,000,000 gallons of milk are consumed per annum in the United Kingdom, valued at £30,000,000. About 10 per cent. of the samples examined were found to be adulterated either by the addition of water or the abstraction of fat, and the loss to the consumer works out at £200,000 paid to the dairyman for added water, and £90,000 paid for fat removed. The total loss to the public who have been served with margarine for butter works out to no less than £470,000; and the publican receives £125,000 per annum for water in lieu of spirits. See *The Analyst;* Dr. Hassall's *Food: its Adulterations* (1855); Blyth's *Foods: Composition and Analysis* (3rd ed. 1895).

Adultery. See Divorce.

Ad valorem duty is levied in proportion to the value, and not the quantity, of the article imported. It is an inconvenient form of taxation, giving great opportunity to fraud, and is not used in British customs. (See Tariff.) The *ad valorem* stamp duty, on stocks and shares which are transferred by deed, is levied upon their cash value, and not upon their face value.

Advancement. If a person buys property in the name of another, the legal presumption is that he is merely a trustee for the latter; but if the purchase is in the name of a child or other person towards whom the purchaser stands *in loco parentis*, or whom he is legally bound to support, the presumption is that the purchase was intended to be for the benefit or 'advancement' of such child or person. This presumption may be rebutted by evidence of a contrary intention. A power of advancement in a will or settlement enables capital money to be paid to children for their advancement in life.

Advance Note, a draft, generally for a month's wages, given to sailors by shipowners when they sign articles of agreement.

Advent is the season during which preparation is made for the festival of the nativity of Christ. As Advent commemorates the first coming (Lat. *adventus*, 'arrival') of Christ as Saviour, so it anticipates His second coming (see below) as Judge, and the Scripture lessons for the included Sundays are specially chosen so as to direct the thoughts of Christians to that event. The season was originally observed with a rigour almost equal to that of Lent. Since the 6th century Advent has begun the ecclesiastical year (*cf.* Keble's *Christian Year*)—*i.e.* from the Sunday nearest to St. Andrew's Day (Nov. 30) except in the Greek Church, with which it counts from St. Martin's Day (Nov. 11).

Advent, The Second. While it was formerly held that the coming of Christ was fourfold (1) at His nativity; (2) to His disciples at their death (John 14:3); (3) at the fall of Jerusalem (Matt. 24:3 *f.*); (4) at the day of judgment—the term Second Advent is now usually restricted to the last mentioned, when He shall appear 'the second time without sin unto salvation' (Heb. 9:28). The whole subject of His second coming, or *parousia*, forms one of the most perplexing themes in theology, as may be seen not only from the frenzied speculations of those who are bold enough to fix a date (and, when that fails, to proclaim another), but also from the difficulty experienced by sober-minded inquirers in interpreting, and obtaining a sufficiently self-consistent theory from, the various Scripture passages referring to the event. In Matthew, Mark, and Luke it seems to be associated with the fall of Jerusalem, and to be spoken of as something imminent. Occasionally Paul also speaks as if the event were at hand, but again he seems to remove it to the distant future; while the book of Revelation introduces the millennium as having to ensue before the final day. Without doubt many of the prominent passages are interfused with the Messianic expectations of the Jews. It may be held that the idea of a Second Advent is a mere residuum of Jewish eschatology; or, with Augustine and the great majority of orthodox theologians since his time, we may hold that a literal and actual coming is meant; or, with Russell, that the event was one with the fall of Jerusalem; or, lastly, that the coming is a spiritual one—a dispensation rather than an event, a continued spiritual manifestation of Christ among men, to be completed at the end of the world-process. See Russell's *Parousia:* the N.T. theologies of Beyschlag and Stevens; also ESCHATOLOGY, ANTICHRIST, MILLENNIUM.

Adventists, SECOND. See SECOND ADVENTISTS.

Adventurers, those who risked money in debenture bonds made payable in land confiscated in Ireland on account of the Irish rebellion of 1641. The Act of Settlement (1665) annulled many of the claims, and the adventurers subsequently emigrated to America. 'Merchant Adventurers,' a term applied to the members of certain early incorporated societies—as that founded in 1505 for trading in wool with the Netherlands. Queen Elizabeth's patent to the East India Company in 1600 was entitled 'A Privilege granted by her Majesty to certain Adventurers.' But see further under MERCHANT ADVENTURERS. The name 'Adventurers' was also applied to the contractors who in the 17th and 18th centuries drained the fenny districts of England, in Yorkshire, Lincolnshire, Huntingdonshire, and beside the Thames.

Advertisement. The modern advertisement is one of the remarkable developments of the press. Printed journals practically came into being in Britain during the first quarter of the 17th century, and they had not been long in existence when the advantage of using their columns for commercial purposes was recognized, slowly at the outset, but with an increasing frequency in the 18th century, to which heavy and indiscriminate taxation became the chief impediment. First introduced in 1712, one year before the stamp duty on newspapers, the tax upon advertisements amounted in 1832 to 3s. 6d. for each paragraph, whether large or small, and yielded no less than £170,649. In 1833 the tax was reduced to 1s. 6d. in Great Britain and 1s. in Ireland, and eight years later the revenue had fallen to £128,300, though this sum implies a considerable increase in the total number of advertisements published. Ten years after the reduction, in 1851, the tax yielded £175,094, and in 1853 it was abolished. No fiscal reform, not even the abolition of the stamp duty, has been more thoroughly justified by events. It is hardly possible to conceive of the complex social life of the present day existing apart from the daily newspaper; but the newspaper as we know it could not be carried on without the income derived from the advertisement pages. The 'puff par.' is not unknown in Britain, but is more highly developed in France and America. Comprehensively used, the word 'advertisement' (Fr. *avertissement,* 'warning,' 'information,' 'notification') applies to every form of announcement intended for the public eye. Though the rudiments of advertising have a remote origin, the developments are modern and even recent. This is especially true of wall-posters, which many French and German and a few British artists (*e.g.* Sir John Millais, Prof. Herkomer) have made harmonious in colour and of real pictorial value. Enormous sums (£1,000 per week is not an unheard-of figure) are spent by leading firms in bringing their wares into public notice, and some owe their success solely to a constant appeal to the public eye. Schools of advertising, originating in the United States, have now been established in this country; while the advertising expert, or 'schemer,' as he is termed in America, has for some years been employed by large business firms on both sides of the Atlantic, and, in London, by at least one great daily newspaper. But the main function of the one, as of the other—the production of ingenious and attractive advertisements—was anticipated by numerous advertising agencies, which were created by the growth of advertising, and which act as the intermediaries between advertisers and the press, relieving both of a vast amount of clerical labour and multiplied contracts. For their services the agents are usually allowed a special quotation on lineage rates and a varying commission on settled accounts. As a branch of industry, and even of art, advertising now possesses a periodical press of its own, consisting of three weekly papers—the *Advertiser and Social News,* the *Advertisers' Review,* and the *Advertising News;* and five monthlies—the *Advertising World, Billposter and Billposters' Journal, Billposting and Outdoor Publicity, British Advertising,* and *Irish Advertising.* With the view of preserving the rural features of the country, and combating the ugliness and extravagance of certain methods of advertising, there was formed in London, in 1893, a National Society for Checking the Abuses of Public Advertising. A year later the London County Council prohibited what were known as sky signs, and the same body has also regulated and defined the employment of searchlight and flashlight advertisements.

The legal effectiveness of advertising has been recognized and sanctioned by various statutes. The *Gazette* is the official vehicle of such announcements as relate to sequestrations, bankruptcies, and so forth, and it is accepted in the courts of law as evidence. But when brought as evidence of other notices not so authorized, such as dissolutions of partnership, the perusal or at least the possession of the paper by the party must be proved. An advertisement may also be allowed in substitution of service of a writ, etc., of which prompt personal service cannot be effected. The master of a general ship, advertising for a voyage as ready to receive goods, is held to be a common carrier, and the advertisement entitles a merchant to bring his goods to the ship, and to insist upon their shipment, unless the vessel has either already been filled or has been actually engaged. It is not illegal to advertise for the recovery of stolen property, but by the Act 24 & 25 Vict. c. 96, s. 102, an advertiser who, besides offering a reward, imports into the public announcement words to the effect that 'no questions will be asked,' is liable to the forfeiture of £50 to any informer, and to pay the legal expenses in any action for recovery of that sum. In England some rather curious decisions have been made in respect of the advertisement of rewards. It has been held that if advertisement has been made offering reward for the recovery of lost or stolen property, the person who recovers the property, or furnishes the information which leads to its recovery, is entitled to the reward, whether or not he has seen the advertisement. A further decision compelled the advertiser of a patent medicine to pay the sum of £100 which he had offered to any one suffering from a cold whom his medicine failed to cure. Advertisements by husbands warning the public against supplying goods to wives are absolutely worthless—the law requiring that a claim for debts incurred by a spouse in name of household requisites can only be resisted if intimation has been given to each individual tradesman. An auctioneer is not rendered liable if a sale by auction which has been publicly announced is, for any reason, postponed or abandoned. If, however, the sale has been advertised as 'without reserve,' and has actually begun, the contract must be fulfilled. In the London metropolitan area it is unlawful for the proprietor of a stage or hackney carriage to suffer any notice, advertisement, or printed bill, etc., to appear upon the outside or inside of such carriage so as to obstruct the light or ventilation, or cause annoyance to any passenger. The disfigurement caused by wall advertisements in many quarters of large towns has also been the subject of much discussion, and some municipalities (*e.g.* Dover, Edinburgh, Glasgow) have obtained powers under private acts to deal with such offences against the amenity of their districts. In Prussia the preservation of landscapes from the introduction of such foreign and offensive features has been made the subject of prohibitory legislation. Urban and rural amenity is to some extent safeguarded in this country by the National Society for Checking the Abuses of Public Advertising, and, in the particular case of the Scottish capital, by the Cockburn Association. A ground of action for damages lies against the person or persons by whom the insertion of a false and discreditable advertisement may have been procured; while in the case of Morrison *v.* John Ritchie and Co. (Oct. 21, 1902), a jury in the Scottish Court of Session found a newspaper liable in damages for having permitted the publication of a bogus announcement of birth. See *Edin. Rev.*, 1843; Sampson's *Hist. of Advertising;* the Histories of the Newspaper Press by Grant and Fox Bourne; and various numbers of *Notes and Queries.* For advertising agencies, see Browne's *Advertiser's A B C* and Sell's *World's Press.*

Advice, in commerce, formal notice given by one party to another of any transaction, especially of bills drawn.

Advocate, Lord. The Lord Advocate, or King's Advocate, is the principal law officer of the crown for Scotland. He is a Privy Councillor, and a member of Parliament and of the ministry, though not in the cabinet. He goes out of office with the government. Along with the Secretary of State for Scotland he has charge of Scottish legislation in Parliament. His position corresponds generally to that of the Attorney-general for England. He conducts public prosecutions for the crown in Scotland, and is the only competent prosecutor in the High Court of Justiciary, though prosecutions may be conducted by the solicitor-general or the advocates-depute, as his deputies. Private persons may only prosecute with the concurrence of the Lord Advocate. He represents the crown in civil actions, and has statutory powers of suing under the Bankruptcy Act, and with regard to the reduction of patents, and for the protection of the property of lunatics, and in the interests of the public in all cases affecting charities. His concurrence is necessary in many private actions in which public interests are affected. His salary is £5,000 a year, with fees for crown cases, and he is allowed to take private practice. For history, see Omond's *The Lord Advocates of Scotland* (1883).

Advocates, Faculty of. Advocate is the name applied to members of the Scottish bar, who all belong to the Faculty of Advocates. It is also used of a solicitor in Aberdeen. (See M'Pherson *v.* Watt, 3 App. Cas. 254.) The Faculty of Advocates is a constituent part of the College of Justice, founded, at the desire of James v., by an act of 1532, and of which the judges of the Court of Session are senators, and the advocates, writers to the Signet, and others are members. The Faculty elect annually a dean, a vice-dean, and a treasurer, and also the keeper and curators of the Advocates' Library. They appoint counsel for the poor, and make regulations for the examination and admission of candidates. The dean nominates nine examinators, of whom three retire annually. Candidates must pass two private examinations, one in general scholarship and one in law. They must attend lectures on Scots law and conveyancing in a Scottish university, and on other branches of law either in a Scottish or some other approved university or school of law. Finally, they have a public examination, in which they defend a thesis impugned by members of the Faculty, and are then admitted by vote of the Faculty. Advocates have an exclusive right of audience in the Court of Session. As regards their duties, privileges, and liabilities, advocates are practically in the same position as barristers. See King's Counsel.

Advocates' Library, Edinburgh, the largest library in Scotland, and since 1709 one of the copyright libraries in the United Kingdom, was founded in 1682, by and for the use of the Faculty, by which body it is maintained, though it is generously thrown open to persons engaged in *bonâ fide* literary work. In 1692 the collection contained over 3,000 vols., housed in three small rooms in Parliament Close; but after the great fire of 1700, which partly destroyed the earlier collection, the remaining books were removed to the Laigh (lower) Parliament House (still occupied by the library), and extended by several large additions, of which the latest was completed in 1899. The library contains many examples of early printing, collections of old Scottish MSS., and several historical and literary relics of great interest. In 1903 the stock of books was estimated at about 490,000 vols.

Advowson (*Advocatio Ecclesiæ*), in English law the right of a patron to present a clergyman to a benefice on a vacancy. It is a right of property which descends to the heir as real estate, but it may also be vested in trustees, corporations, the whole body of the parishioners, the bishop, or the crown. If the patron is a Roman Catholic, the right to present passes to the University of Oxford or Cambridge, according to the situation of the parish, under Acts of 1606 and 1713; and if the right of presentation belongs to an office under the crown, and the holder of the office is a Roman Catholic, the right devolves for the time being upon the Archbishop of Canterbury, under the Roman Catholic Emancipation Act, 1829. An advowson may be sold, subject to the restrictions contained in the Benefices Act, 1898; but under that act, since Jan. 1, 1899, a right of next presentation cannot be sold. See Simony; Phillimore's *Ecclesiastical Law.*

Adye, Sir John Miller (1819-1900), English soldier, entered the Royal Artillery; served in the Crimean war, Indian mutiny, and Egyptian expedition of 1882. He was governor of the Royal Military Academy at Woolwich (1875-80), and governor of Gibraltar (1883-6). He published *The Defence of Cawnpore* (1858), *A Review of the Crimean War* (1860), *Recollections of a Military Life* (1895), and *Indian Frontier Policy* (1897).

Adytum (Gr. 'not entered') was the inmost chamber, in Greek temples where oracles were given or mysteries performed, which could only be entered by the priests and the initiated.

'A. E.,' the pen-name of George W. Russell, Irish poet, born at Lurgan in 1867. His brief volumes—*Homeward: Songs by the Way* (1894; Amer. ed. 1896), and *The Earth-Breath* (1897)—contain work of remarkable beauty. See W. B. Yeats, in *Treas. of Irish Poetry* (1900); and Lord Lytton, in *Nat. Rev.*, May 1899.

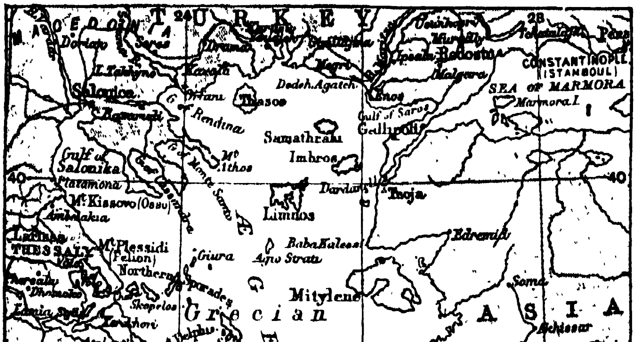
Æ, in shipping. See Lloyd's Register.

Æacus, son of Zeus and Ægina, and king of the island Ægina; so famous for righteousness that after death he was made one of the judges of the dead, the others being Minos and Rhadamanthus.

Aeby, Christoph Theodor (1835-85), Swiss anatomist, became professor of that subject at Bern in 1863, and subsequently held the same post at Prague. Among his contributions to science is a useful method of craniometry. He published *Eine neue Methode zur Bestimmung der Schädelform von Menschen und Säugethieren* (1862), *Die Schädelformen des Menschen und der Affen* (1867), *Ueber das Verhältniss der Mikrocephalie zum Atavismus* (1878), and other works.

Ædiles, magistrates of ancient Rome, who were entrusted with the care of public buildings, streets, markets, weights and measures, etc.; they fixed the prices of food-stuffs, were the custodians of the decrees of the senate and of the people, and maintained public order. Two ædiles of the people were created in B.C. 494; in 388 two patrician or 'curule' ædiles were added; and Cæsar appointed others (B.C. 45) to administer the corn supply. The public games and spectacles were arranged by the ædiles. See Mommsen's *Hist. of Rome* (new ed., 5 vols. 1894).

Ædui, or Hædui, a Celtic people of Central Gaul, between the Arar (Saône) and the Liger (Loire). In B.C. 52 they were conquered by Cæsar.



The Ægean Sea.

Æetes, or Æeta, in Greek mythology, son of Helios and Perseis, was king of Colchis (Æa) when Jason, the leader of the Argonauts, sought the golden fleece. His daughter Medea (called by the poets Æetis) assisted Jason to obtain the prize, and left Colchis as his wife. She subsequently returned, and restored her father to the throne, which his brother Perses had seized.

Ægades Islands (Ital. *Egadi*, 'goat islands'), three islands off the W. coast of Sicily—Marittimo (ancient *Hiera*), reaching 2,245 ft. in Monte Falcone; Favignana (anc. *Ægusa*), 1,070 ft.; and Levanzo (anc. *Phorbantia*), 850 ft. Total area, 70 sq. m. Pop. (1901) 6,419, who carry on tunny fishing. Here, in 241 B.C., C. Lutatius Catulus defeated the Carthaginians, and terminated the first Punic war.

Ægean Sea, the N.E. division of the Mediterranean, between Greece, Turkey, and Asia Minor. Its waters are relatively shallow, and studded with islands (the Greek Archipelago), and its shores are greatly indented. The greatest depth, between Samos and Chios, is only 640 fathoms.

Ægeus, in classic mythology, father of Theseus; king of Athens, where he introduced the cult of Aphrodite. When he was driven from the throne by his nephews the Pallatides, Theseus, who was being educated at the court of his grandfather Pittheus at Trœzen, and was in ignorance of his origin, restored his father to the throne. When Theseus went to Crete to deliver Athens from the tribute to Minos, he promised his father he would hoist a white sail on his return, as a signal of safety. But in the intoxication of his victory he forgot his promise, and his father, perceiving the black sail, thought that his son had perished, and threw himself into the sea, which, from this event, received the name of the Ægean.

Ægilops ('hard grass,' 'goat grass'), hard dwarf annual grasses native to the south of Europe, now included in the genus Triticum (wheat). *A. ovata* is supposed by some to be the source from which wheat originated; it is capable of considerable improvement under cultivation. See Wheat.

Ægina. (**1.**) An isl. and tn. of anc. Greece, in the Saronic Gulf, midway between Attica and Argolis; inhabited in historic times by Dorians, and then a place of great commercial importance. About 500 B.C. it was the chief seat of Greek art, and its standard of coinage obtained in most of the Dorian states. In 429 B.C. the Athenians, its keenest rivals, seized the island and expelled its inhabitants. The Ægina Marbles, now in the Glyptothek at Munich, were discovered (1811) in the ruins of the temple of the local goddess Aphæa, near the town of Ægina. (**2.**) Gulf of, or Saronic Gulf, between the peninsulas of Attica (N.) and Argolis (S.); length, 40 m. It contains many islands and good harbours.

Aegir, a *jotun* or giant of the Norse Sagas, whose journey to Asgard is chronicled in Snorri Sturluson's *Edda*. Understood also as a sea-god, or spirit of the flood; and in this sense Carlyle (*Heroes*, Lect. 1) identifies Aegir with the 'Eager' of the river Trent.

Ægirite, or ÆGIRINE, a mineral belonging to the group of pyroxenes; a silicate of soda and iron. It is frequently found in the rocks known as phonolites and nepheline syenites. It crystallizes in the monoclinic system, is dark green in colour, pleochroic, and easily fusible under the blowpipe.

Ægis, in mythology, the cloud surrounding the thunderbolts of Zeus; thence the shield of Zeus, Apollo, and Athena. (See *Iliad*, v. 738 *ff.*) In ancient art it is shown as a mantle fringed with serpents, that of Athena bearing Medusa's head. The word is now used as a symbol of protection or patronage.

Ægisthus, son of Thyestes and cousin of Agamemnon. While the latter was away besieging Troy, Ægisthus became the paramour of Clytæmnestra, Agamemnon's wife. On Agamemnon's victorious return they murdered him; but some years afterwards, Orestes, son of Agamemnon, returned from Phocis, where he had taken refuge, and slew the guilty pair. Homer in the *Odyssey* gives the earliest version of his story, which was also treated by Æschylus in the *Agamemnon* and *Choephoræ*, by Sophocles in *Electra*, and by Euripides in his *Electra*.

Ægium, tn., anc. Greece, one of the twelve towns of Achaia, and its capital after the destruction of Helice. According to legend it was the birthplace of Zeus. Here Agamemnon mustered the Greek chiefs against Troy. The modern town is Vostitsa.

Ægle, a genus of Indian and African trees, of the order Rutaceæ (orange order). *A. marmelos* is the source of the bael fruit.

Ægospotami, riv., Thracian Chersonesus. In its estuary, in 405 B.C., the Lacedæmonians, under Lysander, signally defeated the Athenian fleet, under Conon.

Ægrotat, a medical certificate granted to students in English universities, to show that illness prevented due attendance to duties; colloquially, 'an æger.' An 'ægrotat degree' may be granted to an honours student who is prevented from taking his final examination by illness.

Ægyptus, son of Belus and twin-brother of Danaus. Danaus was made king of Libya, and Ægyptus king of Arabia. He subdued the Melampodes, and named their country after himself.

A.E.I.O.U., the initial letters of the motto for the imperial device of the unhappy Emperor Frederick III., second of the Hapsburg dynasty: Lat. *Austria est imperare Orbi Universo*, or Ger. *Alle Erde ist Oesterreich unterthan*, 'Austria is to rule all the world.'

Æken, or HIERONYMUS, JEROM VAN (1462-1516), a Flemish painter of the Van Eyck school, known as Jerom Bosch from his birthplace, s'Hertogenbosch. The galleries of Madrid, Antwerp, and Berlin contain examples of his work, which is characterized by a grotesque but ingenious style. Breughel was greatly influenced by him.

Ælfgar, EARL (d. *c.* 1062), son of Leofric, Earl of Mercia, and the 'Lady Godiva' of legend. He and his father assisted Edward the Confessor against Earl Godwin. Outlawed by the Witan in 1055, he took refuge in Ireland, thereafter invading Herefordshire with Welsh allies. Succeeded as Earl of Mercia in 1057.

Ælfheah, or ST. ALPHEGE, Anglo-Saxon bishop of Winchester in 984, and Archbishop of Canterbury in 1006; in 1011 taken prisoner by the Danes and killed. St. Alphege Day in the English Church is April 19.

Ælfred. See ALFRED.

Ælfred Atheling, son of Æthelred II. and Emma; taken with his brother Edward (afterwards the Confessor) to their uncle, Richard the Good of Normandy. In 1036, on the death of Canute, the claims of Ælfred and Edward to the English throne were set aside by the Witan. Ælfred landed at Dover with a force of Normans, but was attacked and captured by Earl Godwin, who cruelly blinded him; he died from his injuries at Ely.

Ælfric (*c.* 1000), old English homilist, called from his *Latin Grammar*, 'Grammaticus.' His identity is, however, imperfectly established; for although it is certain that Wright and Freeman were wrong in confusing this writer with Ælfric, Archbishop of Canterbury (995-1005), and almost certain that he was not that Ælfric who was Archbishop of York (1032-51), there are few facts known regarding his career, nor can we trace his rise to any higher title than that of abbot. A disciple of Bishop Æthelwold, whose life he wrote, Ælfric had as a patron Æthelmaer, the munificent ealdorman of Devonshire, and presided in turn over two of the latter's monastic foundations—Cerne, in Dorset, and Ensham, near Oxford. The date of his death, as that of his birth, is unknown. Besides his *Grammar*—first printed at the end of Somner's *Anglo-Saxon Dict.* (1659), and edited by Zupitza (1880)—there are attributed to Ælfric various translations, epistles, and treatises (one of these astronomical), together with the pleasing *Colloquium*. But he is best known as the most advanced writer in Old English prose by his *Homilies*, two series of which were edited by Thorpe for the Ælfric Society (1844-6), and a third (*Saints' Lives*)

Society existed from 1842 to 1856.

Ælia Capitolina, the name given by the Emperor Hadrian to the city which he built near the ruins of Jerusalem after the Jewish rebellion of 132-135 A.D.

Ælianus, CLAUDIUS (*c.* 250 A.D.), a native of Præneste, Italy, who was the author of two works which have survived—a history in fourteen books, the *Varia Historia*; and a work on the peculiarities of animals, the *De Animalium Natura*. Ed. by Hercher (Teubner Series, 1864-6).

Ælius ARISTIDES, ASCLEPIADES. See ARISTIDES, etc.

Ælla (ELLA), died 588, first king of the Deirans, an East Anglian tribe, whose name, and especially those of his race (Angli) and kingdom (Deira), are commemorated in the legendary tale of Pope Gregory and the English captives in the market-place at Rome.

Ælred OF RIEVAULX (1109-66), historian, native of Hexham; educated with the family of David I. of Scotland; afterwards a monk of the Cistercian monastery of Rievaulx, Yorkshire; author of *Lives* of Edward the Confessor, King David, and Queen Margaret of Scotland.

Aeltre, tn., E. Flanders, Belgium, 12 m. from Ghent. Pop. (1900) 7,265.

Æmilian Road, THE, a highway made in B.C. 187 by Marcus Æmilius Lepidus, Roman consul. It ran from Rimini, on the Adriatic, through Bononia (Bologna), in a N.W. direction to Placentia (Piacenza), on the R. Po, being the continuation of the Flaminian Way from Rome to Rimini.

Ænaria, Italy. See ISCHIA.

Æneas, son of Anchises and Aphrodite (Venus), next to Hector the chief hero of the Trojans in the famous war. He survived the fall of Troy, and Homer clearly regards him as reigning there after the Greeks departed; but later legend makes him wander far and wide. In his wanderings he visited Epirus, Sicily, and Carthage, where he loved and deserted Dido, who committed suicide. On his arrival in Latium, the king Latinus promised him his daughter Lavinia in marriage; but a former suitor, the Italian hero Turnus, would not give way. War followed, in which Turnus fell. Then Æneas married Lavinia, and established his kingdom at Alba Longa, but soon fell in war against the natives. His son Iulus—from whom the Julian family in Rome claimed descent—succeeded him; and Romulus, the actual founder of Rome, was descended in the direct line from Iulus and Æneas.

Æneas Silvius. See Pius II.

Æneid, Virgil's epic, in twelve books, setting forth the wanderings of Æneas. The poem has been translated into English several times, among others by Gawin Douglas (c. 1513), Dryden (1697), Conington (1870), and William Morris (1876).

Aeng, or An. (1.) River and town, Kyauk-pyu dist., Arakan, Lower Burma, 19° 45′ N. (2.) Pass through Arakan Yoma Mts. between Burma and Arakan.

Æolian Harp, a sounding-board on which are strung several gut strings of different thickness; these are tuned to the same note, and give its various harmonics when made to vibrate by the wind. Its invention is ascribed to St. Dunstan, but in its present form it is not thought to have existed before the 17th century. Thomson (*Castle of Indolence*) and Coleridge (*Æolian Harp*) describe its charms.

Æolian Islands. See Lipari Is.

Æolian Mode, in music. See Mode.

Æolians, one of the main divisions of the Greek race, who originally dwelt in Thessaly, and thence spread over Bœotia and other districts of N. Greece; they also colonized the island of Lesbos, and many places in the N.W. of Asia Minor, the coast district of which was known as Æolis.

Æolic Dialect is generally looked upon as the oldest form of Hellenic speech. It is usually divided into four dialects, the chief of which is the Lesbian, because it was carried to great perfection in the lyric writings of Alcæus and Sappho. It threw out the aspirate or rough breathing, and was smoother than Doric.

Æolipile (Lat. 'ball of Æolus'), a hollow metallic ball rotating about its vertical axis, with horizontal armlike tubes projecting radially, and having their free ends bent round in a tangential direction. When the water in the globe is heated, and steam rushes out of the tubes, rotation is set up. (*Cf.* Barker's Mill.) The æolipile was invented by Hero of Alexandria about 120 B.C.

Æolotropy, the antithesis of isotropy. It is the state of those bodies or substances which do not show the same qualities (*e.g.* in behaviour to heat, electricity, strain, etc.) in all directions.

Æolus (Gr. 'fleet'), in Greek mythology, the god of the winds and ruler of the Æolian (Lipari) Is., where he kept the several winds immured in a cave. According to euhemeristic interpretation, Æolus was an ordinary mortal, the first chief of the Æolians.

Æolus, a British ship-name, associated with Strachan's action off Cape Ortegal (1805), Martinique (1809), and Sveaborg (1855).

Æon, a cosmological term signifying an age, an indefinitely long period of time, an era; chiefly used rhetorically. Also, in Gnostic doctrine, a divine emanation partaking of the eternal duration of God, having a specific and independent activity in providential history.

Æpinus, Franz Maria Ulrich Theodor (1724-1802), German physicist, was appointed professor of physics at St. Petersburg in 1757. He made important researches in electricity and magnetism, and published *Tentamen Theoriæ Electricitatis et Magnetismi* (1759), and *Reflections on the Distribution of Heat on the Earth's Surface* (1761), and a *Treatise on the Electricity of Minerals* (1762).

Æpyornis, a gigantic wingless bird found as a fossil in Madagascar, was 12 to 14 ft. in height, and the egg was one foot in length. See Moa.

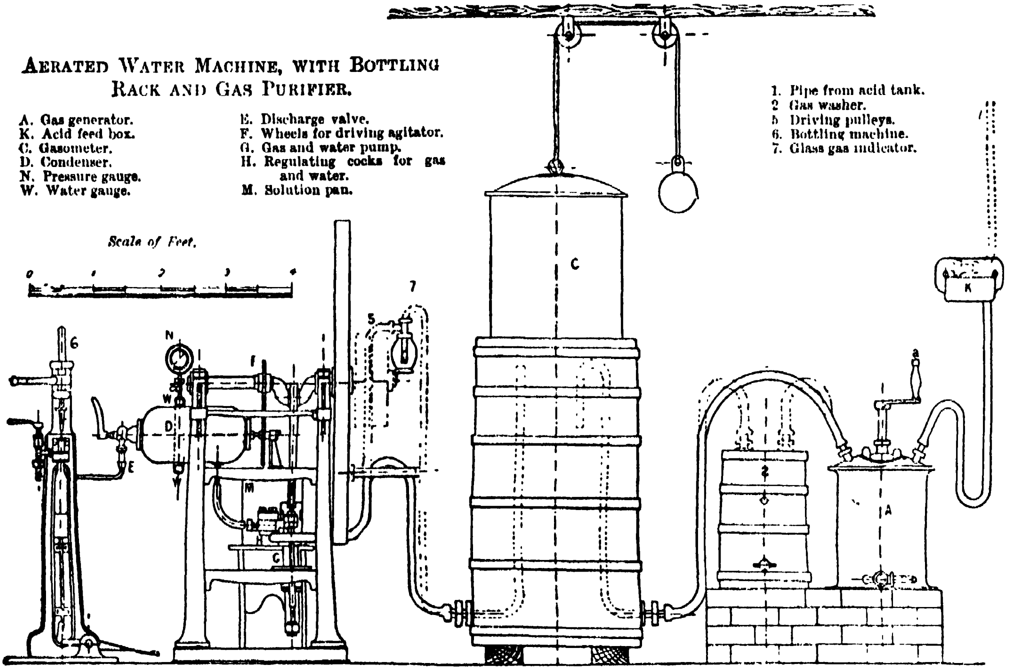
Æqui, an ancient Italian race who inhabited the upper valley of the Arno. For centuries they were constantly at war with Rome, but were finally subdued about B.C. 300.

Ærarium, the public treasury of ancient Rome, on the Capitoline Hill. It contained all important state papers, the laws engraved on brass, the standards of the legions, and the state money and accounts.

Aerated Waters. The term includes both natural and artificial products, consisting in the main of water containing more or less saline and flavouring matters, and charged with an excess of carbonic acid gas. The natural aerated waters are often called mineral waters, on account of the mineral salts dissolved in them. The best-known natural waters are those of Carlsbad, Vichy, Selters, Friedrichshall, and Apollinaris. All these waters are highly charged with carbonic acid gas, and effervesce when drawn from the spring. The principal medicinal ingredients of each water is as follows:—*Carlsbad,* sulphate and carbonate of soda. *Vichy Water* varies slightly in composition according to the spring from which it is drawn, but the waters are all alkaline, owing to the presence of sodium carbonate. *Selters* (Seltzer) *Water* contains a large quantity of common salt; it is alkaline, from the presence of sodium carbonate. *Friedrichshall Water* has a very decided bitter taste, due to the large quantity of magnesium salts present; it is a strong aperient water, given in doses not exceeding half a tumblerful at a time. *Apollinaris Water* is slightly alkaline, and when bottled at the spring for export has some of the carbonic acid gas which escapes from the water at the spring pumped back into it.

In making artificial aerated waters, carbonic acid gas is first prepared by acting on whiting or chalk with sulphuric acid. This action takes place in a vessel fitted with an agitator, which is kept in motion. The gas next passes into a metal vessel containing water, termed the purifier. The object of the purifier is twofold—first, to wash the gas; and next, to retain any splashes of whiting or acid which might be carried over by the violence of the action. The purified gas is next conducted to a gas-holder, where it is stored until required. The ordinary gas-holder is a wooden tub containing water; a metal bell-like receiver floats in the water, being suspended by a counter-weight. By means of a pump the gas and water are forced under pressure into a metal vessel, in which they are thoroughly mixed by an agitator. The pump is so arranged that it draws both the gas from the holder, and water or other liquid from the containing vessel, by alternate strokes. From the mixer the aerated liquid passes to the bottling-machine, where it is mechanically bottled and corked, or otherwise closed under pressure. There are many different machines in use for the preparation of these beverages, but all of them, though differing in particulars, are based on the principles described. Various additions are made, either to the bottle before filling, or to the liquid in bulk before aeration. Soda water is very often only plain aerated water, but for medicinal purposes it should contain fifteen grains of bicarbonate of soda to the gallon, while potash water should contain a similar amount of potassium bicarbonate. Lemonade is prepared by aerating water with the addition of a syrup containing either citric acid or tartaric acid, and flavoured with essence of lemon. A number of other beverages are prepared in a similar manner, the difference depending on the flavouring essence used.

The gasogene or seltzogene is a household machine for producing aerated water. It consists of two glass globes of different sizes welded together, but communicating with each other; and a metal top, possessing a tap with lever handle, and a glass tube passing to the bottom of the larger globe. This top is removed; the lower globe is filled with water, and proportionate quantities of dry bicarbonate of soda and tartaric acid (or bisulphate of potash instead of the acid, as being cheaper) are introduced into the upper globe; the top is then screwed down, and the seltzogene is inclined, so as to allow the water to flow from the lower to the upper globe till the latter is about one-third filled. The action of the acid on the soda is thus established, and is continued until the gas by its own pressure has become dissolved in the water, when the water can be drawn off by pressing the lever, exactly as with the siphon. A more recent introduction is the sparklet. This is a bottle with a hollow removable screw top, for holding a soft steel capsule containing liquid carbon dioxide sufficient to aerate the bottle of water. The top is removed, the bottle filled with water, a capsule placed in the neck, and the top screwed down on it so that the capsule comes in contact with a sharp steel point, which pierces it, and the gas which escapes is conveyed by the tube to the bottom of the water. A brisk shaking assists the aeration, which is accomplished in a few minutes.


AERATED WATER MACHINE, WITH BOTTLING RACK AND GAS PURIFIER.

A. Gas generator.
K. Acid feed box.
C. Gasometer.
D. Condenser.
N. Pressure gauge.
W. Water gauge.
E. Discharge valve.
F. Wheels for driving agitator.
G. Gas and water pump.
H. Regulating cocks for gas and water.
M. Solution pan.

1. Pipe from acid tank.
2 Gas washer.
5 Driving pulleys.
6. Bottling machine.
7. Glass gas indicator.

Scale of Feet.

Aeration (in plants). Leaves are the special organs set apart for the absorption of gases, as well as for the transpiration of water-vapour and the expiration of other gases. Gases can only be absorbed by the cells of leaves or other parts of the plant when these gases are in a state of solution; and in the larger plants the great number of cells and compactness of structure would make it impossible for all but the surface cells to procure the necessary aeration. Hence an extensive system of irregular passages between the cells has been developed, communicating with the outer air by minute openings between the surface cells or through larger breaks in the cork layers. In the case of submerged water plants, the gases are already dissolved in the water surrounding the leaves; but in the case of land plants, the gases contained in the atmosphere are dissolved by the sap which saturates the cell-wall. A small amount of nitrogen is absorbed, but chiefly oxygen and carbon dioxide are taken in by the leaves; both of the latter are also exhaled. Carbon dioxide is absorbed not only by the leaves but by all parts of the plant's surface which contain chlorophyll. It is a food, being indeed the source of most of the carbon, that element which constitutes so large a bulk of the solid constituents of all plants. Under certain circumstances small quantities of ammonia, sulphur dioxide, and sulphuretted hydrogen are also absorbed by the leaves of plants. See also ABSORPTION and TRANSPIRATION.

Aerial Ropeways. See ROPEWAYS.

Aeroclinoscope, a weather indicator consisting of a pillar with movable arms, by which the variations of the barometer and the direction of the wind can be signalled.

Aerodynamics. See HYDROKINETICS, HYDROSTATICS, and KINETIC THEORY OF GASES.

Aerolites (Gr. 'air-stones'), metallic or stony masses of matter falling from the sky, known as 'fireballs,' 'falling or shooting stars,' 'meteoric stones,' 'thunderbolts,' etc. Such a phenomenon was considered incredible by scientists even to the beginning of the 19th century. Then, however, such men as Sir Joseph Banks, Howard (*Phil. Trans.* for 1802), Biot, and Cuvier, following the German Chladni, took the matter up, and in 1809 a report announced that the 'fact had been established in physical science' (*Mémoires de l'Institut*, vol. vii.). Most aerolites are covered with a blackish glaze, as if fused during their passage through our atmosphere. Some are chiefly 'meteoric iron,' others are almost entirely of stone; others, again, are a mixture of stone and iron. Gassendi, in 1627, saw one fall in Provence which weighed 59 lbs. In 1620 a mass of meteoric iron which fell in the Punjab was forged into a sword for Jehangir, one of the Indian emperors; and in 1492, in Alsace, a huge stone of 270 lbs. fell near Ensisheim, where part of it is still shown. Most of the sacred stones of antiquity were no doubt aerolites—such as the shield of Mars in ancient Rome; the primitive image of Diana at Ephesus, which 'fell down from Jupiter;' and the black stone of Mecca, the sacred Kaaba of the Mohammedans. Livy, Plutarch, and Pliny have distinct references to aerolites; and a Chinese record of 616 B.C. mentions one which killed ten men. Probably the largest on record is that which fell in Brazil, and is said to weigh over six tons. Reichenbach, the German physicist, concluded that at least 4,500 aerolites of all sizes fall every year; that their composition closely resembles that of the plutonic rocks; and that their mean specific gravity is rigorously equal to that of our earth.

The 'fireball,' a brilliant meteor rushing through the air with an average velocity of more than 30 miles a second, seems to be an aerolite which escapes contact with our planet. In 1887 a large fireball passed from the Irish Sea over the whole of Ireland at a height of about 20 miles. About a century previously, in 1783, another grand specimen crossed Europe in a south-easterly direction from the North Sea to the Mediterranean, with a light 'greater than the moon at full;' the height was estimated at 50 miles, and the velocity 30 miles a second.

The most familiar form of the aerolite is the 'shooting star,' occurring frequently as single stars and sometimes in groups. The chief instance is the great group called the November meteors (see LEONIDS), issuing, as they seem on our planet, from the constellation Leo. Another group, the Taurids (from the constellation Taurus), are generally mixed with fireballs. Both of these groups are seen in November. Many similar groups of 'radiants' are now known to astronomers, and are named from the constellations in which they appear, as the Perseids and Pegasids in August, the Orionids, Aurigids, Lyraids, etc.

As to the origin of meteorites or aerolites there was formerly much discussion. Physicists now regard them as mere fragments of the innumerable interplanetary bodies which form a part of the solar system. See works already cited, and Chladni's *Ueber Feuermeteore* (1820), Morogues' *Mémoire sur les Chûtes des Pierres* (1812), Arago's *Popular Astronomy*, Brit. Assoc. *Report on Meteors*, Fletcher's *An Introduction to the Study of Meteorites* (Brit. Museum Handbook), Bonney's *Story of our Planet* (1893), Lockyer's *Meteoric Hypothesis* (1890).

Aeronautical Society of Great Britain was founded in 1865, its first president being the Duke of Argyll, to bring together those interested in aeronautics (excluding professional balloonists), to discuss its practical and theoretical questions, and to educate public opinion by the issue of an *Aeronautical Annual*.

Aeronautics. See BALLOON, KITE, FLYING MACHINE.

Aerophore, a tanklike respirator into which the air from the lungs passes, where it is purified by chemicals contained in the tank, and is made fit to be breathed again. It is carried on the back by firemen entering burning buildings.

Aeroscope, an apparatus for collecting microscopic objects (dust, etc.) from the air. It consists of a glass collecting vessel smeared with glycerin, through which a stream of air is drawn by an inspirator. As the air passes through, the particles of dust adhere to the film of glycerin. Since the amount of air passing through in a given time is known, it is possible to find out the degree of its purity by examination of the particles.

Aerostatic Press, an apparatus by which the pigments are extracted from dyewoods: a solvent is forced through the wood by atmospheric pressure.

Aerostatics. See HYDROSTATICS.

Aerotherapeutics, a method of treating disease by varying the pressure of the surrounding atmosphere, or by modifying its composition, or by change of climate. Atmospheric pressure may be varied in an air-tight chamber, a good example of which is the air-lock used by workmen employed in caissons. Two methods of treatment have been adopted: (1) administering compressed air by means of a mask fitting tightly to the mouth—not a successful method; (2) compressed air baths, the patient being placed in an air-tight iron chamber, and filtered air pumped in till the added pressure is two-thirds of an atmosphere. He remains in this two hours. Some discomfort is at first felt in the pharynx and ears, but the result is claimed to be that, after some time, muscular power is augmented, appetite generally improved, and weight almost invariably gained. The temperature is not materially affected. Lung diseases, such as asthma, chronic bronchitis, and emphysema, are sometimes benefited.

The term is also applied to treatment by change of climate: phthisical patients are benefited by residence in a dry climate—either warm, as the Canaries, Egypt, the Mediterranean islands, Algeria, Australia, S. California; or in high and cold altitudes, as at Davos (5,200 ft.), St. Moritz (6,000 ft.), or high and warm, as at Colorado Springs (6,022 ft.), Kimberley (4,002 ft.), Colesberg (4,407 ft.), Bloemfontein (4,500 ft.), and many others. Sea voyages have often proved beneficial. At such places as Nordrach in Germany, and Nordrach-on-Dee in Scotland, without elevation or any particular advantage of climate, open-air exercise and generous dieting have greatly improved many patients, and have shown that much benefit can be obtained by adopting hygienic measures at home.

Aerschot, tn., Brabant, Belgium, on river Demer, 9 m. N.E. of Louvain; taken in 1705, 1746, and 1793 by the French. Important junction on the railway line Antwerp-Aachen. Pop. 6,984.

Aertsen, AVERTSEN, or AERTOZEN, PIETER (surnamed *De lange Pier*) (1508-75), painter; born at Amsterdam, and studied under Allart Claasz. His best-known works are altar-pieces—*e.g.* at Delft, *The Nativity* and *The Offerings of the Magi;* at Amsterdam, *The Death of the Virgin;* and at Antwerp, a *Crucifixion*.

Aeschi, large vil., on s. side of Lake Thun, canton Bern, Switzerland. Favourite summer resort. Pop. 1,409.

Æschines (389-314 B.C.), Attic orator, and the chief opponent of Demosthenes. His policy was to help Philip of Macedon to become head of a confederacy of all Greece, while Demosthenes's aim was to crush Philip and keep the Greek states independent; but even though Æschines was in the pay of Philip, we need not believe that his action was influenced solely by corrupt motives. In 347 Æschines was a member of an embassy which made a temporary peace with Philip, and for the next ten years upheld his cause at Athens. After Philip's decisive victory in 338 at Chæronea, he brought a charge against Ctesiphon, a friend of Demosthenes, which was only decided in 330, and resulted in his own exile. (See DEMOSTHENES.) He retired to Rhodes, where he taught rhetoric. Three of his speeches survive—*In Timarchum, De Falsa Legatione, In Ctesiphontem.* Editions: text only, Blass (Ger.), 1896; with notes, Benseler (Ger.), 1855-60; *In Ctesiphontem* only, Gwatkin and Shuckburgh (Eng.), 1890.

Æschylus (525-456 B.C.), son of Euphorion, the earliest of the three great Athenian tragic poets. His career as a dramatist began in 499 B.C., and lasted practically until his death. In 490 he fought against the Persians at Marathon, and again in 480 and 479 at Salamis and Platæa. In 476 he visited Syracuse, at the request of its ruler Hiero, and seems to have spent much of the rest of his life in Sicily. He died at Gela, and was buried there. The chief note of his style is grandeur of thought and imagery, with a magnificence of language which sometimes verges on bombast, and a deep religious feeling. He largely developed Attic drama—which had before consisted of monologues divided by choric songs—by introducing a second and a third actor, and is said to have introduced scenery and stage appliances. He wrote ninety plays, of which seven are extant—the *Supplices, Prometheus Vinc-*

tus, *Septem contra Thebas*, *Persæ*, *Agamemnon*, *Choephoræ*, and *Eumenides*, of which the three last [illegible] pla[illegible] with contemporary history; the *Agamemnon* as being unsurpassed by any play, ancient or modern, for tragic force. Editions: text only, Wecklein (Ger.), 1885-93; Sidgwick (Eng.), 1900: with notes, Paley (Eng.), 1879; *Agamemnon*, *Choephoræ*, *Eumenides*, Sidgwick, 1887-92; *Persæ*, Prickard, 1889; *Septem c. Thebas*, Verrall, 1887; *Supplices*, Tucker, 1889; *Prometheus* and *Persæ*, Weil (Fr.), 1884. Eng. trans.: in verse—Swanwick, 1881; Campbell, 1890; Browning (*Agamemnon* only), 1879: in prose—Paley, 1871.

Æsculapius (called ASCLEPIOS by the Greeks), the son of Apollo and Coronis according to later story, but spoken of by Homer as a mortal, whose sons were present with the Greek army at Troy. In any case, he was regarded as the founder of the art of healing, and in later times was worshipped as a god, especially at Epidaurus, where his temple served many of the purposes of a modern hospital; and the same was the case in other places. A guild called Asclepiadæ (sons of Asclepios) claimed descent from him, and the monopoly of medical knowledge. Their principal seats were at Cos and Cnidus. See Frazer's edition of *Pausanias* (1898); also Pater's *Marius the Epicurean* (1885).

Æsculus. See HORSE-CHESTNUT.

Aesir, the plural form of *As* or *Ass*, is the name given to an order of mighty beings in the Scandinavian and Teutonic mythology—the children of Odin, of whom the most famous were Thor, Freyr, Balder, Bragi, Heimdall. There were also corresponding female demigods—*e.g.* Frigga and Idun. These divinities waged warfare against the Vanir and against the Giants. Their country is known as Asgard.

Æsopus, or ÆSOP (probably B.C. 620-560), a celebrated Greek fabulist. Certain writers (Vico, in his *Scienza Nuova*, etc.) deny the personal existence of Æsop altogether, owing to the uncertainty attaching to the authorship of many fables attributed to him. But the general conclusion seems to be that Æsop was a real person—a Phrygian by birth, a contemporary of the 'seven sages,' and a slave to several masters until set free by Jadmon of Samos. Thereafter he visited Crœsus at Lydia, and went on an embassy to Delphi, where he was murdered. Nevertheless it has been proved that certain stories traditionally attributed to Æsop have a far more ancient origin, and are, indeed, the common property of all Eastern nations—*e.g. The Lion and the Mouse*, and *The Dispute between the Stomach and the Members*, which have been shown by Brugsch and Maspero to be identical with certain fables found on Egyptian papyri. It has, indeed, been maintained that they are all of Arabian and Persian origin, and that Æsop is the Grecian figure corresponding to the Arabic Lukman or Lokman. None of Æsop's fables have come down to us in the original Greek, if there was ever such a compilation in existence; but two authors—Babrius in Greek, and Phædrus in Latin—have preserved many of them. In the middle ages there were three principal collections published, including many spurious fables: (1) that of Maximus Planudes, a monk of Constantinople, in the latter part of the 14th century; (2) one published at Heidelberg (1610); and (3) one discovered in MS. at Florence, probably a century older than that of Planudes. There is a statue to Æsop in the Villa Albani at Rome.

Bust of Æsop the Fabulist.

Æsopus, CLAUDIUS or CLODIUS, a celebrated Roman actor, a friend of Cicero, and of equal merit with his contemporary Roscius. He left a large fortune to his son—that worthless Æsop who is said to have boastfully dissolved in vinegar a pearl worth £10,000, in order to provide a costly drink.

Æsthesiometer (Gr. 'measure of perception'), an instrument used for estimating the sense of touch in any part of the body. Two points are applied to the part, and the minimum distance is recorded at which they are felt as two points, and not as one. On the tongue-tip two points can be distinguished, normally, at a distance of 1 mm. apart. The palmar surface of the last joint of a finger is next in sensibility, with a distance of 2 mm. See TOUCH.

Æstheticism. Primarily, attachment to the principles of æsthetics has come to be applied to extravagant devotion to trifling forms of beauty, which frequently develops into whimsical absurdities, such as have been ridiculed in the opera *Patience*, and in Du Maurier's *Punch* cartoons. Among the promoters of a saner æstheticism were Ruskin, Leighton, Millais, and Morris.

Æsthetics. By æsthetics is meant primarily a theory of the beautiful as exhibited in works of art. That is to say, æsthetics, considered on its objective side, has to investigate, first, the function of art in general as expressing the beautiful, and the nature of the beauty that is so expressed; and, second, the special functions of the several arts, and the special aspects of the beautiful with which they are severally concerned. Æsthetics, therefore, has to discuss, among others, such topics as these: the relation of art to nature and life; the distinction of art from nature; the relation of natural to artistic beauty; the conditions and nature of beauty in a work of art; the distinction of beauty from truth, from utility, and from moral goodness; the classification of the fine arts; the conditions and limitations of artistic representation or production in the several arts—*i.e.* the kinds of beauty the several arts are fitted to represent—and so on. Æsthetic theory is thus distinguished from art criticism by its more abstract character, or by the importance—relatively much greater in the former than in the latter—of the scientific as compared with the artistic interest. Art criticism is concerned primarily and mainly with the appreciation of particular works of art; whereas æsthetic theory seeks rather to formulate the more abstract and fundamental conceptions, distinctions, and principles which underlie all such criticism. Æsthetic theory is thus one remove further from the actual works of art and their immediate appreciation. It is not, however, on that account to be regarded as quite severed from, or discontinuous with, art criticism. For although in æsthetics the scientific interest in the statement of principles has become, in a sense, of even primary importance, yet science would degenerate into pedantry if the artistic interest did not retain its vitality. In fact, art criticism is, in this respect, simply a mean between æsthetic science on the one hand and intelligent appreciation on the other. And as appreciation at the one extreme does not sink to the level of featureless sensation, so, too, knowledge at the other does not aim at an abstractness that is indifferent to all artistic content.

A second main subject of inquiry may be included in æsthetics—*viz.* the investigation, on the subjective side, of the æsthetic consciousness. By this is meant an inquiry into the psychological nature, origin, and development of æsthetic judgment and æsthetic emotion or sentiment—in other words, a theory of taste and the pleasures of taste. This second inquiry is obviously dependent on the first, and subordinate to it, since we cannot define the sense of beauty apart from the beauty of which it is the sense. It is to be observed that psychological æsthetics may investigate the process and conditions of artistic *production*, as well as of artistic perception or *appreciation*.

The two most important contributions of classical antiquity to general æsthetic theory are, on the one hand, those discussions in Plato and Aristotle of the value of art and the relation of art to nature, that centre round the conception of art as imitative; and, on the other hand, an insistence on the more formal conditions of artistic excellence, such as the unity of the work of art as a whole, and the due proportion of the parts that make up the whole. The most important single work on æsthetic theory in antiquity is Aristotle's *Poetics*, in which the theory of poetic art (and mainly tragedy) is discussed both on its objective and on its subjective side. (See ARISTOTLE.)

In the modern period, the greatest and most continuous development of æsthetic theory has taken place in Germany. The valuable work of Lessing in his *Laocoön* and his dramatic criticism was followed in 1790 by Kant's epoch-making *Critique of Judgment*, in which, for the first time, the sphere and object of the æsthetic judgment—in other words, the general nature of the beautiful—were clearly defined. Most of the great German thinkers since Kant's time have dealt in some fashion with æsthetic theory. Hegel's *Lectures on Æsthetics* is perhaps the greatest work on the whole subject, aiming, as it does, at determining the nature of the ideal or the beautiful, and exhibiting the manner of its concrete realization throughout the whole scope of art. Herbart and Fechner, again, seek to bring an exact psychology to bear upon the problems of æsthetic science; while in no philosophy is the place of art more exalted than in that of Schopenhauer. Later German writers on the subject have been Lotze, Carrière, and F. T. Vischer.

The British writers on æsthetics of the 18th century, such as Hutcheson, Hume, Home, Alison, Burke, were concerned primarily and mainly with the psychological investigation of the æsthetic emotions. No work on æsthetics as a whole, has been produced in Britain which can compare with the works of the great German writers and their successors. See Bosanquet's *History of Æsthetic*, with the bibliography; or Sully's article on Æsthetics in the *Encyc. Brit.* Most of the leading works above mentioned are translated (see, for example, LESSING, KANT, and HEGEL). For a more concrete work on art theory, see Baldwin Brown's *Fine Arts* (2nd ed. 1902).

Æstivation. (1.) In zoology a summer sleep, not uncommon in animals which inhabit climates where the summer is very hot and dry, especially in the case of forms requiring a considerable degree of moisture, or whose habitat is fresh-water ponds. Thus, both land and water tortoises frequently retire into cavities of the ground during heat and drought, and there remain till the recurrence of the rainy season. The African fish *Protopterus* in the dry season constructs mud nests, in which several months may be spent; the nests have been dug up and brought to Europe without detriment to their contents. The phenomenon is entirely comparable to hibernation. (2.) In botany, the arrangement of leaves in the bud with relation to one another. The term is applied chiefly to flower-buds; and as the æstivation of buds is usually constant for the same flower, and often for the same genus or even order, the study is important in classification.

Æt., abbreviation for *ætatis anno*, 'in the year of his age.'

Aetas, or INAGTAS, a race of Negritos (pigmy blacks) inhabiting Luzon, in the Philippine Islands. They are closely allied to the Andaman Mincopies; average height is from 4 ft. 6 in. to 4 ft. 8 in.; crisp black hair and negro-like features; skull brachycephalic; legs calfless, and feet turned inwards. They are strictly monogamous; wear almost no clothing; build rude huts in sequestered places; weapons, short spears, bows, and poisoned arrows; fiercely opposed the invading Malay Tagals, but are now a mere persecuted remnant.

Ætheling, or ATHELING, in Anglo-Saxon times meant, at first, one of noble (*æthel*) birth, and, later, from the 9th to the 11th century, a prince of the blood-royal. The title is specially associated with Edgar, grandson of Edmund Ironside.

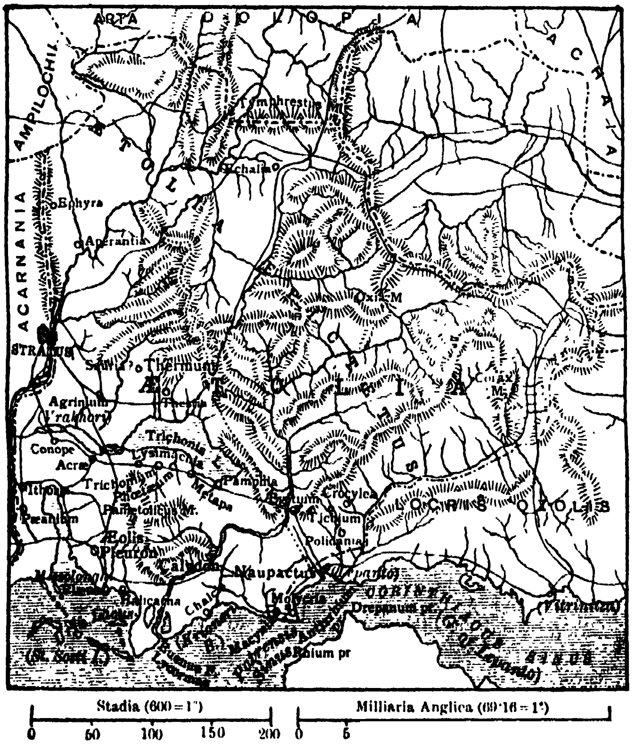
Æther, in Greek mythology, son of Chaos and Darkness, one of the elementary substances out of which the universe was formed; in later times the wide expanse of heaven, the abode of the gods.

Æther, or ETHER, the name given to the medium which fills space, and is believed to permeate matter. As a fundamental conception in physical science, it is necessary for the propagation of the vibratory motions which constitute light. The evidence is overwhelming that light and similar forms of radiant energy are transmitted in all directions through the visible universe from body to body; and to give a satisfactory explanation of many optical phenomena, we are forced to regard the vibratory motion in æther which constitutes light as taking place at right angles to the direction in which the light is being propagated. (See LIGHT.) In other theories the 'substance' called æther behaves as an incompressible elastic solid capable of transmitting purely distortional disturbances only. This highly elastic substance, filling all space, permeating all matter, and throbbing to the molecular vibrations of matter, nevertheless exerts apparently no resistance to the rapid motion of matter in bulk through it. In other words, matter must grip the æther molecularly, but not in mass. Attempts have been made to imagine a mechanism by which this interrelation between matter and æther may be imitated, but with small success. Fresnel formulated in a masterly manner the dynamical properties of an æther in terms of which the broad phenomena of light could be expressed; and Green, Stokes, Kelvin, and others have striven to find a strictly elastic basis for the wave theory of light. The whole question of the constitution of the æther entered, however, upon a new phase with Faraday's discovery of the effect of magnetism on light; and of special importance is the brilliant theory enunciated and developed by Maxwell, that light is an electro-magnetic phenomenon. The æther now becomes a medium capable of transmitting electric and magnetic disturbances. Instead of displacements analogous to those in an elastic solid, we have electric displacements or fluxes; and did we know what these were in their ultimate essence, the problem of the æther would be solved. The present tendency of speculation is to regard æther and matter as two substances through which, and in virtue of the motions of which, electric effects are produced. Under certain conditions the electric vibrations affect our organs of vision, and luminous or optical phenomena are the result. Broadly speaking, Maxwell's theory at present holds the field; but there are many modifications of it associated with the names of Helmholtz, Hertz, J. J. Thomson, H. A. Lorentz, Larmor, Drude, and others.

A question of peculiar theoretic interest is the connection of matter and æther. How far does the æther within the region occupied by a portion of matter partake of the motion of the matter? To what extent, for example, does the earth in its motion drag the æther along with it? The phenomenon known as the aberration of light, in virtue of which stars appear displaced from their true position by an amount depending on the ratio of the earth's speed to the speed of light, would seem, on first consideration, to require that the æther in the neighbourhood of the earth did not share in the earth's motion. But if this were so, other phenomena would be observable, which the most delicate experiments have failed to show. On the other hand, direct attempts to establish the existence of a drag on the æther, in virtue of heavy matter moving rapidly through it, have failed; and yet it was demonstrated by Fizeau that light moved more quickly in the direction of motion of a rapidly-moving medium than in the opposite direction. These contradictory results may be reconciled, if we assume with Fresnel that the æther within a body moves in the direction of motion of the body, but not with the velocity of the body. The present outlook, however, is much wider than it was in the days of the early triumphs of the wave theory of light. Electric and magnetic actions must be taken into account, and some very difficult problems arise as to the phenomena associated with the motion of matter through æther. We can hardly escape from the necessity of assuming that æther, as well as matter, possesses inertia; but it is not certain how far other general properties must be postulated. Kelvin has shown that bodies dominated by gyrostatic motion possess a quasi-elasticity, and the elasticity of gases is a direct consequence of their molecular motions. Similarly, certain properties which æther must possess may be themselves explained in terms of the motions of the particles or elements of æther. As regards gravitational action, there is no evidence that æther is subject to it. Kelvin has, indeed, argued that if the æther were subject to gravitation it must be infinitely incompressible, otherwise a condition of instability would ensue. If æther has inertia, it must have a definite density. Calculating from the amount of solar energy present in the æther in the neighbourhood of the earth, Kelvin found that 1,000,000,000 cubic miles of æther contained at least 1 lb. of mass. On the other hand, Larmor finds that the density of the æther must be much greater than that of matter, if we adopt the hypothesis that material molecules are states of strain in the æther. Osborne Reynolds comes to a similar conclusion in his new grain theory of the universe. (See DILATANCY.) See the published papers of Kelvin, Stokes, Larmor; also Larmor's *Matter and Æther* (1900).

Æthionema, cruciferous perennial dwarf plants from S. Europe; best grown in the rock garden. They form tufts, with many pink and lilac flowerets.

Æthrioscope, an instrument designed by Leslie in 1817 for the purpose of measuring changes of temperature produced by radiation. It consists of a differential thermometer, with both bulbs contained in a cup-shaped mirror, and one of them in its focus. By this instrument slight variations of temperature, due to changes in the condition of the sky, are also estimated.



Ætolia.

Ætiology. See ETIOLOGY.

Aetion, a Greek painter contemporary with Alexander the Great. His masterpiece was *The Marriage of Roxana and Alexander*; it was exhibited at the Olympic games. The picture is described in detail by Lucian, and was reproduced by Raphael.

Aetius. (1.) A Roman general, the last successful defender of the Roman empire; born in Mœsia. Early in life he was handed over to Alaric as a hostage, and became familiar with the tactics of the barbarians. As commander-in-chief of the armies of the Western Empire, he kept Italy, Spain, Britain, and Gaul in peace from 433-450 A.D. In 451 he succeeded in checking the advance of Attila in the great battle in the Catalaunian plains, near Châlons, but was murdered (454) by Valentinian, who suspected him of aiming at the throne. (See Gibbon's *Decline and Fall*, c. 33 and 35.) (2.) Surnamed 'The Atheist,' and leader of the Anomœan sect of Arians, who are sometimes called after him Aetians. Ordained deacon in 348, he was present at the first synod of Sirmium, when he defeated in argument the bishops Basilius and Eustachius, of the Homoiousian party. In 356, from fear of Constantius II., he left Antioch for Alexandria; but in 361 he was recalled by Julian the Apostate, from whom he received an estate in Lesbos and a position in the court at Constantinople, where he died in 370. His work *De Fide* was refuted by Epiphanius.

Ætna. See ETNA.

Ætolia. (1.) Division of ancient Greece, bounded E. by the Ozolian Locrians, S. by the Corinthian Gulf, W. by the Achelous R., and N. by Epirus and Thessaly. In ancient times the inhabitants appear to have been equal in culture to the rest of the Greeks, and their chief city Calydon was famous in the legends. In historical times, however, they, like their neighbours the people of Acarnania, were semi-barbarous. In the 3rd century B.C. they were united in an important league, which was joined by several cities in the north of Greece. They allied themselves with Antiochus III., king of Syria, against the Romans, and on his defeat became virtually subject to Rome. After 146 B.C. they were included in the province of Achaia. See Holm's *Hist. of Greece*; and for the league, Freeman's *Hist. of Federal Government*. (2.) With Acarnania, a prov. (nomarchy) of modern Greece (N.). Area, 3,013 sq. m. Pop. (1896) 170,565.

Ætolikon, AITOLIKON, or ANATOLIKO, fort. tn., Acarnania and Ætolia, Greece, 6 m. N.W. of Missolonghi. Pop. 5,500.

Afanasiev, ALEXANDER NIKOLAIEVITCH (1826–71), Russian author and scholar, born in the government of Voronetz; was in the civil service until 1862. His principal work, *The Poetical Views of the Slavs about Nature* (3 vols. 1865 9), is a rich storehouse of information about Slav mythology. He published also a large collection of Russian *Popular Tales* (4 vols. 2nd ed. 1873), many of which have been translated into several European languages.

Afar, tribe. See DANAKIL.

Afer, DOMITIUS, of Nemausus (Nîmes), a celebrated Roman orator; prætor A.D. 25. He gained the favour of Tiberius by accusing Claudia Pulchra, cousin of Agrippina, A.D. 26. See Quintilian, xii. 11; Tacitus, *Annales*, iv. and xiv.

Afer, used by Milton for the south-west wind which blows from Africa over Italy. *Cf.* 'Levanter,' a name given for a similar reason to the east wind in the Levant.

Affenthaler, a red wine which takes its name from the village of Affenthal in Baden.

Affettuoso, an Italian musical term indicating a tender and affecting style; it lies between *adagio* and *andante*, and is frequently joined with these terms. *Affetto* and *con affetto* are used in the same sense.

Affidavit, a written statement of facts made upon oath, or affirmed, before a magistrate or commissioner for oaths. Generally an affidavit should be confined to matters within the knowledge of the deponent, but in some cases (*e.g.* in interlocutory applications) he may speak 'to the best of his knowledge and belief.' In contentious cases evidence at a trial is nearly always oral; but in the Chancery Division parties sometimes agree to try a case by affidavit, and the use of affidavits is almost universal in interlocutory and non-contentious business in that division. Leave may be obtained to cross-examine a deponent upon his affidavit. Affidavits are required by statute, both in Scotland and England, in support of certain claims, or in proof of accounts and other statements, especially in connection with bankruptcy and matters affecting the public revenue. In the Scottish courts affidavits have never been so much favoured as in the Chancery courts in England. They are practically only used for establishing a *primâ facie* case to be afterwards proved. Affidavits may be made abroad before the British consul or an official of a British embassy.

Affiliation. On an affiliation summons taken out either before or after the birth of an illegitimate child - but if after, then within twelve months of its birth or the last payment for its maintenance —the father may be ordered by the magistrates to pay the mother a weekly sum not exceeding five shillings until the child is sixteen. The mother's evidence as to paternity must be corroborated, and an appeal lies to quarter sessions. Funeral expenses of the child, and confinement expenses, may be allowed. The Bastardy Acts do not apply to Scotland, where the father and mother are jointly liable at common law to support an illegitimate child; but the mother may sue the father in the sheriff court, and obtain aliment to the extent of about £8 a year. See Sandars, *Law and Practice of Orders of Affiliation*; Fraser, *On Parent and Child.*

Affinity, the relationship, in law, between a husband and the blood relations of his wife, and between a wife and the blood relations of her husband. Marriages within the degrees of affinity prescribed by the Prayer Book are null and void under Lord Lyndhurst's Act of 1835. The act does not apply to Scotland, where the table of affinity is based on Leviticus, by two statutes of 1567.

Affinity, CHEMICAL, is the term expressing the specific attraction of particular atoms or groups for each other by which chemical compounds are formed. Its actual nature is unknown, and its relative value in different cases is greatly obscured by other causes, notably by the mass of the acting bodies. The relative avidity of acids for bases, or proportion in which a base distributes itself between different acids, has been found to be the same as that of their electric conductivities, which are believed to be in proportion to the degree of their dissociation into ions; so that the affinity of the acid may be an effect of the same cause. See EQUILIBRIUM and ELECTROLYSIS.

Affirmation, a solemn declaration made in the prescribed legal form as required by the Oaths Act, 1888. By that act any person may now affirm, instead of taking an oath, provided he states that he objects to the latter, either because he has no religious belief, or because the taking of an oath is contrary to his religious belief. A false affirmation is punishable as perjury. Quakers and Moravians were given the right to affirm in 1833. See also OATH.

Affleck, SIR EDMUND (1723-88), rear-admiral in the British navy; in 1778 was appointed to the *Bedford*, which took part in the engagement off Cape St. Vincent (1780). Affleck's services in the W. Indies under Rodney and Hood (1782-4) gained him a baronetcy and the rank of rear-admiral.

Afforestation is the transformation of habitable land into a *foresta* or wilderness, whether accompanied by the planting of trees or not a distinction still observed in the title of the Department of Woods *and* Forests. Afforestation may be carried out with two very different ends in view. In the formation of the New Forest (Hampshire) by William I., and of various 'forests' by other Norman kings, certain districts were denuded of their inhabitants in order to provide a 'chase' for royal sportsmen; and the makers of 'deer forests' in the Scottish Highlands in modern times are actuated by similar motives. What is aimed at in such instances is the creation of huge *foresta*, in which wild animals may roam about at will, ultimately to provide sport; and the mountainous wastes in Scotland which are reserved and *created* for deer-stalking are never 'afforested' in the secondary sense of the term. Afforestation of this order means the systematic planting of large tracts of land, which may have been previously treeless, or which may have recently been denuded of wood by fire or by the woodman's axe. This kind of afforestation is largely practised, under government supervision, in India, Germany, Norway, Sweden, and N. America. In England this matter has since 1889 been under the control of the Board of Agriculture; and in 1902 a departmental committee was appointed to inquire into the management and planting of woodlands in Great Britain. See further under FORESTRY; and consult the publications of the Scottish Arboricultural Society, J. S. Gamble's *Manual of Indian Timbers* (1881), and various books by John Croumbie Brown published between 1887-92. Afforestation for the rearing of game in England is dealt with in Sir M. Hale's *Hist. of the Common Law of England.*

Affre, Denis Auguste (1793-1848), archbishop of Paris (1840), a wise and moderate man in a time of intense political strife, was shot at the barricades (June 24) while making an appeal for peace. He left several theological works. See Cruice's *Vie de D. A. Affre* (1849).

Affronté, Affrontant, or Affronted, in heraldry said of the figures of men or animals placed full-face to the spectator, also (but rarely) of figures which are represented facing each other in profile.

Affry, Louis Augustin Philippe, Comte d' (1743-1810), Swiss statesman, appointed landamman (chief magistrate) 1803, and again in 1809, when Napoleon claimed the protectorate over the Swiss Confederacy. His judicious conduct, as well as the personal favour in which he was held by Napoleon, was of the greatest service to Switzerland at this critical period.

Afghanistan, inland country of Asia, bounded on E. and S. by India and Baluchistan, on N. and N.E. by the Russian and Chinese empires, and on the W. by Persia. Its length from W. to E., between Khorassan and the Punjab, is 600 m., but about 900 m. to the Chinese borders; its breadth, N. to S., is from 450 to 500 m.; area about 250,000 sq. m.; and pop. about 5,000,000.

As a 'buffer state' between the Russian and British empires, the precise limits of its territory have been settled by treaty, and locally demarcated by several boundary commissions. The Russo-Afghan border-line starts from Zulfikar, on the Hari-Rud, runs through the Badghais district, and, leaving Panjdeh to Russia and Meruchak to Afghanistan, terminates on the Amu Daria at Khamiab. Thence it is formed by the Amu Daria and the Ab-i-Panj up to Lake Victoria, whence it follows the crest of the Nicholas range, between the Great and Little Pamirs, to a peak in the Sarikol, the meeting-place of Russian, Afghan, and Chinese dominions. The Sarikol range, N. and S., separates the Little Pamir from the Chinese Pamir. From the Wakhjir Pass, where the British, Afghan, and Chinese spheres meet, the Indo-Afghan border follows the Hindu-Kush to the Dora Pass, and then to the divide between the Bashgol and Chitral Rs. From the Kabul R. it follows the Safed Koh to the Caiwar Kotal, and thence S. to the junction of the Gumal and Kundar Rs. From this point Afghanistan borders with Baluchistan for 800 m. to Koh-i-Malik Siah, where Persian, Afghan, and British territories converge.

The chief mountain range is the Hindu Kush, with its prolongation the Koh-i-Baba. To the E. are the Sulaiman Mts., forming the watershed of the Indus, and the Safed Koh. The whole country forms part of the Iran plateau, and has a general elevation of 2,000 to 4,000 ft. The hydrographic systems belong to the inland basins of the Aralo-Caspian (Amu Daria, Murghab, and Hari-Rud), the Hamuns of Seistan (Helmand, Harud, etc.), and the Indian Ocean through the Indus (Kabul, Kuram, and Gumal). The climate is continental, with great heat in summer and severe cold in winter (above 5,000 ft.), but is generally healthy. The rainfall is slight, and the snowfall heavy in the highlands. The N.W. 'wind of the 120 days' blows from March to end of July.

Though the minerals are not much worked, they are tolerably plentiful in N. Afghanistan, and comprise gold, silver, rubies, lapis lazuli, iron, copper, lead, antimony, zinc, copper, sal-ammoniac, gypsum, and nitre. There are two harvests (summer and autumn) in the year in most parts of Afghanistan, and wheat, barley, lentils, rice, millet, sorghum, maize, tobacco, beet, sugar-cane, madder, mulberry, and fruits (grapes, melons, etc.) are largely grown, the fruits forming the principal food of most of the people. Domestic animals are camels, horses and ponies, cattle, sheep (two fat-tailed varieties), goats, and dogs.

The population consists of many discordant elements: one-half probably belongs to the dominant Afghan race, the Duranis; next are the Ghilzais, probably of Turki origin; the Hazaras and Aimaks, of Tartar origin; other races are Arabs, Jews, Baluchis, and Kafirs. The language is Pushtu, but Persian is in general use. Most of the Afghans are pastoral and nomadic, others are agricultural. Agriculture is carried on wherever possible, and with the aid of irrigation. Manufactures are unimportant, and are mainly confined to the production of silks, carpets, felts, and fabrics from wool of sheep, goats, and camels. The sheepskin *postin* manufacture is one of the most important industries. Industrial expansion is much impeded by prohibitive duties.

Trade is carried on with Persia, Russian Central Asia, China, and India. The chief exports are wool, silk, sheepskins, horses, cattle, and fruits. The imports are cotton, silk, and woollen goods (chiefly from Britain), coarse cloths, sugar, tea, indigo, drugs, arms, metal goods. The chief highways are through the Khyber, Gumal, and Bolan Passes to Kabul, Ghazni, and Kandahar; from Kabul to Bokhara, Herat, and Kandahar; from Kandahar to Seistan, Herat, and Meshed. Oxen, camels, and horses are used for caravans. There are few made roads except about Kabul, and there is but one local railway, also at the capital.

The government is a hereditary monarchy based on a tribal organization. At its head is the Ameer, who belongs to the Barakzai branch of the Duranis. There is a council of state, consisting of Ameer, sirdars, khans, and mullahs.

There are five provinces: Kabul, Kandahar, Herat, Turkestan, and Badakhshan. At the head of each is a *hakim* or governor. The supreme court and court of appeal is that of the Ameer of Kabul. Justice in most cases is left to the administration of a *kazi*, or chief magistrate, assisted by *muftis* or *mutaassibs*, who somewhat resemble detective officers. The laws, which are largely disregarded, are tolerably equitable. The Ameer receives a subsidy of 180,000 rupees (formerly 120,000) from the Indian government, and grants of arms. He has no foreign relations save with India.

There is a regular army, originally formed by Shere Ali on his return from India in 1869; it is estimated at 40,000 foot, 20,000 horse, and 360 guns. It is supplemented by the tribal levies. Guns, small arms, and ammunition are now manufactured at Kabul arsenal.

The religion of the Afghans is (Sunni) Islam. They were conquered and converted to this faith in the 7th century A.D. Many of the tribes are fanatical, and the mullahs have much power. There is little education, and the policy of the Ameer has been one of isolation.

The chief towns are Kabul (140,000), Kandahar (30,000 upwards), Herat (12,000), Ghazni (10,000).

Afghanistan is the gateway to India. Most historic invasions of that peninsula have been made through its passes, from the days of Darius and Alexander (330-329 B.C.) to Moslem and Mogul times; the Afghans themselves have made many predatory incursions, and have even set up Afghan or Pathan dynasties. After forming successively part of the Parthian and Sassassian empires, the country was at times partly subject to Persia, partly to the Mogul empire, and at times divided amongst small native dynasties, of which that of Ghazni (1001-1186) was the most notable. Eventually in 1708 the Ghilji rose against Persia and set up an independent kingdom at Kandahar, and in 1717 the Afghans asserted their independence at Herat. Nadir Shah of Persia, who had levied a strong Afghan contingent for his invasion of India, was assassinated (1747), and the Afghans chose as king Ahmed, a gen-

Afghanistan—The Bala Hissar or Black Citadel, Kabul.

eral in Nadir's army. Ahmed reduced to his rule the whole of Afghanistan, and annexed Sindh, part of the Punjab, and Kashmir. The years following 1793 were disturbed by domestic conflict and anarchy, out of which Dost Mohammed emerged as chief (1823), assuming the title of Ameer ('commander') in 1835. Beset by Persia on the W. and the Sikhs on the E., the Ameer sent to Lord Auckland, governor-general of India, with a view to British aid in the recovery of Peshawar. His terms, refused by Britain, were accepted by Russia, leading to the siege of Herat by a Persian army, and the splendid defence of Eldred Pottinger. Lord Auckland then declared war against Afghanistan; and Sir John Keane, with 21,000 men, occupied Kandahar and Kabul, and set Shah Shuja on the throne (1839). Dost Mohammed, who had surrendered, was sent to Calcutta; but his eldest son, Akbar Khan, continued resistance. In a revolt at Kabul (Nov. 2, 1841) Sir A. Burnes, British resident, was killed; Sir W. Macnaghten, envoy, was shot by Akbar (Dec. 23); and on Jan. 6, 1842, the garrison capitulated upon terms of a safe escort to India. Except for one man, Dr. Brydon, who escaped to Jelalabad, all the 16,500 were massacred, or perished of hunger and exposure, in the retreat. An avenging army under General Pollock relieved Jelalabad (April 16, 1842), demolished the citadel of Kabul (Sept. 15), and, Shah Shuja having been killed, replaced Dost Mohammed on the throne. From this time his friendly relations with Britain were marked by British aid against Persia, and by his faithfulness during the time of the mutiny. Having taken Herat, and thus consolidated the whole kingdom, he died (1863), and was succeeded by his son Shere Ali. The new Ameer's reign was greatly harassed by a series of conflicts with Azim, his brother, and Abdur-Rahman, his nephew, who occupied Kabul (1866); but he regained his throne and kingdom in 1869, and received a subsidy of money and arms from Britain, and a recognition of his northern boundary by Russia was secured for him. Alarmed by the fall of Khiva, Shere Ali sent to Simla to request an offensive and defensive alliance, with recognition of his heir-apparent, and was so deeply offended at the British refusal to accord his request that he declined to admit British agents to any part of the country, and concluded a treaty with Russia (1878). His action was regarded as hostile; the British occupied Kandahär; and Shere Ali died a fugitive from Kabul (Feb. 1879). His son, Yakub Khan, came into the British camp, and signed the treaty of Gandamak (May 26), by which a resident was to be admitted at Kabul, the Khyber Pass and certain districts in Baluchistan were ceded to Britain, and Afghan foreign relations were to be submitted to British guardianship. In the same year, however, the envoy (Sir Louis Cavagnari) and the whole garrison were murdered (Sept. 3). General Roberts occupied Kabul (Oct. 12), and sent Yakub Khan to India. Early in 1880, Abdur-Rahman, who had invaded the Turkestan province, was suggested by Lord Lytton as a suitable ruler, and was proclaimed Ameer (July 22); and the British prepared to withdraw (Aug. 10), when news of the defeat of General Burrows at Maiwand by Eyyub Khan, and of the siege of Kandahar, arrived. Then followed Roberts's famous march to Kandahar (Aug. 9-31), and its relief and the defeat of Eyyub Khan. Abdur-Rahman regained Herat, and was occupied, during most of his reign, in putting down opposition and disaffection. As early as 1883 he had justified his selection by the British, and his rule was endowed with an annual subsidy of twelve lakhs of rupees. After the occupation of Merv by Russia (1884), it was found necessary to have the north-western boundary defined. An Anglo-Russian commission was appointed; finally, a protocol was signed at St. Petersburg (July 22, 1887). The Omand mission visited Kabul (1893) and settled the Anglo-Afghan border; at the same time the subsidy was increased to sixteen lakhs. Abdur-Rahman broke the power of the tribal chieftains by maintaining a standing army, and by skilfully husbanding the resources of his treasury. Habibullah, his eldest son, succeeded him (Oct. 3, 1901). See Elphinstone's *Account of the Kingdom of Caubul* (1815); Havelock's *Narrative of the War in Afghanistan* (1840); Sale's (Lady) *Journal* (1843); Mohan Lal's *Life of the Ameer Dost Mohammed Khan of Kabul* (1846); Kaye's *History of the War in Afghanistan* (4th ed. 1890); Rawlinson's *England and Russia in the East* (1875); Durand's *The First Afghan War* (1879); Malleson's *History of Afghanistan* (1879); Bellew's *Afghanistan and the Afghans* (1879), and *Races of Afghanistan* (1880); Hensman's *Afghan War* (1881); Hamley's 'Russia's Approach of India,' *J.U.S.I.* (1885); Edwards's *Russian Projects against India* (1885); Yates's (A. C.) *England and Russia Face to Face in Asia* (1887); Yates's (C. E.) *Northern Afghanistan* (1888); Curzon's *Russia in Central Asia*, with bibliography (1889); Mark Bell's 'Defence of India and its Imperial Aspect,' *J.U.S.I.* (1890); Oliver's *Across the Border* (1890); S. S. Thorburn's *Asiatic Neighbour* (1894); Forbes's *Afghan Wars* (1892); Wheeler's *The Ameer Abdur-Rahman* (1895); Lane Poole's *Mohammedan Dynasties* (1896); Roberts's *Forty-one Years in India* (1897); Hanna's *Second Afghan War* (1899); Balfour's (Lady Betty) *Indian Administration of Lord Lytton* (1899); Gray's *At the Court of the Ameer* (1900); Lebédev's *Russes et Anglaisen Asie Centrale* (1900); Colquhoun's *Russia against India* (1900); Mohammed Khan's *Constitution and Laws of Afghanistan* (1900), and *Life of Abdur-Rahman* (1900); Warburton's *Eighteen Years in the Khyber* (1900); Holdich's *The Indian Borderland* (1901).

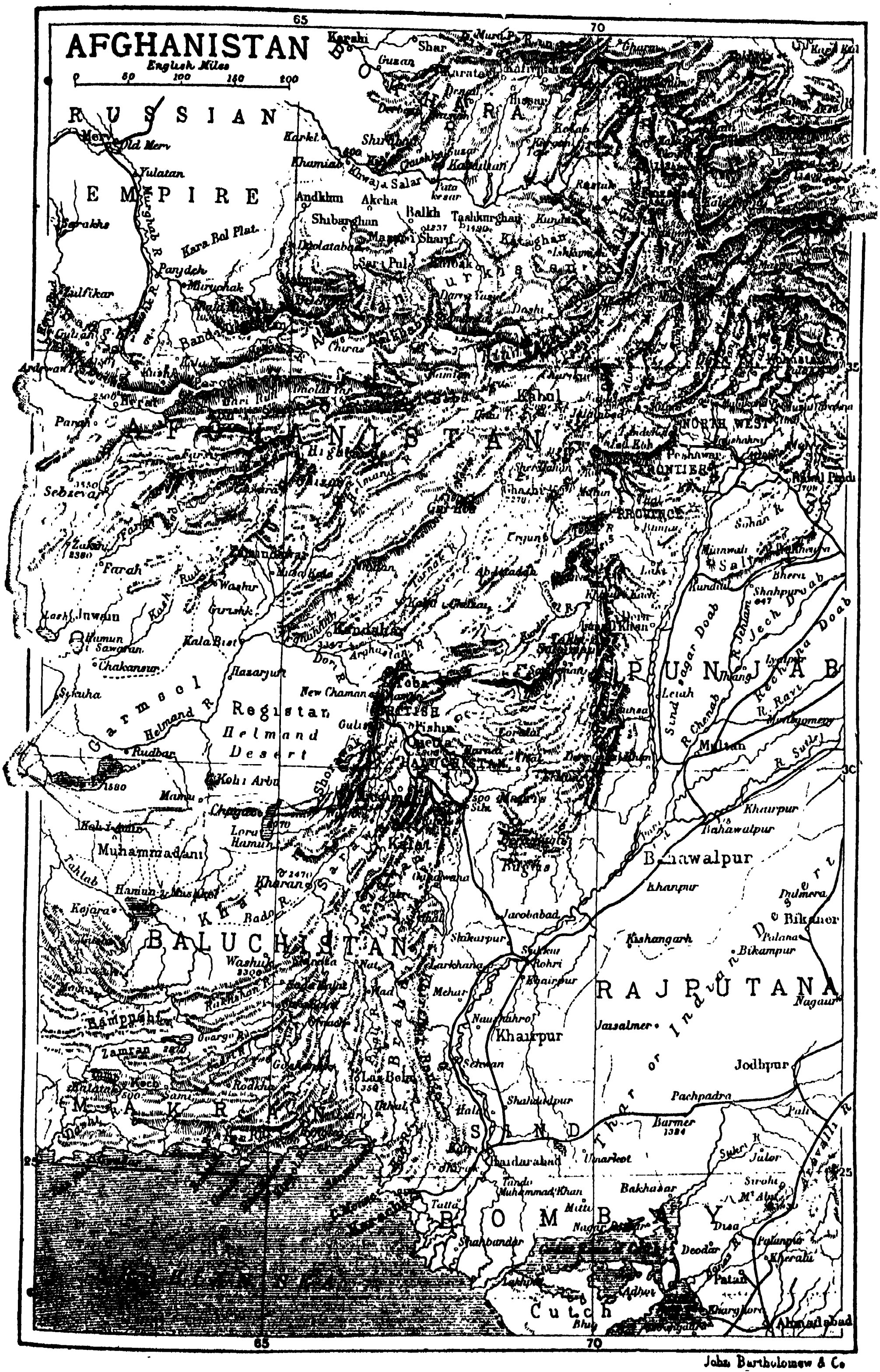
Afium-Kara-Hissar, or KARA-HISSAR-SAHIB (anc. *Synnada*), important commercial tn., Anatolia (Khodavendikiar-Brusa prov.), 54 m. S.S.E. of Kutahiya, with ry. stn. where the Anatolian Ry. joins the Smyrna system; the centre of the opium (*afium*) dist.; citadel rises 800 ft. out of the plain. Pop. 20,000.

Aflenz, vil. and summer resort of Austria in Styria, 11 m. by rail N. of Brack-an-der-Meer. Pop. (1900) 3,247.

Afra. (**1.**) A patron saint of Brescia, who became a Christian on witnessing the fortitude of her brothers when thrown to the wild beasts by Hadrian. She was martyred in 121. (**2.**) A patron saint of Augsburg, converted by the teaching and example of a Spanish priest who had taken refuge in her house during the Diocletian persecution. Accused of harbouring Christians, she was burned at the stake in 307.

Afragola, tn., Italy, prov. and 4 m. N.E. of Naples. Pop. (1901) 22,419.

Afranius, LUCIUS. (**1.**) Roman comic poet, flourished about 100 B.C. Roman scenes and manners, for the most part of the lower classes, form the subjects of his comedies. Fragments of his works have been published by Bothe in his *Poetæ Latini Scenici Fragmenta*, and by Ribbek in *Comicorum Romanorum Fragmenta* (Leipzig, 1873). (**2.**) Roman general and friend of Pompey, whom he served in the Sertorian and Mithridatic wars, B.C. 77. He was elected consul in B.C. 60, and when Pompey obtained the provinces of the two Spains in B.C. 55 he sent Afranius and Petreius to govern them. On the breaking out of hostilities between Cæsar and Pompey, Petreius and Afranius were, after a short campaign, compelled to surrender at Ilerda, B.C. 49. Afranius was present at the battle of Pharsalia; and on the defeat of Pompey at Thapsus he fell into the hands of Sittius, and was slain, B.C. 46.

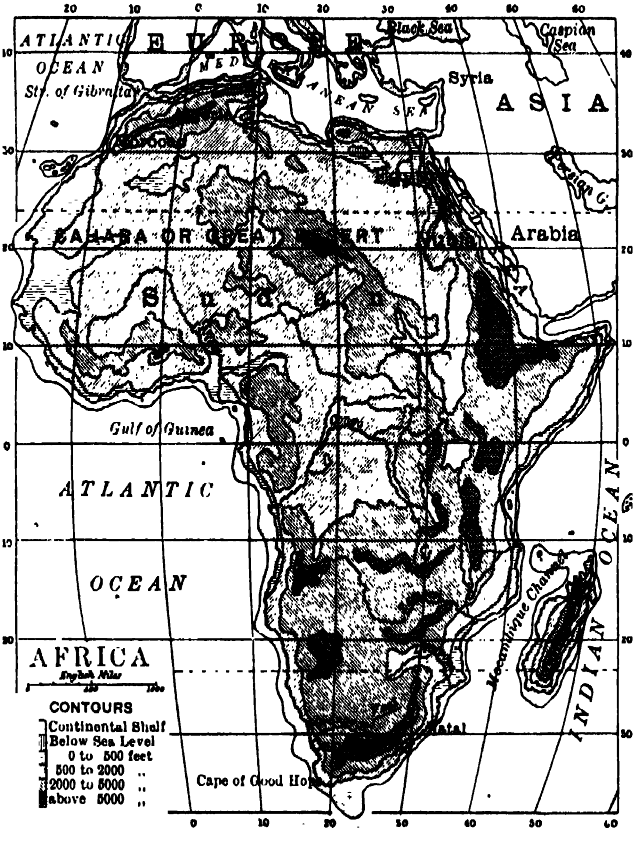


John Bartholomew & Co.

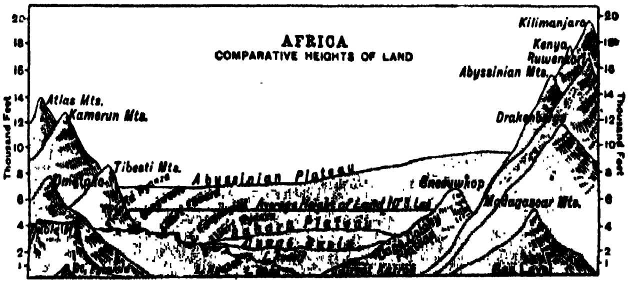
Africa, a continent forming the southernmost prolongation of the Old World. The greater bulk of its compact mass lies between the tropics; the equator crosses it almost half-way between N. and S. The distance from N. to S. is 5,000 m., and from W. to E. (Cape Verdi to Ras Hafun, S. of Cape Guardafui) 4,650 m. Its shape roughly resembles that of a pear, bulging out in the N. and tapering to the S., so that its breadth at 10° S. is only about 1,000 m. In the N.E. it is separated from Asia by the deep waters of the Gulf of Aden and the Red Sea, between which it is almost joined to Asia at the Strait of Bab-el-Mandeb (14 m. wide). In the N. it is actually continuous with Asia at the Isthmus of Suez (75 m. wide), across which the shallow trough of the Suez Canal has been cut. The deep Mediterranean separates Africa from Europe in the N., but the two continents approach to within 9 m. of each other at the Strait of Gibraltar. Africa is bounded by the Atlantic in the W., and by the Indian Ocean in the E. The area is 11,500,000 sq. m., or roughly three times that of Europe. The coast-line, neglecting minor indentations, is 19,000 m. There are no true peninsulas of any size in Africa, and the islands (which are all small, with the exception of Madagascar) form but two per cent. of the total area.

Relief.—Africa is a massive platform rising out of deep seas. The continental ledge or shelf, which is covered with water not deeper than 600 ft., is everywhere narrow. It is most marked in the S., where it forms the triangular Agulhas bank. The lowlands under 660 ft. above the sea are also narrow, and represent only about 15 per cent. of the surface (*cf.* Europe, 57 per cent.). The greater part of the land between 660 and 1,650 ft. in elevation lies in the N., and is 34 per cent. of the whole; but much of the land between 3,300 and 6,600 ft. —*viz.* 19 per cent. of the whole—lies in the S. Only 2½ per cent. of Africa is over 6,600 ft., and this is mostly in Abyssinia and the Atlas region. The average elevation of the continent is 2,130 ft.

Natural Regions.—Except for the folded chain of (1) the Atlas, which is sharply distinguished from the rest of the continent, the natural divisions are not well marked. A line from the mouth of the Nile to that of the Zambezi separates (2) East Africa from the rest of the table-land, which may be subdivided into (3) the Northern Plateau, N. of 5° N.; (4) the Central Plateau, or Congo basin; and (5) the Southern Plateau, S. of 10° S. The (6) Eastern Islands and (7) the Western Islands must also be considered as separate natural divisions.



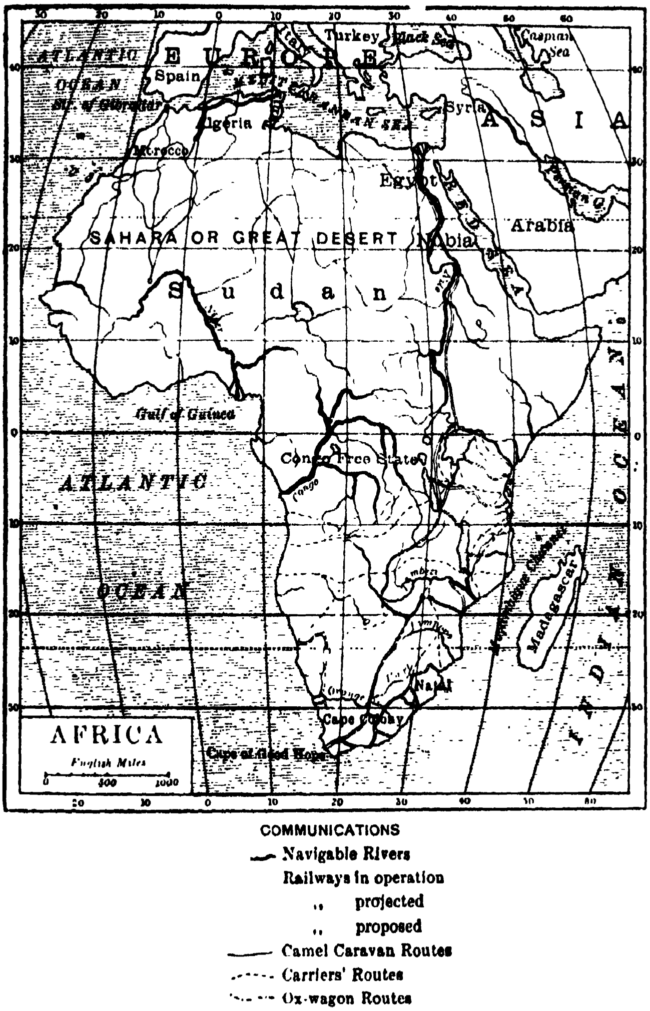
Orographical Map of Africa.



The Atlas Mountains, which lie to the N. of a line drawn from the Wadi Draa to the Gulf of Gabes, are a continuation of the folded mountain system of Southern Europe. In the E., two parallel ranges, the Mediterranean and Saharan ranges, are separated by the Algerian Plateau, which is over 3,000 ft. high. In the W., the Great Atlas of Morocco has an average height of 10,000 ft.—its lowest pass, Tel Remt, being 7,000 ft., and its highest summit over 14,000 ft. South of and parallel to it rise the plateaus of the Little or Anti-Atlas (9,500 to 11,000 ft.).

The Northern Plateau, with an area of between four and five million sq. m., and an average elevation of 1,500 ft., is much the most extensive region of Africa. The lowlands are in the W. and N. The band of Tarso (Tibesti highlands), rising from 6,000 to 8,000 ft. high, crosses this region diagonally from N.W. to S.E., and the Upper Guinea Plateau bounds it in the S. The N. and centre of this region form the Sahara, a land of barren stony plateaus and shifting sand-dunes, crossed by a few dry valleys. In the S. the land becomes less arid, and the Niger and its tributary the Benue flow across it to the Gulf of Guinea, the Shari to Lake Chad, and the Bahr-el-Ghazal to the Nile.

The Congo basin is a hollow in the Central Plateau formerly occupied by a great lake. This depression is almost circular in shape, and is about 1,000 ft. above the sea at its floor, rising to from 4,000 to 5,000 ft. round its rim, but rarely higher. The divide with the Shari is less than 1,500 ft. high, and the river forces its way to the W. over a still lower lip by a series of rapids to a great estuary.



Africa—Main Lines of Communication.

East Africa is bounded on the W. by the Nile and the great lakes—Albert, Albert Edward, Tanganyika, and Nyasa. It is characterized by two lines of rift valleys—the W., that of the lakes just mentioned; and the E., that passing from the N. of Nyasa, by Lakes Naivasha, Rudolf, and Margherita, to the S. and E. escarpments of Abyssinia. The Red Sea trough and the Jordan valley are regarded by many authorities as a continuation of this E. rift. Much of the plateau S. of Abyssinia lies about 4,000 ft. above the Indian Ocean, to which it descends by a series of terraces. The lowest terrace forms the low coastal plain, which attains a considerable width only in the S. near the Zambezi delta, and in the N. in the Somali peninsula. Between the two rifts the Victoria Nyanza, with an area equal to that of Scotland, fills the lowest basin, and in the E. the land rises to an average height of 7,000 ft. in the Nandi plateau. Near the W. rift active volcanoes, such as Mt. Kirunga, are found near Lake Kivu, between Lakes Tanganyika and Albert Edward. Farther N. is the great igneous mass of Ruwenzori (variously estimated at from 16,000 to 20,000 ft.). This and the extinct volcanic peaks of Kilima-Njaro (19,200 ft.) and Kenya (17,300 ft.), which rise near the E. rift, are the culminating points of Africa. Abyssinia is also mainly composed of young volcanic accumulations, rising in Ras Dashan to 15,000 ft. Here Jurassic rock is found beneath the loose volcanic deposits, in which the rivers have excavated gorges some thousand feet deep. In the heart of the plateau is Lake Tsana or Dembea, the source of the Blue Nile. North of Abyssinia the plateau is both narrower and lower, although it attains 9,000 ft. at the highest point. It is composed of crystalline rocks much older than the sedimentary ones of Nubia. A depression, probably an old Nile course, runs from the first turn of the great S. bend of the Nile to the Red Sea, and the towns of Berber and Suakin have arisen at its extremities.

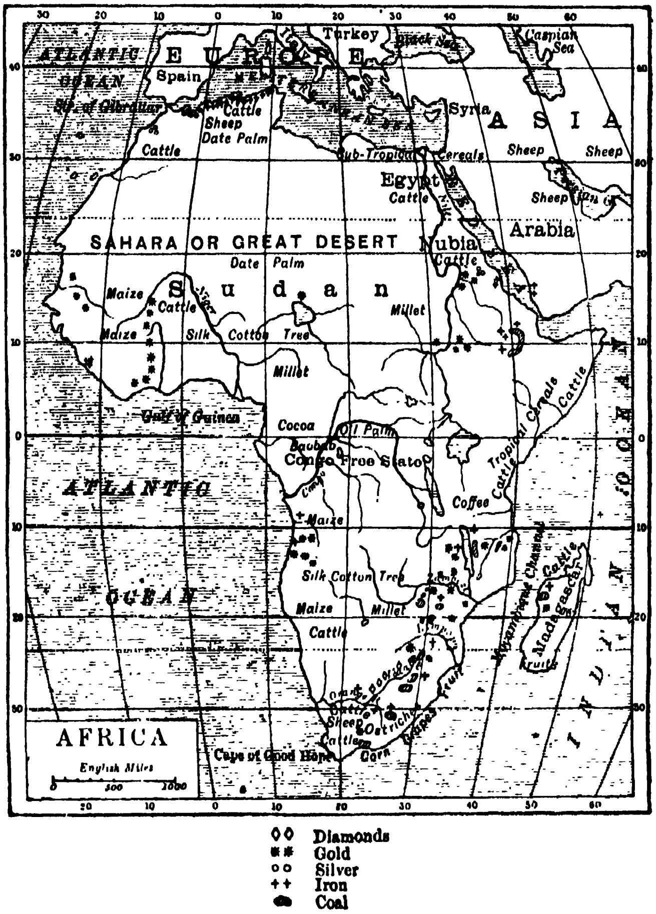
The South African Plateau has also a high average elevation, between 3,000 and 4,000 ft.; but no great heights rise above it, except in the S.E., where the massive tables of the Drakenberg or Kwathlamba Mountains reach over 11,000 ft. This plateau is divided into four regions, each over 4,000 ft., by the valleys of the Zambezi, Limpopo, and Orange—the Congo-Zambezi plateau in the N., the Matabele plateau in the E., the High Veldt in the S.E., and the Damara plateau in the W. Across these most of the rivers flow in gorges, and the undulating landscape is diversified by flat-topped hills (the tables or *mesas* locally known as kopjes), which are often steep-sided. The descent to the coast is by a series of terraces, those in the E. being cut up into more rounded hilly regions, which gradually sink to the sea-line. In the S. the terrace flats widen, and form the Great and Little Karroos, each bounded on its S. side by a parapet of older folded mountains, the Zwarte and Lange Bergen chains.

Coastal Belt and Islands.—The coast-line is very regular. Islands are few, and the coast is either steep, or a flat, sandy plain of varying width, leading to the steep terraces of the inland plateau. The N.W. coast is steep from the Wadi Draa to Cape Bon, and from the Barka peninsula to the Nile. Between the Atlas and Barka a low coast curves S., and forms the Gulf of Gabes in the W. and the Gulf of Sidra in the E. The E. coast, along the Red Sea and to beyond Cape Guardafui, is straight, regular, and steep. The island of Sokotra is an outlier of the Somali peninsula, which protrudes eastwards S. of the Gulf of Aden like a horn, and is bordered on the E. by a low plain. From the equator to Delagoa Bay the coastal plain is narrow, with hills which here and there approach the sea. In this portion of the coast are two incurves and outcurves which have no special names. In the N. incurve lie the little islands of Pemba, Zanzibar, and Mafia; and off the S. incurve is the island of Madagascar, which is separated from the mainland by the Strait of Mozambique, having the Comoro Is. in the N. The coast is regular S. of Delagoa Bay, both round the S. coast and N. along the W. coast as far as the mouth of the Orange. The rest of the W. coast is bordered by sandy shores, except at the head of the Bight of Biafra and in some parts of the N. Guinea coast. The Gulf of Guinea is formed where the W. coast changes from a N.S. to an E.W. direction, and is divided by the Niger delta into two bays—the Bight of Biafra in the E., and the Bight of Benin in the W. A line of volcanic islands, including Fernando Po, Prince's I., St. Thomas, and Annobon, rises above the Bight of Biafra. The N. Guinea coast, trending E. and W., is known by various names—*e.g.* the Slave Coast (immediately W. of the Niger delta), the Gold Coast, the Ivory Coast, the Grain or Pepper Coast, each succeeding the other to the W. Off Cape Verde lie the Cape Verde Is., and off the N.W. the Canary and Madeira groups.

Madagascar, the largest African island, is nearly twice the area of the British Isles. It is 1,000 m. long, 360 m. wide, and 2,000 ft. in average elevation. The E. plateau is bounded by a straight, fractured coast, and traversed by a long valley parallel to it. It descends to the W. by a series of terraces ending in a wide coastal plain.

Climate.—Three-quarters of Africa lies between the tropics, and here the days are of nearly uniform length, with, except for clouds, almost twelve hours of bright sunshine every day. At sea-level the mean temperature of the coldest month is over 70° F., except near the extremities of the continent, where it falls to 55° F. Round the tropics the daily and seasonal ranges of temperature are great—over 30° F. between the warmest and coldest month; but in equatorial regions, and towards the N. and S. of the continent, where it is bordered by seas, the range is small. A narrow strip of the S.W. coast is kept cool at all seasons by an upwelling of cold water along the coast and by low fogs (*cf.* Port Nolloth, 40 ft. above the sea, 59·5° F. in Jan., 54·3° in July, and 57·2° for the mean ann., with Springbokfontein, 3,200 ft. above the sea, Jan. 73·7°, July 51·7°, and the mean ann. 63°). At the equinoxes a belt of rising air and heavy rains is found near the equator, and this moves N. and S. with the zenithal sun; so that round the equator there are two rainy seasons, and in some regions almost constant rains, while at the tropics there are one wet and one dry season.

There are nine climatic regions in Africa:—1 and 2. The Mediterranean and extreme S.W. regions, with mild winters (during which rain falls) and warm, dry summers. 3 and 4. The N. and S. desert regions, round the two tropics, where little rain falls, and the extremes of temperature are considerable. In the N. Sahara the rain showers usually come in winter; in the S. Sahara and Kalahari they usually occur in summer. 5 and 6. The subtropical regions of summer rains, with a smaller range of temperature, and a short but adequate rainy season at the height of summer. 7. The equatorial regions, hot and wet nearly all the year round, but with the maximum rainfall when the sun is at the zenith. These include the Congo basin and the Guinea Coast, the E. coast of the mainland from the equator to the Tropic of Capricorn, and the E. coast of Madagascar. 8. The higher land surrounding these regions forms the high plateau regions. Owing to their elevation the temperature is lower and the rainfall less, and, except on the great lake plateau, there is only one rainy season in summer. 9. The high mountain region, above 5,000 ft.



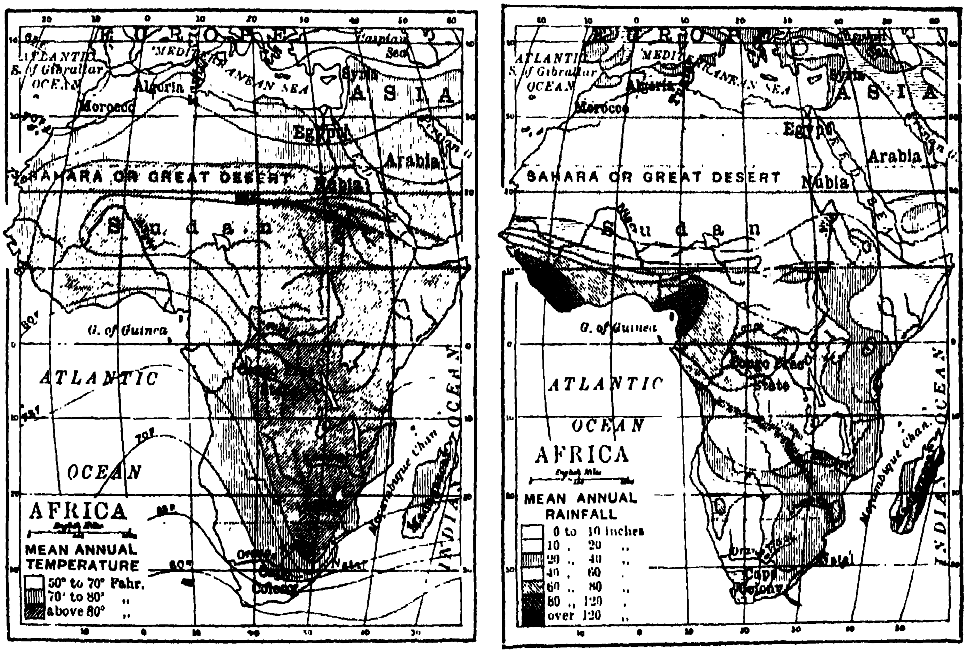
Africa—Principal Mining Districts.

Hydrography.—Each climatic region has its own type of river, and most African rivers, where they leave the plateau, have their courses impeded by cataracts, usually near their mouths. The rivers of the equatorial rainy regions are constantly supplied with water, and where they flow through flat ground—as in the case of the Congo between Stanley Falls and

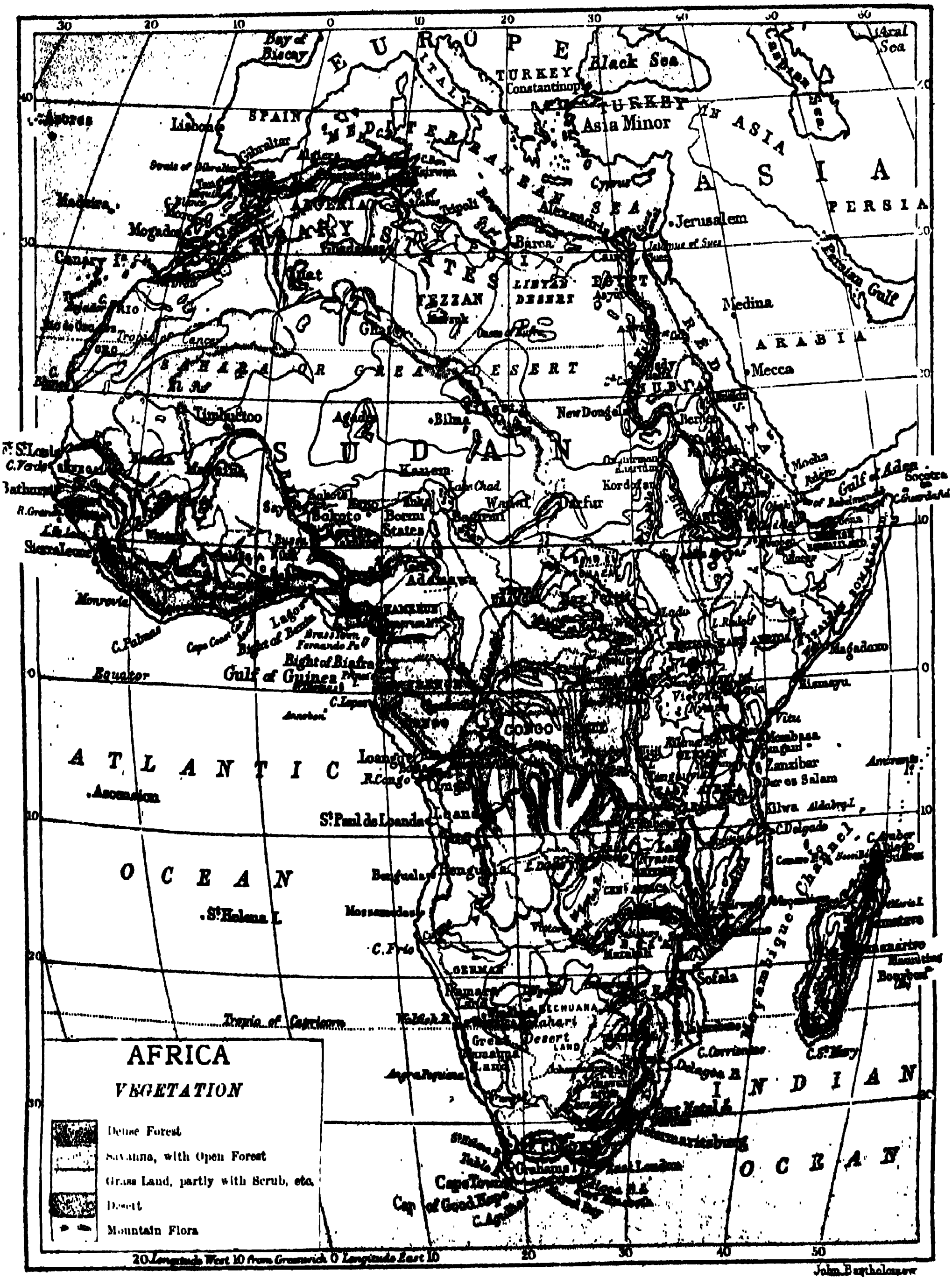
Stanley Pool, and of the Lower Niger—they spread out into numerous channels or loops, so that the limits between water and land are indefinite. The Zambezi and the Niger are fullest after the summer rains, and both reach the sea across great deltas fringed with mangrove swamps. The E. African rivers receive most rain in summer. The Orange (which flows in a deep gorge, with many rapids in its course) and the Senegal have their sources in coastal lands, with summer rains; but in their lower courses they flow through arid regions, where their volume steadily diminishes. The deserts are intersected by numerous wadis, filled only after heavy rains. The Nile crosses all the climatic zones, and consequently is an epitome of African rivers. The greatest precipitation over the basin, considered as a whole, occurs in the northern summer, both in the Sudan and Abyssinia, causing the annual floods of the Nile, to which Egypt owes its very existence. The great lakes act as reservoirs, and in summer they are supplemented by the temporary lake No, which is formed in the flat Sudanese lands.

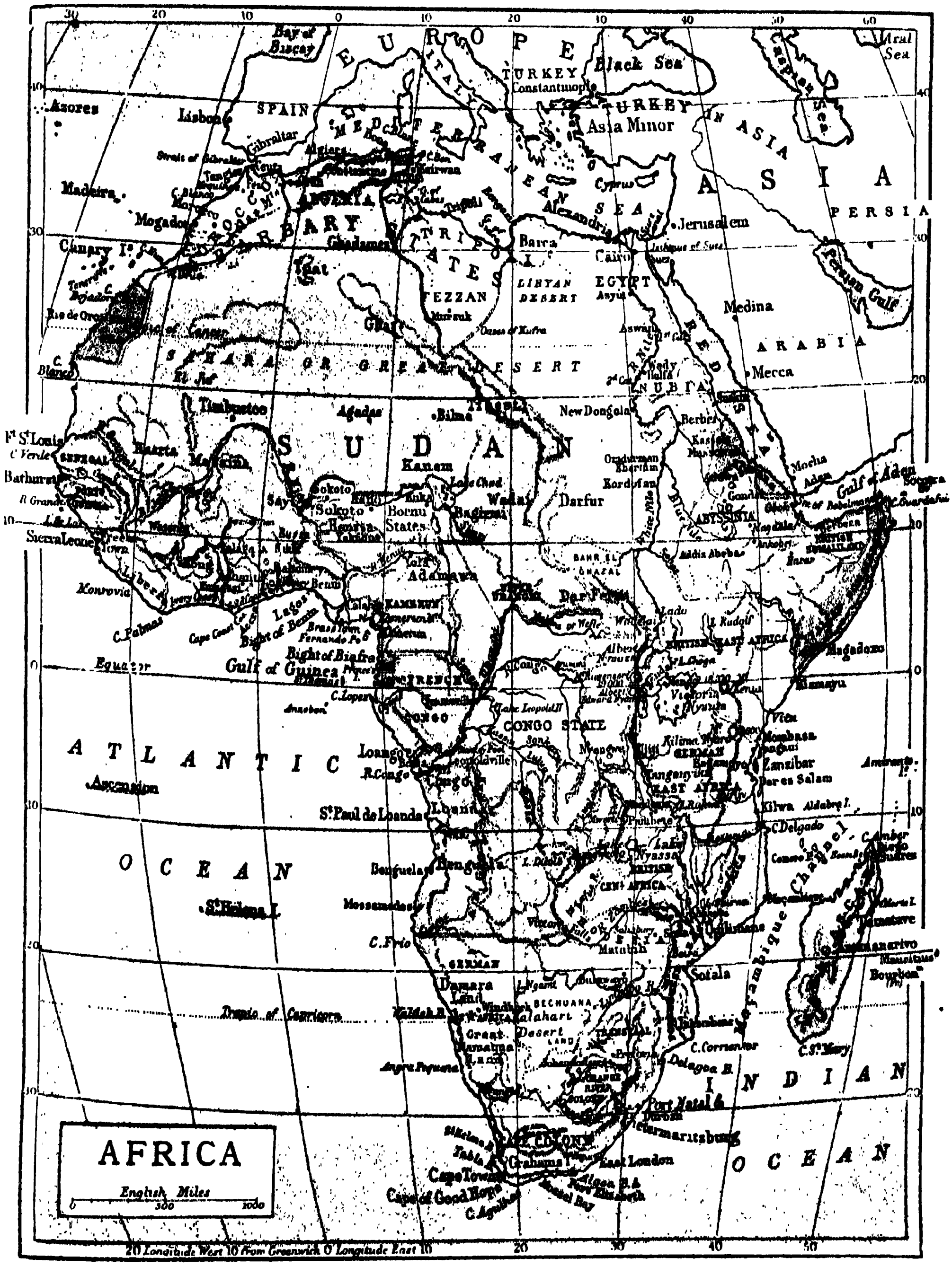
Flora and Fauna.—Physiologically, the biological regions correspond with the climatic ones. Morphologically, the Sahara is a barrier between the Mediterranean and true African forms. Hence the species differ greatly in Barbary and at the Cape, in the Sahara and the Kalahari, although there is a general resemblance in the manner in which they have become adapted to similar environments. The regions with winter rains are characterized by heaths and other dry, scrubby plants; water-storing species, like mesembryanthemum; and thick-skinned plants, such as the agave. The olive is typical of the wetter regions of the Mediterranean, but does not flourish in the S. The deserts have a very poor flora, of even more spiny, leathery, or water-storing plants than the above. Animals are few, reptiles being relatively important. The grass lands consist of poorer scrub near the desert and in the karroos of the S. The most important grass lands are the savannas, which are continuous from the Upper Niger across the Sudan by the Eastern and the Matabele plateaus; and the High Veldt, a branch running westwards along the Congo-Zambezi divide. Flat-topped trees are dotted about the savannas, and form continuous woods along the river courses. The savannas are very rich in animal life, the most numerous and characteristic being antelopes. On the borders of the forest lions, elephants, buffaloes, leopards, hyænas, and giraffes are still found; but elephants and most other big game are becoming scarce, owing to indiscriminate shooting by hunters. The double-horned rhinoceros is abundant on some of the grassy plateaus, while the hippopotamus and crocodile are found in the rivers. Among the birds are the ibis, pelican, and secretary bird. Termites, tsetse flies, and mosquitoes require special mention. The wet jungles of the equatorial forests cover the coastal plain of Upper Guinea, the lower part of the Congo basin, and the E. of Madagascar. They are characterized by the number of palms, their comparative poverty in mammals, and their wealth of bird and insect life. The gorilla, chimpanzee, and other monkeys, the hippopotamus and elephant, are among the most important mammals. Madagascar has dense forests in the E., and savannas on the plateau and W. terraces. Several trees and plants are characteristic, and the flora generally is of much interest. It is also a peculiar zoological region, which connects the faunas of S. Africa and the Malay Archipelago. There are no large-sized mammals, but the lemur and the aye-aye are among the characteristic ones. It is rich in birds and insects, the latter curiously unlike those of E. and Central Africa, but resembling the species of S. and W. Africa, Asia, Australia, and even America.

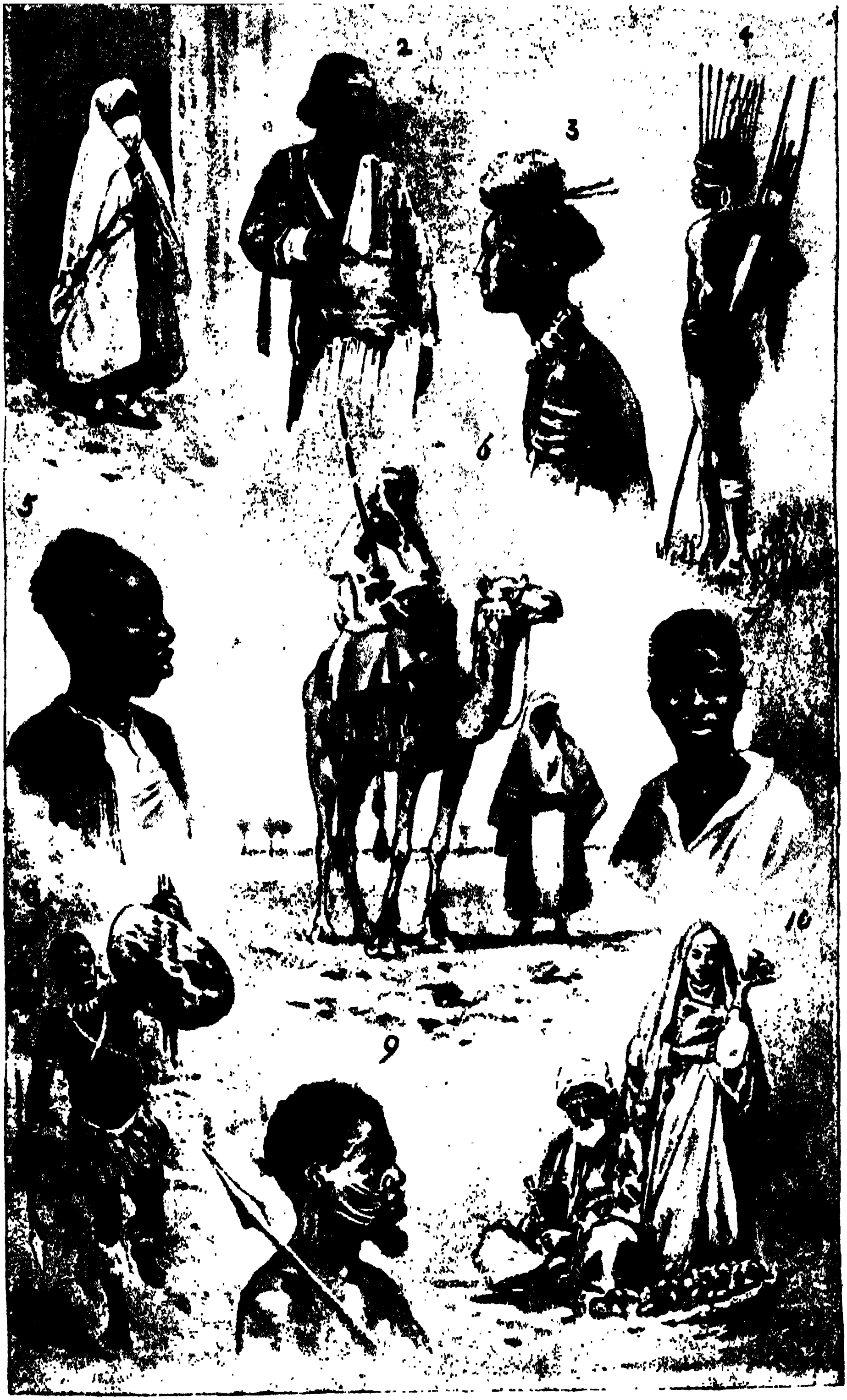
Population.—The population is estimated at 170,000,000, or fifteen inhabitants per sq. m. Vast areas are uninhabited, especially in the deserts, and the dense wet jungles are but sparsely peopled. The most populous regions are the



Africa—Climate.


AFRICA
VEGETATION
Dense Forest
Savanna, with Open Forest
Grass Land, partly with Scrub, etc.
Desert
Mountain Flora
E U R O P E
Bay of Biscay
SPAIN
Lisbon
Gibraltar
Azores
Madeira
Canary Is.
ITALY
TURKEY
Constantinople
Black Sea
Aral Sea
Caspian Sea
TURKEY IN ASIA
Asia Minor
A S I A
PERSIA
Persian Gulf
Cyprus
Jerusalem
Isthmus of Suez
M E D I T E R R A N E A N   S E A
Algiers
ALGERIA
Tripoli
Barca
Alexandria
Cairo
EGYPT
Mogador
Tropic of Cancer
S A H A R A   O R   G R E A T   D E S E R T
FEZZAN
LIBYAN DESERT
Medina
ARABIA
Mecca
RED SEA
NUBIA
Timbuctoo
Bilma
New Dongola
S U D A N
Agades
Kanem
L. Chad
Wadai
Darfur
Kordofan
Mocha
Gulf of Aden
Aden
Socotra
C. Guardafui
St. Louis
C. Verde
Bathurst
R. Grande
Sierra Leone
Sokoto
Bornu States
Bagirmi
Adamawa
Monrovia
C. Palmas
Cape Coast
Lagos
Bight of Benin
Brass Town
Fernando Po
Bight of Biafra
Gulf of Guinea
Equator
C. Lopez
Annobon
Lado
L. Rudolf
Magadoxo
Kismayu
Victoria Nyanza
CONGO
Vitu
Mombasa
Zanzibar
Dar es Salam
Loango
R. Congo
A T L A N T I C
Ascension
St. Paul de Loanda
Kilwa
Aldabra I.
C. Delgado
Amirante Is.
Comoro Is.
Mozambique Channel
C. Amber
Benguela
L. Ngami
O C E A N
St. Helena I.
Mossamedes
C. Frio
Sofala
Mauritius
Bourbon
Tropic of Capricorn
Walfish B.
BECHUANA LAND
Kalahari Desert
Great Namaqua Land
C. Corrientes
C. St. Mary
Delagoa B.
Angra Pequena
I N D I A N
Port Natal
Maritzburg
East London
Grahamstown
Cape Town
Cape of Good Hope
C. Agulhas
O C E A N
30
20
10
0
10
20
30
40
50
60
20 Longitude West 10 from Greenwich 0 Longitude East 10
John Bartholomew


AFRICA
English Miles
0 500 1000
20 Longitude West 10 from Greenwich 0 Longitude East 10
E U R O P E
Bay of Biscay
SPAIN
Lisbon
Azores
Gibraltar
Strait of Gibraltar
Madeira
Mogador
Canary Is.
ITALY
TURKEY
Constantinople
Black Sea
TURKEY IN ASIA
Asia Minor
Aral Sea
Caspian Sea
A S I A
PERSIA
Persian Gulf
Cyprus
Jerusalem
MEDITERRANEAN SEA
Algiers
Tunis
ALGERIA
BARBARY STATES
TRIPOLI
Ghadames
Alexandria
Cairo
EGYPT
Suez
Isthmus of Suez
Medina
Mecca
ARABIA
LIBYAN DESERT
FEZZAN
Murzuk
Oasis of Kufra
SAHARA OR GREAT DESERT
Tropic of Cancer
C. Blanco
NUBIA
Wady Halfa
New Dongola
Berber
Suakin
Mocha
Aden
Gulf of Aden
Socotra
C. Guardafui
Timbuctoo
Agades
Bilma
S U D A N
Kanem
Lake Chad
Bornu States
Sokoto
Say
Wadai
Darfur
Kordofan
Omdurman
Khartum
Blue Nile
White Nile
ABYSSINIA
Addis Abeba
Ft St. Louis
C. Verde
SENEGAL
Bathurst
R. Grande
Sierra Leone
Freetown
Monrovia
Liberia
Ivory Coast
C. Palmas
Cape Coast Castle
Lagos
Bight of Benin
Adamawa
KAMERUN
Fernando Po
Bight of Biafra
Gulf of Guinea
Equator
Annobon
C. Lopez
FRENCH CONGO
CONGO STATE
Lake Leopold II
BAHR EL GHAZAL
L. Rudolf
BRITISH EAST AFRICA
Magadoxo
Kismayu
Albert Nyanza
Victoria Nyanza
Kilima Njaro
GERMAN EAST AFRICA
Tanganyika
Mombasa
Zanzibar
Dar es Salam
Kilwa
Aldabra I.
C. Delgado
Amirante Is.
ATLANTIC OCEAN
Ascension
Loango
R. Congo
Leopoldville
St. Paul de Loanda
Benguela
Mossamedes
St. Helena I.
C. Frio
L. Nyassa
BRITISH CENTRAL AFRICA
Comoro Is.
Mozambique
Mozambique Channel
C. Amber
Diego Suarez
Tamatave
Antananarivo
Mauritius
Bourbon
Quilimane
Victoria Falls
Sofala
GERMAN
Damara Land
Walfish B.
Great Namaqua Land
L. Ngami
BECHUANA LAND
Kalahari Desert
TRANSVAAL
Tropic of Capricorn
Inhambane
C. Corrientes
Delagoa B.
C. St. Mary
Angra Pequena
Port Natal & Durban
Pietermaritzburg
CAPE COLONY
Grahamstown
East London
Algoa B. & Port Elizabeth
Mossel Bay
St. Helena B.
Table B.
Cape Town
Cape of Good Hope
C. Agulhas
INDIAN OCEAN



Types of African Natives.

1. Moorish lady. 2. Egyptian porter. 3. Abyssinian. 4. Bushman. 5. Sudan negro. 6. Arabs. 7. Hottentot. 8. Kafir. 9. Negro of Niger Delta. 10. Fellahin.

for the last thousand years, and their traders and slave-traders penetrate as far S. as the Tropic of Capricorn. Mediterranean Africa has witnessed Egyptian, Phœnician, Grecian, and Roman civilization. Central and S. Africa are isolated from Mediterranean culture by the Sahara and the sea. The Portuguese navigators of the 15th century made known the central and S. coasts to Europe, the Cape having been rounded by Diaz in 1487. The Portuguese traded in Upper and Lower Guinea, and in the S.E.; but the Dutch were the first to settle in the temperate lands of the S., round their 'refreshment station' at Table Bay. Hither, in the 17th century, came refugee Huguenots, and the resulting mixed race gradually spread over the S. terraces and the High Veldt. In the E. of these terraces, and in Natal, British and Germans settled in some numbers, especially in the middle third of the 19th century. Indian coolies have been brought as labourers to Natal, as Malays were formerly brought to the Cape, and Chinese are now being brought to the gold fields. Italians, Spanish, and French have settled on the African shores opposite their own lands, where they find similar climatic conditions.

Exploration of the Interior.—In every case the exploration of the great rivers of Africa has been from the source to the sea. Mungo Park, at the end of the 18th and beginning of the 19th century, followed by Lander, solved the Niger problem. Laing and Caillié reached Timbuktu, the mysterious, early in the 19th century. Barth reached it in the fifties by crossing from Tripoli to the S. and going up the Niger. Nachtigal, Schweinfurth, and Junker are the chief explorers of the E. Sudan. Speke and Grant traced the Nile from Lake Victoria, and Baker discovered Lake Albert in the sixties, the Blue Nile having been followed by Bruce in the previous century. Oswell, accompanied by Livingstone, crossed the Kalahari, discovered Lake Ngami, and reached the Zambezi, which Livingstone afterwards explored on two memorable journeys, giving up his life to the problem of the Congo in 1873. Tanganyika was reached by Burton and Speke in 1858, Cameron crossed the Congo basin in 1874-5, and Stanley followed the great river to its mouth in 1876-7. In Central Africa, Stanley, Emin Pasha, Joseph Thomson, Johnston, Wissmann, Baumann, and many others, filled in our knowledge during the last quarter of the 19th century, as did French explorers on the Niger.

Political Spheres.—European states in the last fifteen years of the 19th century marked off protectorates and spheres of influence, so that only three states in Africa still remain nominally independent—Morocco in the N.W., Abyssinia in the E., and the republic of Liberia on the Guinea Coast. In N. Africa, France is overlord of all W. of and including the Tarso Mts. and N. of the Congo-Ubangi, except Morocco, Spanish Rio de Oro, Portuguese Guinea, British Gambia, Sierra Leone, Gold Coast, Lagos, and the protectorates of N. and S. Nigeria, and German Togoland and Kamerun. Tripoli, Barka, and Egypt are Turkish possessions; but Egypt is only nominally so, and is controlled by Britain. In the Nilotic Sudan this Anglo-Egyptian co-dominion is predominantly British; and British interests alone prevail in the Uganda and E. African protectorates and in Zanzibar. Round Abyssinia on the E. and S. are the Italian Eritrea and Somaliland, separated by French and British Somaliland. The rest of the E. African plateau is German to the Rovuma, and Portuguese beyond to Delagoa Bay. In the W. the Congo basin is controlled by the king of the Belgians (though bequeathed by him to Belgium), Angolaland by Portugal, and Damara and Namaqua lands by Germany. The rest of Africa S. of Tanganyika and Nyasa is British, forming the Central African Protectorate—N. and S. Rhodesia, Bechuanaland, the Transvaal, Orange River Colony, Basutoland, Natal, and Cape Colony. Madagascar, the Comoro Is., and Réunion are French; the other E. African islands—Mauritius, Admiralty, Rodriguez, Seychelles, and Sokotra—are British. Portugal owns Madeira, the Cape Verde Is., Principe, and São Thomé; and Spain the Canaries, Fernando Po, Annobon, and Corisco Bay in W. Africa. Ascension and St. Helena, on the mid-Atlantic ridge, are British. See separate articles under all these titles.

Africander, or AFRIKANDER, a native of S. Africa descended from Dutch parents settled there.—AFRIKANDER BUND, a S. African association, formed (1879) for the furtherance and consolidation of Afrikander influence in S. Africa. Its founders were Borckenhagen, Reitz, and Hofmeyr. In addition to the Cape, the organization embraced the Transvaal and the Orange Free State, and after the Jameson Raid (1895) it became Boer rather than Afrikander. In the Anglo-Boer war of 1899-1902 it sympathized warmly with the Boers.

African Explorers. See AFRICA.

African International Association. See CONGO FREE STATE.

African Lakes Trading Corporation, an association (Glasgow) trading in Africa, particularly on Lake Nyasa, the Zambezi, and the Shire. It was founded in 1878, and from 1885-96 was engaged in almost continuous warfare with the Arab slave-traders. In 1893 it was absorbed into the British S. Africa Company.

African Lily. See AGAPANTHUS.

African Steamship Company, formed in 1832, carries on a passenger and goods traffic between Liverpool and the Continent and the W. Coast of Africa. In 1891 it came under the control of the Elder Dempster Co. Incorporated by royal charter in 1852, it receives an annual subsidy of £30,000 from the government, and owns a fleet of thirty-seven steamships, aggregating 94,951 tons gross.

African Teak (or AFRICAN OAK), a heavy, hard timber used in shipbuilding, obtained from *Oldfieldia africana* (Euphorbiaceæ).

African Transcontinental Telegraph, a line conceived by Cecil Rhodes, and begun by him in 1893, to stretch overland from Cape Town to Cairo. The line, which is erected on light iron posts, runs from Cape Town to Tete, on the Zambezi; thence to Blantyre, Abercorn (S. end of Lake Tanganyika), Victoria Nyanza, and so to Khartum and Cairo. The total length is over 5,000 miles.

Africanus, a title of honour borne by the two greatest Scipios, in commemoration of their African victories. (See SCIPIO.) Also, the name of—(**1.**) SEX. CÆCILIUS, a famous Roman jurisconsult and orator, pupil of Salvius Junius, of the time of Antoninus Pius. Extracts from his *Libri IX. Quaestionum* appear in the *Digest.* The remains of his works have been expounded by Cujas, and annotated by Scipio Gentili (1602-7). (**2.**) SEX. JULIUS, a Christian writer of the 3rd century, who lived at Emmaus in Palestine, but visited Alexandria. His works, with the exception of extracts found in Eusebius, have been lost.

Afridis, an Afghan or Pathan people, numbering about 300,000, inhabiting the mountainous region lying S. of the Hindu-Kush, their great stronghold being the high plateau of Tirah, W. of Peshawar. They have no distinctly national life, but consist of a number of clans, often at feud with each other. Fanatical Mohammedans and fiercely independent, they resented the inclusion, in 1893, of their territory within the British frontier; and their consequent revolt in 1897 led to the Tirah campaign of 1897-8, in which a force of nearly 35,000 British and Indian troops took part.

Afrit, or AFREET. See IFRIT.

After-damp. See CHOKE-DAMP.

After-glow, the glow sometimes seen in the sky after sunset, illuminating the upper strata of the clouds, usually in shades of red and yellow; due to the presence of fine dust in the higher atmosphere. It is most frequent in October and November, when the earth passes through meteoric swarms. During the autumn and winter of 1883, following the tremendous eruptions of Krakatoa, in the Str. of Sunda, peculiarly bright and continuous examples were seen in every part of the globe.

After-images are representations to the mind of bygone impressions. They are sensations for which at the time of their occurrence there is no present external stimulus. They may be due to—(1) a simple persistence of sensation; (2) a recurrence of sensation; or (3) fatigue of the nerve cells concerned in the reception of previous stimuli. The two former are positive images, while the third is negative.

Many people can not only remember a friend's appearance, but on closing the eyes can recall the face or figure with a vividness that rivals actual sight. Again, should a ring be removed from the finger after being habitually worn, there still remains with the wearer a sense of contact between the finger and a foreign body. Similarly, one who is a bad sailor may continue to feel the sink and heave of the sea after he is again on shore. Sounds also may produce after-images: thus, the crash of guns in a soldier's first fight may be re-echoed, as it were, in the receptive mind. The conditions of chief importance in the persistence or in the reproduction of images are intensity or long duration of the primary stimulus, and diminished attention to environment at the time the after-image is produced. The process concerned is the same as that which underlies memory and habit.

Negative after-images are manifested chiefly in relation to the sense of sight, and depend upon exhaustion of the receptive sight mechanism. If the eye be intently fixed for a time upon a patch of black on a sheet of white paper, and then be suddenly turned upon a white surface, a bright patch appears on that surface. It moves with the eye, and gradually fades away. Should the patch be coloured, the after-image has the colour 'complementary' to the original—that is to say, the colour of the after-image is such that, when combined with the colour of the object, the two will produce white. Thus, if the retinal cells be fatigued by a close, prolonged gaze at, say, a red spot, an image of that spot is apparent when the eye is directed towards a new white surface, such as the ceiling, a cloud, or a piece of white paper. The image corresponds in shape to the original, but in colour is green, while its size depends on the distance of the new field—the greater the distance the larger the image. The part of the retina on which rays from the primary object fell has temporarily come to an end of its capacity for appreciating red rays, but remains sensitive to the other rays composing the spectrum of white light. Hence an after-image is formed, tinted by such rays of white light as the fatigued portion of the retina can still appreciate.

Afzelius, ADAM (1750-1837), a Swedish naturalist, pupil of Linnæus; demonstrator of botany at Upsala (1785); visited Sierra Leone (1792); lived for a time in London as secretary to the Swedish ambassador; and from 1812 was professor of materia medica, Upsala; author of numerous botanical works.

Afzelius, ARVID AUGUST (1785-1871), Swedish poet, and pastor (1828-71) of Enköping; translator of the *Edda*, and editor, with Geijer, of *Svenska Folkvisor fran Forntiden* (1814-17)—*i.e.* 'Ancient Swedish Folk-songs.'

Aga, or AGHA, a Turkish title borne by officers in the army under the rank of major, and by various lower officials in the ministries.

Agades, AGHADES, or AGADEZ, tn., cap. of oasis of Aïr or Asben, Sahara, Africa; lat. 18° 10′ N., and long. 8° E.; an important centre on caravan route between the Sudan and Tripoli. Pop. 8,000 (Tuareg).

Agama, a genus of lizards with many species, common in Africa and Asia. An example is *A. stellio*, which occurs in Egypt, Asia Minor, and parts of the Grecian Archipelago. It reaches a length of about 15 in., and is brown in colour.

Agamemnon, son of Atreus or Pleisthenes, husband of Clytæmnestra, and father of Orestes, Iphigenia, Chrysothemis, and Electra. He was king of Mycenæ in Argos, then the richest city of Greece, and because of his position became leader of the Greeks against Troy. His character, as depicted by Homer, is eminently that of a king: a great warrior, though not the greatest; wise in counsel, always dignified in speech and action, yet capable of displays of arbitrary temper and caprice. After the fall of Troy he was murdered, on his return home, by his unfaithful wife and her paramour Ægisthus.

Agamemnon, a British second-class battleship launched in 1879. The name is associated with Rodney's victory off Les Saintes (1782), Toulon (1793), Bastia (1794), Calvi (1794), battle of Genoa (1795), battle of Hyères (1795), Copenhagen (1801), Calder's victory off Ferrol (1805), Trafalgar (1805), Duckworth's victory off San Domingo (1806), Copenhagen (1807), and Sebastopol (1854).

Agami (*Psophia crepitans*), one of the trumpeters, a family of birds found in tropical America.

Agamidæ, a family of lizards in which the teeth are inserted on the edge of the jaw (acrodont). The family includes such interesting forms as *Draco volans* (the flying lizard of Java), the hideous *Moloch horridus* of Australia, and the curious frilled lizard (*Chlamydosaurus*), also from Australia.

Agamogenesis. See SEX.

Agaña (SAN IGNACIO DE AGAÑA), fort. tn., cap. of Guam or Guahan I., Pacific Ocean; lat. 12′ N., and long. 145° E. Pop. 6,000.

Agapæ, the 'love feasts' of the early Christians; usually associated with the eucharist, but also held in commemoration of departed friends on the anniversary of their death. Viewed in both aspects, these feasts have been regarded as Christian modifications of older heathen practices. Dr. J. F. Keating (*The Agapé and the Eucharist*, 1901) has made a critical study of the question in its former relationship; while Dr. Joseph Anderson (*Proc. Soc. Antiq. Scot.*, xi. 387) cites De Rossi and Tyrwhitt in support of the view that the agapæ of the catacombs were akin to pagan funeral banquets. They have been revived by the Herrnhuter community; compare the 'love feasts' of the Wesleyans.

The African Lily (*Agapanthus umbellatus*).

Agapanthus, the African lily, a native of the Cape, with white or blue flowers. One species is grown out of doors in the milder maritime parts of England, but requires protection in winter; others are beautiful conservatory plants.

Agapemone ('abode of love'), called also Lampeter Brethren, the community of mystics founded (1859) at Bridgwater, England, by Henry J. Prince (1811-99), an Anglican clergyman, a native of Bath.

Agapetæ, a name given to virgins of the early church, who lived with monks professing celibacy, and between whom was said to exist a bond of spiritual love. The practice was put down by the Lateran Council in 1139.

Agapetus I. (d. 536), a native of Rome, was elevated to the papacy in 535. He was unsuccessful in a mission to Constantinople which he undertook in 536, with a view to making peace with Justinian on behalf of Theodatus, king of the Eastern Goths. He died there.

Agapetus II., a native of Rome, occupied the papal chair from 946-955. In 951 he refused the request of Otto I., king of Germany, that he would crown him emperor, in spite of the friendly relations between Otto and himself.

Agar, or Augur, tn., on rocky height, 1,600 ft., in Gwalior, Central India Agency; about 100 m. N.W. of Bhopal. Pop. 30,000.

Agar-agar, or Agal-agal, Malayan names for a seaweed (*Plocaria lichenoides*), 'Ceylon or Jaffna moss.' It forms an article of trade between China and the E. Indies. It is made into nutritious jellies, and the Chinese also use it as a paper varnish. Edible birds'-nests are made from another *Plocaria* on the coast of Siam. Agar is used by bacteriologists for the cultivation of bacteria.

Agardh. (1.) Karl Adolf (1785-1859), professor of botany at Lund from 1812 to 1835; best known as a classifier of algæ. (2.) Jakob Georg, his son (1813-1901), also professor at Lund; published works on algæ—*e.g.* *Analecta Algologica* (1892-9).

Agaric Mineral, a soft light variety of calcite or calcium carbonate. Bricks made in Tuscany from a stone of this name are so light that they float in water.

Agassiz, Alexander (1835), zoologist, only son of Louis Agassiz, was born at Neuchâtel, Switzerland. He graduated at Harvard University, U.S.A., in 1855; became assistant curator (1860-5) and chief curator (1874-97) of the Museum of Comparative Zoology there; and in 1875 founded the zoological station at Newport, in Rhode I. He has specially distinguished himself by his studies in marine zoology—*e.g.* echinoderms, starfishes, jellyfishes, etc. His publications include books on these branches of marine fauna; *Report on the Echini of the 'Challenger' Expedition* (1881); *Three Cruises of the U.S. Coast and Geodetic Survey Steamer 'Blake,' 1877-80* (1888); *The Islands and Coral Reefs of Fiji* (1899). In 1874-5 he surveyed Lake Titicaca and the copper mines of Peru and Chile, and in 1901-2 investigated the coral formations of the Maldive Is.

Agassiz, Louis (1807-73), a Swiss naturalist, especially distinguished in ichthyology and the study of glaciers. He became (1832) a professor at Neuchâtel. In 1839 he began his never-completed *Histoire Naturelle des Poissons d'Eau Douce de l'Europe Centrale*, and published between 1833 and 1843 the five vols. of text (with five more of plates) of his *Recherches sur les Poissons Fossiles*. Between 1839 and 1845 he made (chiefly on the Unteraar Glacier in the Bernese Oberland) some of the earliest recorded observations on the motion of glaciers. Narrative accounts of their journeys were published by Desor in his two series of *Excursions et Séjours sur les Glaciers* (1844-5); and Agassiz embodied his scientific observations in his *Études sur les Glaciers* (1840) and his *Nouvelles Études* (1847). His theory of glacier motion (dilatation of water frozen in the crevasses) soon gave way, however, to that formulated by Forbes (gravitation *plus* plasticity). In 1847 Agassiz accepted the newly-founded professorship of zoology and geology at Harvard University, Cambridge, Massachusetts—a post which he held till his death, having in 1862 become a naturalized citizen of the United States. He made many scientific journeys in America (particularly one to Brazil in 1865), and in 1859 founded at Harvard the Museum of Comparative Zoology, which is especially rich in fishes. Agassiz's memory is preserved in the Alps by the Agassizhorn (12,980 ft.), in the Bernese Oberland; and in Arizona, U.S.A., by a peak (10,000 ft.) near the Great Cañon of the Colorado. See *Life and Letters of L. Agassiz*, by his wife (1885).

Agassiz Association, a society first organized in 1875 by H. H. Ballard, president of Lenox (Mass.) Academy, to stimulate scientific interest among his students, and in honour of Louis Agassiz. In 1880 a general association was organized, with local divisions called 'chapters,' and with corresponding members in all parts of the world. The association was incorporated in 1892, and now consists of over ten thousand members.

Agasti, or Agastya, a Vedic poet to whom certain hymns are attributed; mentioned in the *Ramayana* as chief of the hermits of the south, and in Tamil literature reverenced as the first teacher of the Dravidian tribes in literature and science.—The Agastya-Malai is a conical hill (6,150 ft.) in Travancore State, Madras, noted as the haunt of the poet's spirit.

Agate, one of the many minerals which consist of cryptocrystalline silica, and which may be included under the general name of chalcedony. (See also Jasper, Onyx, Plasma, Chrysoprase, Carnelian.) It is also known as 'Scotch pebble,' and is largely used in the manufacture of jewellery. It enters into the construction of certain scientific instruments—*e.g.* the knife-edge on which the beam of a chemical balance is suspended—both because of its great hardness (it is a little harder than steel), and because moist air and chemical fumes do not rust or tarnish it. It is, however, somewhat brittle. The chemist also uses agate mortars and pestles for pulverizing hard substances. Agate is found chiefly in rounded nodules with irregular surfaces, formed most frequently in cavities of igneous rocks into which silica, dissolved in water, has percolated. Layer after layer has been laid down within this cavity, the outermost and earliest being often a coating of green chloride or celadonite. The deposited silica, if pure, is colourless or gray, and translucent; but various impurities are usually present, causing different colours in successive layers. The commonest of these are the oxides of iron, producing red, brown, or yellow; but bands of green, purple, pink, and other tints are often found. The layers follow the outlines of the original cavity, and hence are mostly concentric, but are in other cases angular, as in 'fortification' or 'parallel ribbon' agate. In Scotland, the use of agate in jewellery formerly gave rise to a considerable industry, which has been less prosperous of late years. The principal sources of Scotch agate are Burn Anne, near Galston, Ayrshire, and the neighbourhood of Montrose. These come from decomposed igneous rocks of Old Red Sandstone age. The great centre of agate working has for long been Oberstein, in Germany, where it is the chief industry of the population. Agate was formerly found abundantly in that district, as also in Hungary and various other places in Europe; but for many years the chief sources have been Brazil and Uruguay. The natural agate may be treated by various methods to heighten and vary its colours. Its layers are often porous, though not equally so, and will absorb solutions of colouring matters to a varying extent. One method is to immerse in solution of sugar, or to boil in oil: when this has penetrated to some depth, the agate is placed in sulphuric acid, which carbonizes these organic matters, producing brown and yellow rings of various intensity. It is believed that other secret methods are employed.

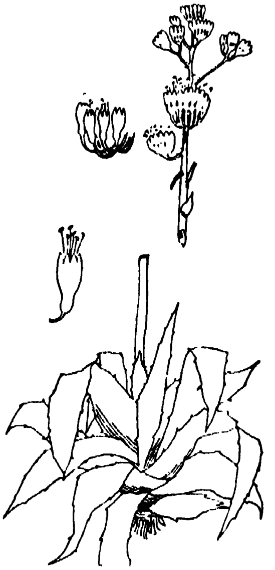
Agatha, St. (d. 251), Sicilian maiden of the 3rd century, canonized on account of her indomitable chastity. Her festival is celebrated on February 5.

Agatharchides, or Agatharchus, Greek historian and geographer of the 2nd century B.C., born at Cnidus, in Asia Minor. He wrote about the campaigns of Alexander the Great and the history of his successors the Diadochi, and described the Nile and its regions. Only fragments of his works survive.

Agathias of Myrina (536-582), an advocate at Constantinople, whose work *On the Reign of Justinian* (five books, covering the period 552-558) was a continuation of Procopius, and was used by Gibbon (*Decl. and Fall*, Bury's ed., vol. iv. p. 420, etc.). Ed. in Bonn Series by Niebuhr; by Dindorf in *Hist. Græc. Minores*, vol. ii. (1871).

Agathocles, tyrant of Syracuse (361-289 B.C.), born at Rhegium, Italy; emigrated with his father to Syracuse, and entered the army as a common soldier. There he gained the favour of Damas, whose widow he married, and thus became the richest man in Syracuse. Having in 317 created an army of adventurers, he assembled about four hundred of the rich and influential citizens and killed them. During the ensuing two days four thousand people were slain, as many banished and their property confiscated, and Agathocles was proclaimed tyrant of the town. To gain popularity he cancelled all debts, and divided the confiscated property among the poor; framed good laws, regulated the finances, and created a powerful army and navy. By conquering nearly the whole of Sicily, he came into collision with the Carthaginians. They sent to Sicily an army under Hamilcar, who defeated Agathocles in 310, and besieged him in Syracuse. Upon this Agathocles conceived the daring project of attacking Carthage. He sailed to Africa, defeated the Carthaginians, and subdued the coast of N. Africa, when he was recalled by the victories of Agrigentum against Syracuse. He defeated the Agrigentines, re-established order in Syracuse, and returned to Africa. But in 306 he suffered defeat, and had to flee back to Sicily. After concluding peace with the Carthaginians, he once more became master over Syracuse, and over most of the Greek cities in Sicily. His government was now marked by good laws and peaceful administration. In 289 he committed suicide, to escape the effects of poison administered by a slave at the instigation of one of his grandsons. His *Life* was written by Diodorus Siculus.

Agathon (c. 447-400 B.C.), Athenian tragic poet, contemporary and friend of Euripides, Aristophanes, and Socrates. He appears to have most nearly approached the great trio, Æschylus, Sophocles, and Euripides, and was the first to write a play, *Anthos* ('The Flower'), with an invented plot; other writers had always based their dramas on the national legends. He is introduced as a speaker in Plato's *Symposium*.



Agave, or American Aloe, with Flower.

Agave, or American Aloe, belongs to the order Amaryllidaceæ; it is also called the century plant, from the mistaken belief that it lives a hundred years before flowering, then flowers and dies. It lives for a varying number of years before flowering; the flowering axis sometimes rises to 20 ft. or more; then the plant apparently dies down to the ground; but a lateral bud springs from the underground part of the stem, and a new plant is formed. The Mexicans grow the plant to form dense hedges, and remove the buds for the sugary sap which exudes from the wounds thus made. This sap is collected in large quantities, and fermented and distilled to form *pulque*, the national intoxicant of Mexico. Other agaves of tropical America are known as maguey, and their fibres are the source of pita thread. *A. rigida* gives sisal hemp, used in rope-making. The leaves yield a substitute for soap, and are also used for roofing.

Agde, dist. tn. (canton), dep. Hérault, France, on river of same name, 2 m. from the Mediterranean, 29 m. S.W. of Montpellier. Pop. (1901) 8,626.

Age. (**1.**) A historical period marked off by special characteristics. Thus, we speak of the Homeric Age, the Age of Pericles, the Augustan Age, the Elizabethan Age, to denote certain broad distinctions in literature and art; and further, we refer to certain ages as the Golden Age, the Iron Age, etc.—a form of reference originating with Hesiod, who divided the world's history into five periods:—(*a*) *The Golden Age*, or reign of Saturn; of patriarchal simplicity, when the earth yielded her fruits spontaneously, and spring was eternal. (*b*) *The Silver Age*, or reign of Jupiter; a lawless time, when troubles began, labour was imposed on man, and property began to be held. (*c*) *The Brazen Age*, or reign of Neptune; a period of lawlessness, war, and violence. (*d*) *The Heroic Age*, when men began to aspire to better things. (*e*) *The Iron Age* (Hesiod's own), from which justice and piety had disappeared (Hesiod's *Theogonia*). Ovid followed Hesiod, leaving out the Heroic Age. Varro (*Fragments*) recognized three ages:—(*a*) *Before the Deluge*; (*b*) *after the Deluge to 1st Olympiad*—mythical period; (*c*) *after the 1st Olympiad*—historical period. Lucretius also noted three:—(*a*) *The Age of Stone*; (*b*) *the Age of Bronze*; (c) *the Age of Iron*. This classification is also followed by modern archæologists, but with a special meaning. (See Archæology.) Historians divide European history from the fall of the Roman empire to the beginning of modern times into certain ill-defined periods:—(*a*) *The Dark Ages*, marked by a decline of civilization, brought about by the influx of barbarians from the N. and E., extending to about the 11th century (Hallam). (*b*) *The Middle Ages*, or the 1,000 years between the fall of Rome (455) and the great movements (spread of humanism, discovery of America and seaway to India, invention of printing, reformation, etc.) of the 15th and 16th centuries. (*c*) *The Feudal Ages*, from the 10th to the 16th century. (**2.**) The word is also applied to the term of human life; and, again, to various stages of that life—as in the memorable passage describing 'the seven ages of man,' delineated by Jaques in *As You Like It* (ii. 7). For the biological consideration of length of life, see Longevity. (**3.**) For legal distinctions, see Majority and Minority.

Agen (anc. *Aginum*), cap. of dep. Lot-et-Garonne, France, on r. bk. of Garonne, 84 m. S.E. of Bordeaux; seat of a bishop and of an appeal court; plum-trees extensively grown. The staple industry is dried prunes. Birthplace of Joseph Scaliger and Lacépède. Pop. (1900) 20,879.

Agence Havas. See HAVAS.

Agent. See PRINCIPAL AND AGENT.

Ageratum, a genus of Compositæ, with white or lavender flowers; used as summer bedding plants, mostly in borders, for which they are well adapted on account of their compact and free-flowering habit.

Agesilaus (445-360 B.C.), king of Sparta from 398-360. After the death of his brother he became king with the aid of the general Lysander. Although insignificant, ugly, and lame, he soon made his great abilities felt. At this time Sparta was at the height of her power. Agesilaus resolved to attack the Persians. He invaded Asia, and defeated them in many battles, and in 396 gained a great victory at the river Pactolus, after which he was preparing to penetrate into the heart of the Persian empire and liberate the subjugated peoples, when he was called back to Sparta, which was threatened by a coalition of Athenians, Thebans, etc. Agesilaus beat the confederates at Coronea (394). In 371 Sparta was defeated by the Thebans, under Pelopidas and Epaminondas, at Leuctra, after which she lost her supremacy in Greece; indeed, her independence was in jeopardy. But the death of Epaminondas at Mantinea in 362 freed Sparta from her danger. After this Agesilaus once more turned his attention to the Persians. In 361 he went to Egypt, at the request of the king, Tachos, who promised him an army against the Persians; but upon his failure to do so, Agesilaus helped Nectanabis to become king. Agesilaus perished in a tempest while returning from this expedition, at the age of eighty-four years. Xenophon has written his *Life* in very eulogistic terms; also Cornelius Nepos and Plutarch.

Agglomerate, volcanic ash in which are scattered large blocks or bombs. It occurs in beds which are usually of no great extent, though their thickness may be considerable, and it is a very characteristic accumulation in the necks and choked-up vents of old craters. Like all volcanic ash, it is due to the explosive action of steam rising in the molten rock which fills an active crater; and it differs from ordinary ash-beds, or tuff, only in its relative coarseness. The large size of the embedded bombs shows in most cases that the material has accumulated close to the actual crater. Very often, in addition to bombs of igneous origin, large pieces of sedimentary rock are found in the agglomerate. These are known as ejected blocks. See Judd's *Volcanoes* (1878); Bonney's *Volcanoes* (1898); Sir A. Geikie's *Ancient Volcanoes of the British Isles* (1897).

Agglutinative Languages, those languages which add qualifying words as suffixes, making longer or shorter compound words, instead of inflecting the principal word or allowing the qualifying word to stand alone. The principal languages of this group are Hungarian, Finnish, Turkish, Mongolian, and the Dravidian languages (*e.g.* Tamil, Telugu) of S. India.

Aggtelek (Hung. *Baradla*), vil., co. Gömör, Hungary, 27 m. N.N.W. of Miskolcz, with the largest stalactite caves in Europe. Inclusive of the side branches, the windings of these caves are over five miles in length.

Agha Mohammed (1720-97), Shah of Persia, founder of the reigning Kajar dynasty. The son of Mohammed Hasan, chief of Astrabad, he raised the standard of revolt against Lutf Ali Khan, the last of the Zend dynasty, and gained the throne after a prolonged struggle. The murder of his rival, and the massacre of the inhabitants of the towns which had held out against him, show the barbarity of his nature; but he had sound ideas of policy, and was particularly jealous of Russian interference. He was killed by his own followers. See Forster's *Journey from Bengal to England* (1798).

Aghrim, BATTLE OF (July 12, 1691), 30 m. S.W. of Athlone, in Ireland. William III.'s general, Ginkel, met and defeated a combined Irish and French force, adherents of James II., under St. Ruth, who was killed in the battle.

Agincourt (Fr. *Azincourt*), BATTLE OF, was fought on Oct. 25, 1415. Henry V. of England, with about 15,000 men, one-third of them archers, was opposed by about 50,000 French under the Constable of France, D'Albret. The victory was complete in three hours. The French lost about 10,000, of whom many were 'gentle;' among them being the constable, Duke of Alençon, and Duke of Brabant. The English loss is variously estimated at from 1,600 (as by St. Rémy) to under 200, among them the Duke of York and the Earl of Suffolk. See Le Fèvre's (St. Rémy - present at the battle) *Chronique* (1408-35), and Nicolas's *Hist. of the Battle of Agincourt* (1827- useful compilation).

Agincourt, a British first-class cruiser launched in 1865. The ship-name is associated with Duncan's victory off Camperdown (1797), and Egypt (1801).

Agio (Ital.), rate of exchange between actual and face values of coinage or paper, or between the standards of different countries; also the amount of appreciation or depreciation from a customary rate of exchange.

Agira, tn., Catania, Sicily, 35 m. N.W. of Catania, crowns a lofty hill (2,130 ft.) 9 m. N. of its ry. stn.; one of the oldest Sikelian towns of Sicily; known in ancient times as *Agyrium*. Here Diodorus Siculus was born. Pop. (1901) 17,634.

Agis, three kings of Sparta (or four counting the legendary founder of the Agidæ dynasty). AGIS I. (II.) reigned 427-397 B.C.; several times invaded Attica, and defeated the Athenians and their allies at Mantinea (418), and besieged Athens (405).—AGIS II. (III.) reigned 338-331 B.C.; endeavoured to crush the Macedonian supremacy in Greece during the absence of Alexander the Great in Asia.—AGIS III. (IV.), king from 245-241 B.C., sought to revive the institutions of Lycurgus, but was put to death by his suspicious subjects. See Plutarch's *Life*, and Alfieri's tragedy *Agide*.

Agistment, in English law an agreement by which the owner of land, called 'the agistor,' allows cattle to pasture on his land, generally for hire. The agistor has no lien on the cattle, and is liable for negligence. In agricultural holdings, agisted cattle are not liable to be distrained for rent.

Agitato, a term used in music, generally along with *allegro* or *presto*, to denote a restless and emotional style.

Aglaophon, the name of two Greek painters, supposed to be grandfather and grandson. The elder flourished about 500 B.C.; is famous as the father and instructor of Polygnotus and Aristophon. The painting of the *Winged Victory*, mentioned by the scholiast on the *Birds* of Aristophanes, is supposed to be by him. Antheus mentions two pictures by the younger (fl. 416 B.C.)—*The Crowning of Alcibiades*, and *Nemea with Alcibiades on her Knees*.

Agnadello, or GHIARA D'ADDA, BATTLE OF (May 14, 1509). Here, after the league of Cambray, the French, under Louis XII., defeated the Venetians.

Agnano, LAKE OF, Italy, 2½ m. W. of Naples, filled the basin of an extinct crater, but was drained in 1870. The carbon-dioxide waters are now used in baths. Near it is the famous Grotta del Cane.

Agnates, or AGNATI, in Roman civil law, were blood relations on the father's side, tracing their descent exclusively through males—*e.g.* one's father's brother's child, but not one's father's sister's child. In Scots law, agnates include all blood relations on the father's side.

Agnel, a French gold coin struck during the reign of Louis IX., but not used after the time of Charles IX. So called because it had a figure of the paschal lamb upon it.

Agnes, St., a Roman virgin, martyr to the Christian faith in the reign of Diocletian. At the age of twelve she was publicly humiliated and beheaded. Her feast is the 21st January.

Agnesi, Maria Gaetana (1718-99), an accomplished linguist and mathematician, was born in Milan. She succeeded her father as professor of mathematics at Bologna, and published *Instituzioni Analitiche* (1748).

Agni, in Hindu mythology god of fire and of the earth, to whom many Vedic hymns are addressed.

Agnomen, a name added by the Romans to those of any person, to commemorate his services, or in allusion to his character—*e.g.* Cnæus Marcius *Coriolanus.*

Agnone, tn., Campobasso, Italy, on the w. slope of the Apennines, 22 m. N.W. of Campobasso; metal industries (iron, copper, etc.). Pop. (1901) 10,189.

Agnosticism. The word agnosticism was coined by Professor Huxley in 1869; but while the name is new, the thing is old. It may possibly have been suggested to Huxley by the inscription which St. Paul found upon an altar in Athens—'Αγνώστῳ Θεῳ, 'To an unknown God' (Acts 17 : 23). By its form it suggests, and, Huxley tells us, was meant to suggest, a theory the exact opposite of gnosticism, which was a vague and theosophical method of speculation widely prevalent in the early church. Agnosticism restricts our cognition to the manifestations and transformations of matter and energy, and disclaims all knowledge of spiritual existence, whether of God or man. While accepting the conclusions of science and sensible experience, it rejects, as unfounded conjecture, all assertions regarding the unseen. Agnostics do not deny that behind the phenomena of knowing, feeling, and willing there *may* be a permanent entity or soul; but they maintain that nothing can be proved or disproved respecting the soul's distinct existence, substance, or durability. Similarly, they admit that behind the material phenomena of the universe there *may* exist a Universal Being; but they hold it impossible to determine whether or not the nature of this Being is conscious and spiritual. To all such questions there is but one answer: we do not know, and nothing leads us to suppose that we shall ever know. At the same time, it is to be remembered that agnostics emphatically protest against their views being confounded with the dogmatic affirmations of atheism and materialism, inasmuch as the latter theories desert the purely nescient attitude with regard to spiritual existence. History, however, appears to prove that much of religious agnosticism tends to issue in ultimate scepticism. There are many shades and varieties of agnosticism, but all reasoned and systematic forms of it at the present day are based more or less overtly upon the speculations of Kant. The conclusion of Kant's critical analysis of human reason is that we can *know* only the phenomenal, while such ideas as God, the soul, and immortality can be apprehended only by practical faith. The negative side of this theory has been adopted and popularized in Britain by Herbert Spencer, whose works present the most elaborate and impressive exposition of agnosticism to be had in English. Agnosticism will always be found to rest upon a subjective theory of knowledge, and can be refuted only by the demonstration that our knowledge of reality, so far as it goes, is genuine and trustworthy. See Huxley's *Lectures and Essays,* Herbert Spencer's *First Principles,* and Leslie Stephen's *An Agnostic's Apology* (1893). A masterly criticism of the theory is to be found in Dr. James Ward's *Naturalism and Agnosticism* (Gifford Lectures, 1899); *cf.* also Flint's *Agnosticism* (1903).

Agnostus, a trilobite common in the Cambrian rocks, is anatomically one of the simplest members of the group.

Agnus Dei (Lat. 'Lamb of God'), a title of our Lord (John 1 : 29), hence a symbolical representation of Christ as a lamb with a halo, and supporting a banner, as found in the catacombs. Also a prayer which since the 6th century has been used in the service of the mass—*Agnus Dei, qui tollis peccata mundi, miserere nobis.* In the Greek Church the cloth which covers the chalice is known as an *Agnus Dei,* this symbol being embroidered upon it. In mediæval heraldry and religion the *Agnus Dei* was associated with St. John, and was consequently borne by those under the patronage of that saint.

Agone, seapt. tn., W. Africa, on Slave Coast, between Great and Little Popo. Pop. 20,000.

Agonic Lines, imaginary lines on the earth's surface connecting those points where the magnetic needle shows no declination. There are two such—a smaller, contained entirely in Siberia and China; and a larger, which passes through Russia, the Indian Ocean, Australia, Antarctic Ocean, Brazil, Atlantic Ocean, and E. Canada.

Agony Column, the column of newspapers in which advertisements regarding missing relatives and friends, secret correspondence, etc., are inserted. The name derives from the distress betrayed in many such advertisements.

Agora (Gr. 'assembly'), the market-place of ancient Greek towns, corresponding to the Roman forum, and the centre of the religious, commercial, and political life of the town or city. The most famous agoræ were those of Elis and Athens, the latter being a large irregular area bordered by the Acropolis, Colonos Agoræus Hill, and the Areopagus Hill. See Pausanias, vi. 24, and Vitruvius, v. 1; also Hirt's *Die Geschichte der Baukunst bei den Alten,* vol. iii. (1821-7), and Gardner's *Ancient Athens* (1903).

Agoraphobia (Gr. 'fear of the public square'), a nervous disease characterized by fear in certain situations, usually large spaces. The patient suffers palpitation of the heart, trembling, coldness, and other symptoms of terror, which come upon him suddenly in the market-place, street, or theatre; he will slink round the edge of a square rather than cross it. Improvement in general health, and keeping the mind well occupied, usually drive it away.

Agoult, Marie Cathérine Sophie de Flavigny, Comtesse d' (1805 76), French author under the pseudonym 'Daniel Stern,' daughter of Vicomte Flavigny and Marie Bethmann of the Frankfort banking family, was educated in Paris; married Count d'Agoult in 1827, but left him to live with Franz Liszt; travelled much in Switzerland, where she met George Sand, and in Germany and Italy. To Liszt she bore a son and two daughters, of whom Blandine married Emile Ollivier, and Cosima married first Hans von Bülow, and later Richard Wagner. 'Daniel Stern' wrote *Nélida* (1845), an autobiographical romance; *Lettres républicaines* (1848); *Hist. de la Révolution de 1848* (1851 3); *Esquisses morales et politiques* (1849), by which she is best known; and *Mes Souvenirs, 1806-33* (1877).

Agouti, a name applied to certain S. American rodents, species of the genus Dasyprocta. They have three toes on the hind limbs, and all the toes end in hooflike claws.

Agra, chief tn., Agra dist., United Provinces, India, on the r. bk. of the Jumna, 120 m. from Delhi. It was founded by the Mogul emperor Akbar, who made it the seat of government. The fort, which covers a large area near the river, was built in 1566. It is surrounded by high walls with red stone towers, but has not the strength to resist modern systems of attack. Jehangir commenced the palace, and erected Sikandra, the mausoleum of his father, Akbar, and the tomb of Itmad-ud-Daula, his father-in-law. The Moti Masjid (Pearl Mosque), the Jama Masjid, and the celebrated

Taj Mahal, a magnificent tomb of white marble, are monuments of the reign of Shah Jehan, the son of Jehangir. The fort was captured from the Mahrattas by Lord Lake in 1803. In 1857 Agra stood a siege of some months during the mutiny. It is an important market for grain and sugar. The chief industries are shoes, gold lace, and delicate mosaic work. Pop. (1901) 188,022. Pop. of dist. (1901) 1,060,528. — The AGRA CANAL, for irrigation and navigation, taps the Jumna 10 m. below Delhi, and re-enters 20 m. below Agra, with branches to that city and to Muttra.

Agram (Croat. *Zagreb;* Hung. *Zágráb*). (1.) County, Croatia, Hungary, 1,573 sq. m., and pop. (1900) 477,740. (2.) Chief tn. of Croatia, and an archiepiscopal see of Hungary, near the l. bk. of the Save, 139 m. by rail N.E. of Fiume. Manufactures of linen, tobacco, and hides. Pop. (1900) 57,690.

Agrapha of Jesus. See LOGIA.

Agraphia, a nervous complaint, analogous to aphasia. The patient is unable to write what he means; his pen sets down meaningless combinations of words or syllables.

Agrarian Laws. See LAND LAWS.

Agrarian Party, a political party of Germany representing the agricultural interest. It originated about the year 1869, and first made its influence felt in the elections of 1874. For some years it was a free-trade party, but it has recently been the zealous advocate of heavier rates against the importation of foreign agricultural products. The official title of the society is 'The Reformers of German Taxation and Economy.'

Agreement. See CONTRACT.

Agricola, CNÆUS JULIUS (37-93 A.D.), son of Julius Græcinus and Julia Procilla. He was one of the highest type of Romans under the early empire, an upright, able man, a good governor, and a competent general. He served in Britain in 60 A.D.; governed Aquitania, in Gaul, 74-76; and was consul in 77. From 78 to 85 he governed Britain, and did much to reduce the island to order and civilization; he penetrated even north of the Forth, perhaps of the Tay, and defeated the Caledonians in a battle whereof the site is uncertain. From 85 to 93 he lived in Rome; some say he was poisoned by the order of the Emperor Domitian. His *Life* was written by his son-in-law Tacitus; trans. by Church and Brodribb (1877), and by B. B. Townshend (1894).

Agricola, GEORG, whose real name was BAUER (1494-1555), the founder of the modern science of mineralogy, and a valued teacher of practical mining in Germany; practised as a physician at Chemnitz (1531 onwards); wrote *De Re Metallica* (1531; trans. into German *Bergwerksbuch*, 1557), and *De Natura Fossilium* (1657).

Agricola, JOHANN, originally SCHNITTER or SCHNEIDER, also called MAGISTER ISLEBIUS, from his birthplace (1492-1566), was in 1525 sent by Luther to establish the Protestant Church at Frankfort. From 1526-36 he preached and taught in his native town of Eisleben, and in 1536 was appointed to a chair at Wittenberg, which he had to resign because of his opposition to Luther and Melanchthon. In 1540 he became court chaplain to Joachim II. at Berlin. He assisted in drawing up the Augsburg Interim. His collection of German proverbs was published in Low German (1528), and in High German (1529). He also wrote many theological works. See Kawerau, *Johann Agricola* (1881); and Latendorf, *Agricola's Sprichwörter* (1862).

The Taj Mahal, or 'Peerless Tomb,' Agra.

Agriculture. The present article is devoted to general considerations: first, with regard to the limits of the science; and secondly, with regard to the more outstanding changes which have marked the history of British agriculture.

There is some risk of confusing horticulture with agriculture; and the subjects certainly overlap each other, and cannot be entirely separated. Forestry, so far as the planting and cultivation of woods are concerned, may be regarded as a branch of agriculture, as also must the improvement and management of pastures and other forms of grass land. The width of the subject is best realized by considering the various matters which must engage the attention of a landowner. Besides cultivated farms, he may possess extensive woods, grazing land, rivers, lakes, and streams, all of which are capable of development. The cultivated land cannot be tilled without implements, cottages, farm-houses, and farm-buildings; while both it and the pastures require a varied knowledge of live stock. The interests involved are therefore very numerous, and it is scarcely too much to say that, for the thorough understanding of them all, every branch of human knowledge must be laid under contribution. Agriculture demands a knowledge of the soil, atmosphere, climate, and meteorology. Still more directly does it involve a knowledge of vegetable life, not only as regards crops, but also weeds, crop enemies, fungoid attacks, and poisonous and injurious plants. Grasses alone form a group of the first interest to farmers. In ascending series, all the phenomena of animal life are observable in live stock—the anatomy, physiology, pathology, and treatment of animals in health and disease, besides questions of heredity, variation, natural selection, hybridization, and acclimatization. Chemistry is required in the study of the soil, fertilizers, feeding stuffs, and the composition of plants. Geology throws light on the distribution and origin of soils, the presence of springs or of water-bearing strata, and on land drainage. Zoology opens up to us the study of noxious insects, and of the devastating effects of entozoa on live stock. Of late years bacteriology has been shown to be intimately concerned with nitrification in the soil, fermentation and putrefaction, and the variations in cheese and butter in different districts. Sterilization and serous inoculation for tubercle, anthrax, and other diseases, all form parts of the theory of agriculture. Further, agricultural science requires engineering knowledge for construction, drainage, and reclamation, as also a knowledge of machinery and implements. It demands no small knowledge of physics and mathematics.

JANUARY.

MARCH.

JUNE.

AUGUST.

DECEMBER.

Agriculture in the Eleventh Century.
(From a calendar of the twelve months prefixed to an English Hymnarium.)

Antiquity of Agriculture.—That the two principal branches of agriculture should be distinctly separated in Gen. 4:2 is remarkable. 'Abel was a keeper of sheep, but Cain was a tiller of the ground.' Very primitive tribes cultivate the ground, and possess cattle, sheep, and horses. Some knowledge of the art of agriculture must therefore be assumed. The facts that wheat does not exist in the wild form, and that no truly wild horse exists in the world, show the antiquity of agriculture. Sheep have been domesticated so long that it is difficult to connect them with any truly wild prototype, and the same seems to be true of domesticated cattle in a modified degree. Efforts to trace the origin of European cattle to three types, all now extinct as absolutely wild animals, have been fairly successful; but *Bos primigenius* (Aurochs) is the only one which exists in a semi-wild condition in the wild cattle of Chillingham Park, Northumberland, Cadzow Forest, Lanarkshire, and in parts of Russia and Hungary. Unimproved races of sheep are generally of varied colour; but the efforts of Jacob to breed sheep to particular colours afford evidence that cattle and sheep were bred with care in the earliest times. Charred grains of wheat and barley have been found in Switzerland on the site of ancient lake dwellings, and the bones of domesticated animals have been recovered from the prehistoric kitchen-middens in Denmark and elsewhere.

Implements.—The earliest plough was probably a pointed stick charred or shod with iron at the end. According to Stephens (*The Book of the Farm*, 1842), a plough of this kind, known as the caschrom, was in use sixty years ago in some of the Outer Hebrides and in Skye.

The early Saxon plough, as depicted in the Harleian MSS., resembled the caschrom, but was drawn by two bullocks from a central shaft. The implement was entirely of wood, and of the form of a pickaxe, one limb of which was held by the ploughman, while the other scarified the soil.

The ancient Egyptian plough was the same in principle, the strain on the share being relieved by a rope. The native Egyptian plough of the present day is of very similar construction.

The mould-board or turn-furrow was at first a flat board, still used on the old Kentish gallows turnwrest plough. It is fastened by a wooden or iron peg, and is transferred from side to side of the plough at the end of every furrow.

The other tillage implements were at first correspondingly primitive. The harrow was of brushwood or thorns wattled through a frame; and the roller was a cylindrical boll of a tree fitted with axle ends, and attached to a frame. Harrows consisted of straight, pointed iron teeth, fixed at the points of intersection of a square framework of hard wood. Ploughs, harrows, and rollers were the only tillage implements. The seed was sown from a basket or a sheet by hand; the crop was reaped by sickles, threshed by flails, and winnowed by a shovel in the wind.

Tillage implements have retained their original type, but they have been altered in form and material. Iron and steel have superseded wood, and steam has in many cases taken the place of manual and horse labour. The modern plough is an instrument for inverting the soil. Slice after slice is cut by the horizontal share and the vertical coulter, and is turned over by the beautifully curved mould-board with the least possible friction. Its parts are adjustable for altering the depth and width of the furrow. The modern harrow is either rhomboidal or zigzag in its iron framework, in order that the teeth may not follow each other in the same track. The roller is of iron, divided into segments to avoid surging in turning; in the clod-crushers and ring-rollers it is composed of toothed or edged discs, which pulverize or cut the hard clods. Steel-tooth cultivators or scarifiers are sometimes used in preference to ploughs, but the older implement maintains its position as the chief cultivating instrument. The latest innovation in cultivating machinery is the 'digger,' which is devised to pulverize the soil by a series of revolving blades which at once break up the earth and produce a seed-bed. In Britain this system has not replaced the usual methods of reducing the soil by ploughing, harrowing, and rolling, and that because pulverization is best accomplished through weather processes. Alternations of frost and thaw, of rain and dry weather, assist tillage; and the farmer relies upon the aid of these natural forces in producing a tilth. Winter ploughing exposes the upturned furrow to the influences of weather; and a tilth so produced is superior to a forced one, which is very liable to 'run together' after a heavy fall of rain. Steam cultivation was at one time expected to revolutionize tillage; but there are many operations connected with agriculture in which steam cannot be conveniently employed. Within recent years electric power has been used with success.

Sowing implements include drills and broad-casters. Drills are in universal use for turnips and all root-crops, and are generally employed in sowing corn. But it is in the former that they are of the greatest value; for in corn-growing there is no superiority in a drilled as compared with a broad-cast crop, especially when the land-presser has been used to form grooves for the reception of the scattered seed.

The greatest improvements in implements are seen in all processes for securing and preparing crops for market. Mowing-machines, reapers, self-binders, hay-tedders, horse-rakes, stackers, loaders, elevators, threshing-machines, winnowers, screens, may be mentioned as among the most important inventions which were perfected during the second half of the 19th century. Not less important are those implements which have been introduced for the preparation of crops for home consumption by live stock, such as chaff-cutters, cake-breakers, grist mills, turnip pulpers and shredders, and boilers or steamers. Lastly, there are the important dairy implements, such as cream separators, improved churns, cheese-tubs, cheese-presses, butter-works, milking machines, deep-sitting vessels for cream-raising, sterilizers, and a number of smaller appliances for the improved manipulation of dairy produce.

Manuring.—This becomes necessary only when land has been to some degree exhausted of its available plant food. According to Jethro Tull, inventor of drilling and of horse-hoeing, tillage may take the place of manure. By thorough tillage he grew wheat year after year on the same ground without manuring. He held that the decay of straw and dung in the soil was useful only in causing such a separation in the particles of earth as to reduce them to the condition of plant food—*i.e.* to the soluble condition. He denied the actual manurial value of dung, and attributed its beneficial effect to its fermentative and comminutive action on the soil. In his day farmyard dung was practically the only manure in constant use, and his view was, no doubt, partly correct. The mechanical effect of decaying vegetable and animal matter in dividing and pulverizing soil is fully allowed, as is also the solvent effect of the carbonic acid evolved during decay upon the mineral matter of the soil.

Farmyard manure, when enriched by meal and cake residues, is a complete manure, as it contains every constituent removed by crops.

The great value of dung depends largely on its composite nature, but also on its durability and on its cumulative effect when applied at the usual intervals of time. Its slow decay within the soil liberates its mineral and nitrogenous elements gradually; and as its decay is arrested at temperatures approaching freezing-point and is accelerated in summer heat, its materials are most available at those periods of the year when vegetation is most vigorous. Farmers who maintain a large head of live stock are comparatively independent of the so-called artificial manures, and rely principally upon dung.

It was only by the aid of chemistry that the true value and composition of farmyard manure was revealed, and the same knowledge suggested other substances which might be used as additional sources of plant food. Bones were found to contain phosphates and nitrogenous matter, and were crushed and applied to the land early in the 19th century. Lime had always been known as a valuable fertilizer. Liebig discovered the beneficial action of sulphuric acid upon bones in making the phosphoric acid soluble, and gave us the first superphosphate. Sir John Lawes introduced mineral superphosphates manufactured from coprolites, and later from various mineral phosphates. By chemical analysis, various substances were found to contain plant food in the form of nitrates, phosphates, potash salts, lime, magnesia, etc., and these became the source of artificial manures. Guano has been imported in enormous quantities; and nitrate of soda, or Chile saltpetre, as it was first called, was found on the western slopes of the Andes, and became an important fertilizer. At the present time artificial manures are manufactured from many materials, including natural phosphates, fish, blood, basic cinder, bones, potash salts, guano, cotton-seed meal, and many other substances.

All excrements or remains of animals and of plants are valuable manures. Among these may be mentioned town sewage, poudrette (prepared human excrement), wool, hair, seaweed, and the refuse from slaughter-houses, tan-yards, glue-works, and fish-curing establishments.

The value of a manure depends upon its richness in phosphoric acid, nitrogenous matter, and potash. Of these, phosphoric acid and nitrates are in greatest demand, because they are removed from the soil in the forms of bone, flesh, and grain. Nitrates are the more necessary on account of their tendency to wash through the soil, or to sink below the reach of the roots of plants.

Composts of weeds and vegetable refuse, road scrapings, ditch cleanings, and 'dirt' of all kinds, as well as the dead bodies of animals, are all, in different degrees, useful fertilizers. This is also true of green crop manure, and is the reason for the custom of ploughing in vetches, green rye, lupins, mustard, or any other growing crop. Other general manures are oil cakes, such as rape cake, cottonseed cake, bruised cake; as well as beans, pease, the cereal grains, and other feeding stuffs. Rape cake is often applied directly to the land; but the usual method is to pass these products through the animals of the farm, and to recover the unappropriated portion, or 'food residues,' in the dung.

General or 'complete' manures may also be compounded artificially by mixing salts of phosphoric acid (phosphates), nitrates, sulphates, potash salts, gypsum, etc., so as to imitate the composition of farmyard manure. There is no reason why the fertility of land should not be kept up by such mixtures; and examples of the growth of many crops of wheat, barley, and oats year after year for sixty years by their means are now recorded in the Rothamsted Memoirs.

Carbonaceous Matter, etc.—Animal and vegetable bodies are composed largely of water and carbohydrates, such as fat, oil, starch, sugar, gum, mucilage, and cellulose. These combinations of carbon and the elements of water, hydrogen and oxygen, are of no direct manurial value in the soil, because growing plants obtain them directly from the air through their leaves. Moreover, carbon accumulates in all soils through the fall and decay of leaves and the death of plants and animals. Fertile soils are rich in carbonaceous matter, but there is abundant evidence to prove that the roots of plants absorb only solutions of mineral salts and of nitrates, and that the carbonaceous matter is entirely derived from the atmosphere. No organic material enters the roots of plants. Decaying matter is, indeed, repugnant to growing roots, and is nutritive only after its complete resolution into pure salts. Plants feed upon watery solutions of salts derived from the decay of organic matter.

Rotation of Crops.—The maintenance of fertility in soils is also secured by proper rotation or succession of crops. The crop residues—that is, the roots, stubble, haulm, and fallen leaves of crops—rank among the most important fertilizers. Thus, the roots of clover are peculiarly rich in nitrogenous matter, which is converted into nitrates of lime and potash, and forms an excellent preparation for wheat. Similarly, root-crop residues furnish a valuable manure for barley, oats, or wheat. Hence the Norfolk four-course rotation of *roots, barley, clover*, and *wheat* is based upon scientific principles. Fallowing exposes the soil to atmospheric changes which dissolve the mineral matter in the soil, and encourage nitrification, with great benefit to succeeding crops. The old three-field course of the early Teutons was obligatory in Anglo-Saxon times. In the ancient institution of the 'mark,' or area *marked out* and appropriated by each *gemeinde* or village community, the arable mark was divided into three fields, one of which was fallow, one winter corn (wheat), and one summer corn (oats or barley). This appears to have been the original form of the English rotation of fallow-wheat-oats, or fallow-wheat-beans, which was general at an early period. According to Thorold Rogers, arable land in the 13th century was generally half in fallow and half in corn. The system of bare fallowing once in two or three years continued, especially in the three-course form, until the close of the 17th century, when turnips began to form a regular crop. As turnip husbandry extended, greater attention was devoted to the winter feeding of cattle, and this gave rise to the general improvement in live stock which marked the later portion of the 18th century. The four-course rotation above mentioned became, with modifications, the modern system of cropping. It is varied by allowing the clover or seeds to remain down for two or more years, giving rise to five and six course rotations, and by the introduction of other crops, such as sainfoin or potatoes. The system of sheep-folding on root and fodder crops has proved of the first importance in arable farming on light lands, and has greatly added to the fertility of the soil.

Live Stock.—Originally, cattle, sheep, and other live stock, were associated with natural pastures. It is impossible to regard mountain sheep-walks and uncultivated plains as agricultural land, and therefore pastoral and agricultural pursuits have been considered as separate from one another, and in some degree as rivals. In order of time pastoral occupation must have preceded agriculture, as more suited to tribal life before property in land was strictly defined. Hunting would come first, and flocks and herds of domesticated animals would naturally follow.

In mixed farming there is always a fair proportion of arable to pasture land, and the two industries are carried on together. In modern agriculture sheep and cattle are kept upon the produce of arable land as much as upon pasture. Live stock forms an essential link in the system of manuring, and becomes the means whereby the land is kept in good condition. Attempts have been made to dispense with live stock, and to keep up the fertility of land by chemical manures; and there appears to be no reason why these should not be successful. A time may come in which the requirements of vastly larger populations may restrict live stock and increase the area of land under corn; but in the present order live stock and corn-growing go well together, and the most successful farmers incline towards live stock, as more profitable than corn-growing.

The high price of meat, and the still higher and more remunerative prices obtained for first-rate breeding animals (both of which are likely to continue), have stimulated the breeding of improved stock, especially in the United Kingdom.

As already pointed out, the improvement in live stock in the second half of the 18th century was in great part a consequence of the extension of turnip husbandry. The second half, and the whole of the 19th century, were marked by extraordinary interest and enthusiasm in the breeding of improved stock. The prices given for animals of the highest quality have often amounted to thousands of pounds; and good breeding cattle are frequently sold for hundreds, and sheep for sixty, eighty, and a hundred guineas each. In some instances a thousand guineas have been given for one ram. The first great improver of live stock in England was Robert Bakewell of Dishley, Loughborough, in Leicestershire. He improved the old English cart-horse, and established the longhorn race of cattle and the improved Leicester or Dishley sheep. His example was followed by the brothers Colling of Barmpton and Ketton, in the county of Durham, who are regarded as the founders of the shorthorn breed of cattle; by the Culleys, who founded the Border Leicester sheep; and by the Ellmans of Glynde, in Sussex, who were the first breeders of improved Southdown sheep. The movement was continued by numerous intelligent breeders until all kinds of live stock were brought to their present perfection. It would occupy many pages to give even an outline of the rise and progress of Hereford, Devon, Sussex, Norfolk, Highland, Aberdeen-Angus, Ayrshire, and other breeds of cattle. Equally important has been the rise of the improved Lincoln, the Shropshire, Oxford, Suffolk, Hampshire, and several other breeds of sheep, all of which have been developed by judicious crossing and subsequent selection of the best types. The improved races of live stock all arrive earlier at maturity, and that by years, months, or weeks, according to the class of animal. Thus, before the time of Bakewell, the ox was rarely fattened before five years old, whereas well-bred steers will now fatten readily at two years old. 'Four-year-old wether mutton' was the attractive phrase adopted by butchers even fifty years ago in recommending their joints; now, mutton is killed at from ten to sixteen months old. Pigs, and even poultry, share in the same early maturity. Well-bred cattle will fatten upon a less nutritious diet than badly-bred ones. A shorthorn bull now in possession of the writer is quite fat, although he feeds on nothing but water-meadow hay, which is an inferior fodder. Well-bred sows may easily be too fat for breeding even after having been turned into a straw yard, with nothing but water and what they forage for in the form of stray grains in the straw. Another peculiarity of well-bred animals is their uniformity of type, colour, form, or whatever may be the object of the breed. These qualities weigh enormously in fixing the money value of individuals.

High-bred stock need not be delicate, because it is in the power of breeders to develop constitutional vigour as much as any other quality. Still, it must be allowed that propensity to fatten is inconsistent with great fecundity or with deep milking, and that it would be unreasonable to expose valuable animals to unfavourable conditions of pasturage or weather. On the other hand, many breeders of first-rate shorthorns keep their cows and young stock out of doors both summer and winter.

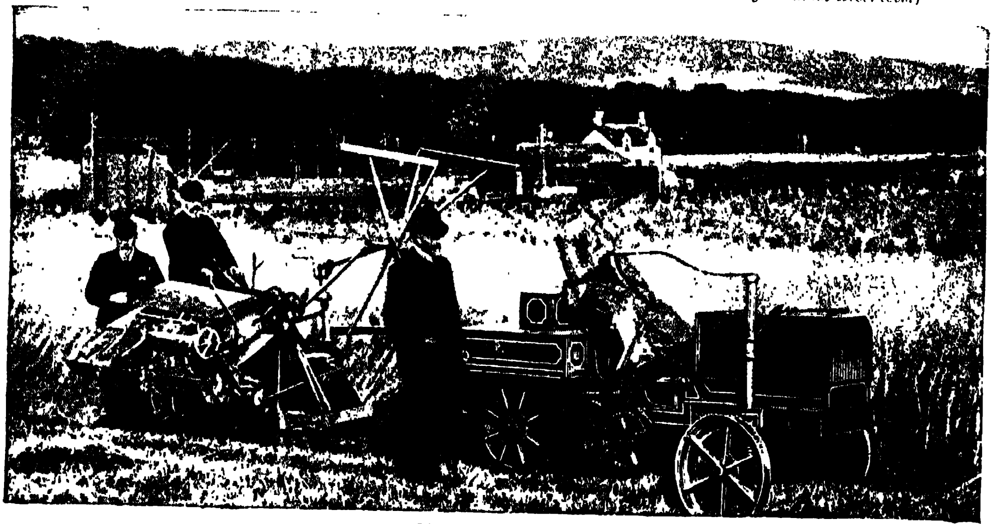
Farm-Buildings.—Good animals need not be accommodated in luxurious buildings. Some of the best shorthorns have lived under thatch and roughly-timbered sheds, sometimes sadly out of repair. Expensive buildings are no sign of good farming, and do not form a necessary feature of first-rate management. Comfort, ventilation, and drainage are the three essentials, and these may be obtained by the use of cheap and easily available materials. Cattle will do as well in an extemporized straw yard fenced with hurdles and sheltered by straw ricks as in the most elaborate stalls and yards. Good buildings are certainly an advantage, but it must not be forgotten that they occupy a subsidiary place in comparison with good cultivation and good stock.

See the articles on special agricultural subjects; also *Journals of the Royal Agricultural Society, the Highland and Agricultural Society,* and *the Bath and West of England Society.* For treatment of scientific agriculture, *The Rothamsted Memoirs.* For general agriculture (and agricultural chemistry), *The Farm Series;* Wrightson's *Agricultural Textbook, Fallow and Fodder Crops,* and *Principles of Agriculture.* For cattle, horses, and sheep, Vinton's *Live Stock Series;* Cassell's *Downton Series* for soils and manure, crops, and live stock; Curtis's *Estate Management;* Bailey Denton's *Homesteads of England.* J. C. Morton's *Cyclopedia of Agriculture* (1850-2) is still one of the best books of reference. The best agricultural newspapers are the *Agricultural Gazette,* the *Mark Lane Express,* the *Live Stock Journal,* the *North British Agriculturist,* the *Farmer and Stock-keeper.*

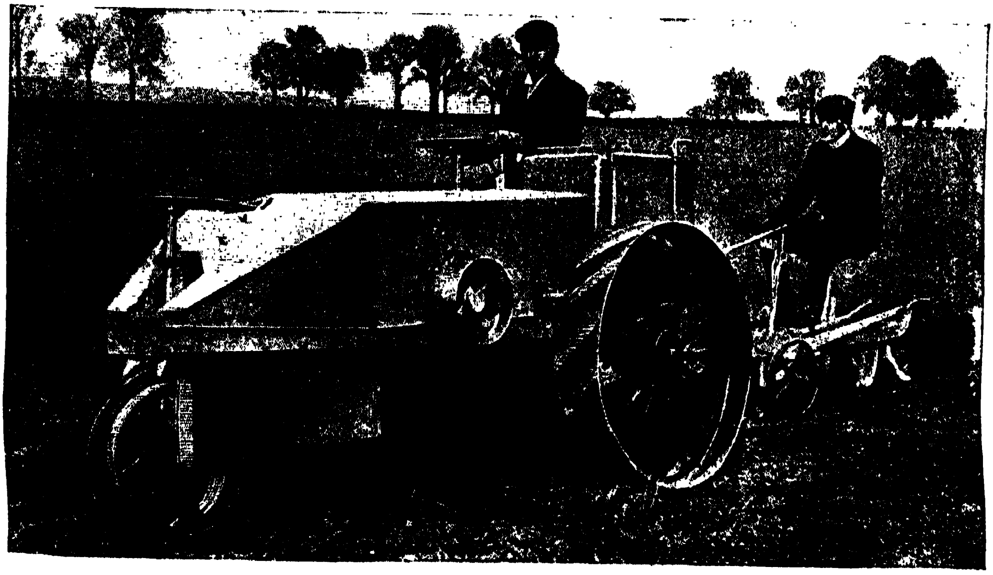
HISTORY OF BRITISH AGRICULTURE.—The issue in 1534, by Sir A. Fitzherbert, of *The Book of Husbandry,* reputed to be the first English treatise on the subject, marked the beginning of a new era of agriculture, the progress of which is chronicled by various subsequent writers, the chief of whom in Queen Elizabeth's reign were Tusser, Googe, and Sir Hugh Platt. Tusser's *Hundred Points of Husbandry* appeared in 1562 (the basis of *The Whole Art of Husbandry,* by Captain G. Markham, 1631), Googe's *Four Books of Husbandry* in 1577, and Platt's *Jewel Houses of Art and Nature* in 1594. From these and other records we learn that in Tudor times enclosures from common lands were numerous in England. These enclosures were associated with two distinct movements:—(1.) The old three-field system, involving scattered strips, common rights, and customary cultivation, gave way to a system of independent, solid holdings, with encouragement for individual energy and initiative. Tusser praises the system of 'severalty,' or enclosed farming, and points out its superiority to the 'champion,' or open-field system. (2.) But simultaneously with this movement there occurred, under the stimulus of the high price of wool, a steady conversion of arable land into pasture, and the fencing of large areas into sheep-walks, which resulted in rural depopulation and social discontent. Hops were brought in and cultivated early in the 16th century; hemp and flax were common crops; hedges were introduced into Scotland and Ireland, and potatoes into England (1586), but for about two hundred years the latter were only grown in the garden. The union of the crowns of England and Scotland in 1603, and the peace and security which followed, led to the increase of population, and a demand for more and better food. Red clover and turnips (then sown broadcast) were known as field crops in Norfolk about the middle of the 17th century; but it was more than fifty years later before they were grown generally in the northern and distant parts of the country. A great agricultural revival was begun in Britain in the 18th century, chiefly towards the end of the latter half of that period. The Norfolk four-course system of cropping was introduced by Viscount Townshend, who settled at Rainham in 1730; and progressive farmers grew turnip crops in rows, and after 1790 also swedes, as field crops. Drill husbandry and horse-hoeing were introduced, as we have said, by Jethro Tull, who began to practise it in Berwickshire in 1701. He published his book on the subject in 1731. An improved English seed-drill appeared in 1783, a threshing-mill in 1788, a winnower or corn-dresser in 1789, an improvement on the horse-hoe in 1799, a hay and straw press in 1796, and a chaff-cutter won a gold medal of the Society of Arts in 1797. Robert Bakewell (1725-95) introduced, in connection with Leicester sheep and longhorn cattle, the system of consanguineous breeding, which has been employed, and is still practised, although at times in a modified form, in the improvement of all classes of live stock. The show of the Smithfield Club (1798) and that of the Bath and West of England Society (1777) were established to encourage the breeding of animals of improved quality. The Highland and Agricultural Society of Scotland assumed its early form in 1784, with the object of encouraging Highland industries. The Chair of Agriculture and Rural Economy in Edinburgh University was founded in 1790; and, drawing its students chiefly from the farming and landed classes, it has exercised for more than a century a direct influence on the agriculture of the country.

The formation of the first Board of Agriculture in 1793, with Lord Somerville as president, and Arthur Young as its distinguished secretary and chronicler, gave a great impetus to the development of a higher type of British agriculture. The investigations of that body, and the surveys of the agricultural practices in various counties of England (several vols., 1768-70), together with the accounts of the secretary's tours of inspection in Ireland (1780), in France (1792-4), and in Italy (1788), materially guided the movement which led to many agricultural improvements during the early years of the 19th century. The latter part of the 18th and the

Steam Threshing. (*The Winnowing Machine shown in centre is unnecessary in most districts.*)



Motor Harvesting. [*Photo by J. P. Milnes, Stranraer.*



Motor Ploughing.

Agriculture in the 20th Century.

first quarter of the 19th century witnessed the enclosure of vast areas of wastes, commons, and open-field farms, on which, on account of the community of rights and diversity of interests, improved agricultural practices had hitherto been impossible. It is said that fully 6,000,000 acres were enclosed between 1760 and 1820. Great landowner pioneers like Francis, Duke of Bedford (d. 1802), and T. W. Coke of Holkham (created Earl of Leicester and of Holkham in 1837), set examples in improved agriculture and estate management which were followed by smaller landlords, greatly to their pecuniary advantage, more especially on the advent of the period of famine prices for corn, 1792-1819. Nicholson's *Principles of Political Economy* (vol. iii. bk. 4, ch. v. § 8) shows that the main cause of the rise in prices was adverse seasons, the Napoleonic war being only a minor influence, and the corn laws practically inoperative. For twenty-seven years before this period prices had been maintained above their normal level by unfavourable seasons, with the result that the price of wheat for the 18th century averaged £1, 18s. 7d. per Winchester quarter, an equivalent to the average of the 17th century, which was £1, 18s. 2d. Since the country became more dependent on its imported than on its home supply of grain, the fluctuation of prices due to local climatic influences has been, and is likely to continue, within narrow limits, and the baneful influence of bad seasons will be all the worse for the British farmer. This was acutely experienced during the adverse seasons in the 'seventies of the 19th century.

Although the great body of the farmers of the country lagged behind, it was during the period of famine prices that British agriculture, in competition with systems of agriculture in other parts of the world, assumed the leading position which it still maintains in spite of foreign competition and other increasing difficulties. The 19th century was divided into six very distinct periods, in which agricultural prosperity and adversity succeeded each other alternately—the total time of prosperity being almost, although not quite, as long as that of adversity.

(1.) During the first period of fourteen years great agricultural activity prevailed, owing to the abnormally high prices of corn just alluded to. Farmers at first became rapidly rich, wages advanced, yet labour was comparatively cheap. Although poor-rates rose, rents went up enormously, so that the landlords in the end benefited most. Between 1790 and 1812 rents in Great Britain were more than doubled, and 'in many parts of England the rent of arable land per acre rose fivefold.' So rapid were the changes and so unstable the equilibrium of rural matters, that in 1814, a year before peace was declared, Parliament was petitioned to make inquiry into the ruined state of thousands of farmers—notwithstanding the fact that wheat had, while fluctuating between 58s. 10d. and 126s. 6d., averaged for fourteen years 89s. per quarter. The great army of unfortunates contained those who had become extravagant beyond their means in the good times, and also those who, from ignorance or perversity, had not advanced with the times, and had in consequence not benefited by their opportunities. Great advances were made in the improvement of the implements and machines of the farm during this period, and iron ploughs were first introduced. Estate improvements (*i.e.* building farm houses and steadings, reclaiming waste lands, draining, chalking, and marling) were carried on extensively, but under a strong temptation to grow corn too frequently. With the limited means of providing additional manure, much of the cultivated area began to deteriorate. The Board of Agriculture encouraged new inventions and experiments, and offered prizes for essays relating to agricultural questions. Sir Humphry Davy (1778-1829) also introduced, about 1810, by his lectures and experimental demonstrations, the subject of agricultural chemistry.

(2.) The succeeding period of agricultural depression (for the initiation of which a contracted currency was to some extent responsible) began in 1815, and lasted for over twenty years, until the passing of the Tithe Rent Commutation Act in 1836. Progress was nevertheless being made in perfecting the implements and machines of the farm, in the breeding and management of live stock, and in the practice of manuring, especially by the use of bones. The introduction of railways (Stockton and Darlington 1825, and Liverpool and Manchester 1830), which soon spread to all the populous centres of the country, gave an impetus to general trade which reacted beneficially upon the agricultural industry, although the effect of the inevitable abolition of stage-coaches was fully expected to be detrimental to it, through the reduction in the number of coaching-horses, and of the amount of oats and fodder required for their support.

(3.) The third period (twelve years, 1837-48) was one of prosperity, and of events of great importance to the agriculture of the country. The Royal Agricultural Society of England was established in 1838, and held its first show at Oxford in the following year. Liebig and Lawes had begun to create an interest in the science of chemistry bearing upon agriculture, and the era of concentrated and artificial manures may be said to have opened. The world-renowned experiments at Rothamsted in Hertfordshire, 25 miles from London, were begun in 1843, and have been supported throughout by the private munificence of Sir John Lawes (d. 1900). The Royal Agricultural College, near Cirencester, was organized in 1842, and chartered in 1845; and its students, drawn mostly from the middle classes, have found homes in all parts of the British empire. With a view to the benefit of the general community, the Corn Laws were repealed in 1846, and the agricultural industry as a whole believed that its ruin was inevitable. But such was not the case.

(4.) The next period of temporary but severe depression (1849-52) began with the sudden drop in the price of wheat per quarter, from 54s. 8d. in 1846, 69s. 9d. in 1847, and 50s. 6d. in 1848, to 44s. 3d. in 1849. Next year, 1850, it reached 40s. 3d., and in 1851, 38s. 6d., the lowest point for a very long period. It was during this time that Caird afterwards Sir James Caird (d. 1892)—writing in the *Times*, advocated high farming, and made himself prominent as an agricultural authority.

(5.) The succeeding period of twenty-two years (1853-74) was one of great agricultural prosperity; but although the agriculture of the country reached a high state of excellence, it was not practised with the economy and progressive forethought which have been the leading characteristics of recent less prosperous times. The expenditure of government money on the draining of land as an estate improvement, prior to the relative amending Act of 1861, in a vast number of cases did not help matters, as the regulation depth of four feet was at least one foot too deep on heavy land, and expense was incurred and the property saddled with the burden without much or any practical advantage. The following figures, from the 'General Agricultural Returns,' show certain significant changes which took place during the last thirty years of the 19th century:—

	Arable Land.	Permanent Pasture.	Total under Crops and Grass.
	Ac.	Ac.	Ac.
1870	18,335,000	12,073,000	30,408,000
1900	15,707,000	16,729,000	32,437,000

The area of arable land decreased fully 2,600,000 acres, and there was a concurrent increase of over 4,600,000 acres of 'cultivated' permanent pasture.

The rage for the ploughing of land by steam tackle, with which the names of Fowler, Smith, and Fisken have been prominent as inventors, occurred during the prosperous period under notice, and subsided after a career of doubtful success. Steam had been employed as early as 1802 to drive threshing-machines, and was in very general use during the succeeding prosperous period among progressive farmers. Thirty years later it was adapted by Heathcoat and Chatworth to land reclamation, drainage, and cultivation; but its popularity and wide application were not to follow for another generation.

The era of steam-digging, associated with the names of Knight, Darby, Scott, and Proctor, dates from 1873; but it was not until 1898 that Darby, after spending about £100,000 on experiments, introduced his land-digger, which can be fitted to any farm engine.

The success of string-binding reapers dates from 1870. Among numerous early efforts to produce a reaping-machine, those of Smith, of the Deanston Cotton Works, Perthshire, in 1811, Henry Ogle, a Northumberland schoolmaster, 1822, and the Rev. Patrick Bell, 1828, were the most promising. Models of Smith's and Bell's machines are preserved in the agriculture section of the Industrial Museum, Edinburgh. Whether or not the United States of America has a right to claim the invention of the reaper, that country has the chief credit of bringing it to its present high state of perfection. M'Cormick's reaper, which first appeared in England at the great 1851 Exhibition, was much improved when, at the Paris Exhibition in 1855, it met the competition of machines produced by both British and French makers. At the Paris Exhibition in 1900, the M'Cormick Company demonstrated the successful adaptation of a petroleum engine to the work of harvesting, by the trials of one of the last novelties of the expiring century, the automower.

(6.) The last long period of agricultural depression, which bridged over the close of the 19th and the opening of the 20th century, began about 1875, soon after the demonetization of silver by Germany, and the abandonment of its free coinage by the Latin Union in 1873. This baneful influence, by decreasing the metallic basis of the world's currency, and thereby the volume of paper money that, *cæteris paribus*, it would carry, tended to lower the prices of commodities generally.

About the middle of the 'seventies began the steady shrinkage of the wheat-producing area of the country, which, as the following figures show, went on till the last year of the century:—

Quinquennial Periods.	Average Acreage.
1871-5	3,526,802
1876-80 . . .	3,036,519
1881-5	2,715,657
1886-90 . . .	2,400,631
1891-5	1,954,017
1896-1900 . .	1,906,269

A third adverse influence, a succession of bad seasons, brought the average of wheat in the United Kingdom for the decade beginning 1872 down to 25 bushels per acre, a decrease of 5·6 bushels on the average of the previous ten years. In 1879, the 'black year' in the history of British agriculture, the average went down to 16 bushels per acre, or only one bushel more than half the average yield of the former decade. The area of wheat was 3,047,000 acres, and the loss to the country was enormous. In this, the coldest year in the meteorological record, live stock also suffered. Owing to the excessive rainfall, there were vast losses among sheep from liver fluke, this parasitic disease extending to pastures which had never before been affected. As a result of the acute crisis, necessarily involving a great fall in agricultural rents, a royal commission of inquiry was appointed, with the Duke of Richmond and Gordon as chairman. The committee reported in 1882, and traced the calamity from which all interests connected with land were suffering to bad seasons and foreign competition. The commission ignored the importance of the great currency influence in lowering the agricultural industry, still the greatest in magnitude and importance, from the first to a second or third rank among the industrial enterprises of the country.

Agricultural capital became immensely reduced, and the incomes of both landlords and tenants curtailed, so that many became bankrupt. Much land has been laid down to pasture, as the margin of profit from cropping continued to shrink and to disappear, and many districts have gone back in fertility.

The Agricultural Holdings Acts of 1875 and 1883, the latter the fruit of the 1879 commission, failed to restore prosperity to agriculture; nor need it be anticipated that the Amendment Act of 1900, nor, in fact, any act relating specially to agriculture, will do much to remove the evils which began soon after 1873.

It was in 1880 that John Garton of Newton-le-Willows, Lancashire, initiated the Garton system of plant-breeding by carrying the work of cross-fertilization of crop plants and grasses past the first cross, the point where nature usually stops short of fertility. He demonstrated for the first time that the flowers of most species of crop plants, conspicuously the Gramineæ, are self-fertilizing, and that the sterile or inert condition which often follows when very divergent varieties, or what are regarded as distinct species, are crossed, can be overcome. This can be accomplished in one, or at times in two generations, by the application of the pollen of one of the original parents to the female organ of the flower of the first cross progeny.

Great advances have been made during the terminal quarter of the last century in the practice of agriculture and in the development of the live-stock industry. It is now the exception, not the rule, to find a breed of farm animals without a corresponding breeders' society and pedigree book. The first volume of the *Thoroughbred Stud Book* appeared in 1793, and of the *Shorthorn Herd Book* in 1822; but it was not till foreign and colonial customers for well-bred stock demonstrated the indispensable character of an accompanying pedigree that the means for public registration of other breeds became general. Cattle-breeders took the lead, closely followed by horse-breeders, pig-breeders, and flock-owners.

In England and Wales 'the gross assessment of lands under Schedule A for income tax for 1898-9 was £37,296,350, or £846,163 less than in the previous year.' For Scotland it was £5,967,345, or £78,033 less. 'Land' here excludes gardens and plots less than one acre in extent, but includes buildings and all landowners' property on the land. A rise in farm rents began in 1852-3, and they tended upwards until 1879-80. For several years, even after the prices of produce began to fall, farmers continued to take farms at high and impossible rents, in the mistaken belief that a period of prosperity was near at hand, and that the swing of the pendulum would be in their favour. The trend of values up and down is seen from the following figures:—

	England and Wales.	Scotland.
1879-80	£51,798,950	£7,769,303
1852-3	41,086,269	5,499,404
Increase up to 1879-80	£10,712,681	£2,269,899
Increase per cent .	26·1	41·3
1879-80	£51,798,950	£7,769,303
1898-9	37,296,350	5,967,345
Decrease up to 1898-9	£14,502,600	£1,801,958
Decrease per cent. .	28·2	23·2

The method of preserving green fodder known as ensilage had its period of attention, which was at its flow in the early eighties; and its position was focussed in a report by Jenkins, secretary of the Royal Agricultural Society, in the society's journal for 1884.

What is known as the 'rural exodus' became increasingly active towards the end of the 'seventies, a natural result of the decrease of employment in rural districts, but also in sympathy with a general movement taking place over a large section of the civilized world, tending to the depletion of the country population and to the accumulation of people in towns. Legislature has endeavoured to arrest the depopulation of rural districts by offering inducements to agricultural labourers to remain on the land.

The Board of Agriculture for Great Britain was created by Act of Parliament in 1889, and in the same year the first county councils were elected in England under the Local Government Act of 1888, Scotland following suit in 1890 under the corresponding Scottish statute of 1889. The Local Taxation (Customs and Excise) Act of 1890 provided funds which, subject to an anomalous first charge for the suppression of contagious diseases among live stock, are available at the discretion of the local authority for agricultural education; and in the Local Taxation Account (Scotland) Act of 1898, which was passed to place the Local Taxation Account of Scotland on the same footing as that of England as regards the supplementing of deficiencies created by the Agricultural Rates Acts, the claims of 'technical (including agricultural) education in Scotland' to participate in the further imperial grant which the act authorized receive recognition. The Board has confided to it the general supervision of agriculture in the United Kingdom, and by regulations which it issues under various statutes, by its experimental investigations, and by other means, controls and assists the agricultural industry.

The introduction of basic slag or Thomas's phosphate powder in 1883, after its value as a manure had been fully proved in Germany, opened a new era for the improvement of permanent pasture lands in Britain. On certain soils it confers no noticeable benefit; but where conditions are suitable, including most black-topped or peaty land, a dressing of 5 to 10 cwt. per acre encourages the growth of white clover in a remarkable way, and the general improvement of the pasture follows as a natural consequence.

The *bouilli Bordelaise* or Bordeaux mixture (24 lbs. sulphate of copper or blue vitriol and 12 lbs. of quicklime in 120 gals. of water per acre) came into use about 1890, for the protection of the potato crop against the ravages of the parasitic fungus *Phytophthora infestans*, by spraying the haulms and leaves, especially on the under surfaces. Experience has shown that if this be regularly practised in the first half of July and again early in August, in seasons when the disease appears, it is most successful, saving probably two tons per acre of good potatoes. There are virtually no results when there is no disease. The Strawson sprayer is one of the best-known implements used in applying the dressing, and 'strawsonite' is a convenient form of it—2 lbs. of powder going to 10 gals. of water. Ten years after the introduction of the Bordeaux mixture the Burgundy mixture came into favour. In it 30 lbs. of washing soda take the place of the 12 lbs. of quicklime. Farmers are slow to adopt the practice of spraying, and too often wait until the brown spots with white margins, characteristic of the disease, appear on the leaves. Then it is too late to save the crop.

The successful means of destroying charlock or wild mustard (*Sinapis arvensis*), when it is about 2 to 3 in. high, by spraying an acre of affected crop with 50 gals. of a 3 per cent. solution of sulphate of copper, did not come into general notice till 1898-1900. To make the work complete, a second dressing should be given two weeks later. The jointed charlock or wild radish (*Raphanus raphanistrum*), and the wild rape (*Brassica campestris*), with less hairy surfaces, are not destroyed like the wild mustard, which they closely resemble in general appearance. This has led to some confusion in the statements of the results of spraying experiments.

Towards the end of the 'eighties corn-growers fared badly, and their condition was only a presage of what was to come. The importation of hay—timothy from Canada, and lucerne (*alfalfa*) from the United States and Argentina—began to assume large proportions in 1893. The original difficulty of the bulk, especially when freights were high, has been overcome by means of the hydraulic press. The deepening agricultural distress, which was aggravated by the drought of 1893, led to the appointment of the 1893 royal commission, under the presidency of Shaw Lefevre, only fourteen years after the Duke of Richmond's commission. The report was issued in 1896, but no great discovery of the cause or method of alleviating the distress resulted.

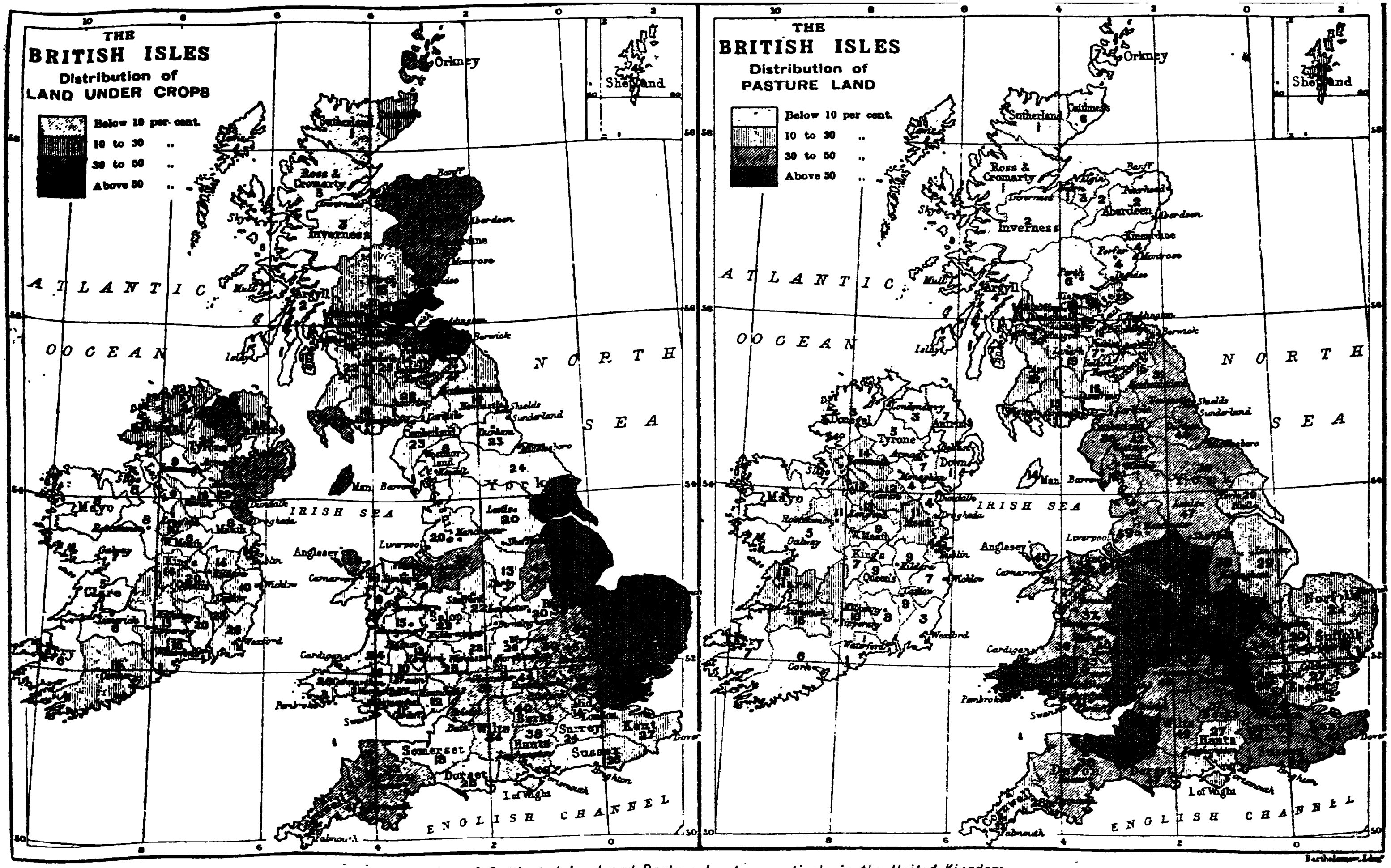
The last decade of the 19th century was fruitful of legislation which has directly or indirectly affected the agricultural interests. The Pleuro-pneumonia Act of 1890 has proved most effective in protecting flocks and herds from the ravages of this disease. The Tithe Act of 1891 transferred the liability for payment of this peculiarly English impost from the occupier to the owner of land. The Markets and Fairs (Weighing of Cattle) Acts, 1887 and 1891, bear fruit but slowly, although passed with the best intention to aid the farmer in the sale of his cattle against the more experienced dealer or butcher. The Act of 1891 provides for the return of market statistics to the Board of Agriculture. The Allotments Acts, 1887 and 1890, provide a system, which any six electors may set in motion, for the acquisition of land by the local authority for the purpose of letting it out in allotments which may extend to one acre, to persons belonging to the labouring population. The corresponding Scottish Act of 1892 follows the same general lines as the English statutes.

The Small Holdings Act, 1892, gave county councils power to acquire land with a view to providing small holdings for workmen who were desirous of employing their leisure time in small culture.

The Fertilizers and Feeding Stuffs Act, 1873, protects the purchaser of fertilizers and feeding stuffs by requiring, *inter alia*, their composition to be stated in the invoice, and directing that such statement shall have effect as a warranty.

The Chaff-Cutting Machines (Accidents) Act, 1897, provided for automatic protective means being employed in the construction of machines which were a fruitful source of accident on the farm. The Threshing-Machines Act of 1878 had a similar object in view. And now, with the extension in 1901 of the Workmen's Compensation Act to farm servants employed by persons who habitually employ one or more agricultural labourers, the position of farm labourers in regard to accidents occurring in the natural course of their duty leaves little to be desired. The Sale of Food and Drugs Acts, 1875-99, cover dairy produce and margarine.

The Diseases of Animals Act, 1896, is designed to prevent the importation of diseased animals into the United Kingdom, and in this way has done much to protect and encourage stock-breeders. One of the most important agricultural measures of recent times is the Agricultural Holdings Act of 1900, which amends the English and Scottish Acts of 1883.



Distribution of Cultivated Land and Pasture Land respectively in the United Kingdom.

The figures show the percentage in each county.

By the Merchandise Marks (Prosecution) Act, 1894, the Board of Agriculture may undertake prosecutions for the contravention of the Merchandise Marks Act of 1891 in cases relating to agricultural or horticultural produce; and British agriculture is in this way enabled to protect itself against injury through fraudulent misrepresentations of the place of origin of imported produce.

The four-course system of rotation of crops—*viz.* wheat or oats, roots, barley, clover—which at first did so much to advance British agriculture by providing food for winter as well as for summer for the fattening of live stock, to the end that fresh beef and mutton should be available all the year round, has practically broken down. This is mainly due to the increase of anbury, commonly called 'finger-and-toe,' in turnips, and to clover sickness, both of which conditions are aggravated by the frequent recurrence of these crops on the same land, and to the brewers' demand for barley of a better quality than can be grown after turnips. Although the leading principles of the old arrangement are maintained, it is extended in various ways to cover a greater period of time. The judicious use of concentrated mineral manures makes it possible to grow barley after wheat without incurring injurious consequences. Catch crops are thrown in either before or after the green crop, which add to the richness of the soil, and increase the food available for live stock.

For advances connected with machinery and tools we are primarily indebted to the American manufacturers, who, by enterprise and healthy competition, have encouraged our home manufacturers to advance with the times. The Oliver chilled ploughs, followed by British-made ploughs of a similar type, have, in spite of the early opposition of the ploughmen, superseded, in many districts where the soil is not too heavy for their successful employment, the iron ploughs with long and sweeping mould-board. Three short-boarded and short-stilted chilled ploughs do as much work as four of the iron ploughs, and accomplish a saving of two horses and one man in the set, or one-fourth of the expenditure on animal power and supervision. The steel spring-tined cultivator, which the Massey-Harris Co. of Canada did so much to introduce, but which in various forms is now made by the large English implement-makers, has revolutionized the working of fallow land in this country.

Certain crops have recently come into greater favour, in some cases through their intrinsic merits having been more widely recognized, and in others because of changes in systems of rotation or general farm management. Lucerne is extending on soils containing abundance of lime. Thousand-headed kale has grown much in favour with flock-masters for green winter and spring food, and field cabbages for autumn consumption. Mangels have been on the increase in all of the three kingdoms. Scotland, which is often too sunless for extensive mangel cultivation, now grows satisfactory crops in certain districts in bright and favourable seasons. The simultaneous shrinkage of the area under turnips and swedes is to some extent due to the increasing prevalence of anbury in these crops. The future of the turnip and swede crops is likely to be affected by a comparatively recent turnip disease, which has been traced by William Carruthers, for the Royal Agricultural Society, to bacteria which attack the plant injuriously about the crown of the bulb, or at its junction with the leaves, the upper parts of which also become puckered. During the wet and cloudy season of 1900 it injured a large area of the crop in the south of Scotland and north of England soon after hoeing, and in many cases a loss of one-third of the yield was sustained. The remainder, which overcame the attack towards the end of the growing season, proved to be inferior in feeding quality. The first serious outbreak was reported in 1897, but at a later stage of the growth of the plant. It is believed to have appeared sporadically, and to have been distributed at least ten years earlier by a consignment of bad seed. The Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland have each a scientific expert, who may be consulted by their members in cases of parasitic injury to crops.

The chief cause of anxiety to the agricultural industry during the closing years of the 19th and the opening years of the 20th century has been the unsettled condition of the labour market, with a rapidly-growing tendency to scarcity and incompetency of farm labour. This is the result of a combination of several influences. The enormous growth of the mining industry, the prosperity of trade in general, and the great development of the railway systems of the country, with associated higher remuneration for work, withdraw many of the young and energetic from rural employment, leaving the old men and the least competent of the younger generation to compete for the higher wages which, by the economic law of supply and demand, the rural exodus makes it possible for them to secure, in spite of the lower degree of efficiency. The great increase in the demand for women in domestic service, in factories, shops, post offices, etc., has depleted the country places of an important class of labour; and this emigration to the towns of the more capable and qualified young women has again reacted on the young and unmarried male population. From 1871 to 1881 there was a decrease of 5·3 per cent. of males, and 28·5 of females, working on the land; and from 1881 to 1891 the corresponding figures were 7·4 and 33·5 per cent. The cottage accommodation in the country has not kept pace with the progress of the requirements of the labouring classes, whose standard of living has risen very much in recent years, through the double influence of a general rise of wages and a concurrent increase in the purchasing power of money. See Stephen's *Book of the Farm* (1887); *American Encyclopædia of Agriculture* (1882), etc.

Agriculture, Board of, for Great Britain, a department of state established in its present form in 1889, though it had predecessors, the first of which was created in 1793. Its chief functions are the collection of statistics and other information relating to agriculture, horticulture, and forestry, the analysis of fertilizers and feeding stuffs, and the inspection and reporting on technical instruction in agricultural subjects. The powers and duties of the Privy Council under the Contagious Diseases (Animals) Acts, of the Land Commissioners (England) under the Tithe Acts, the Copyhold Acts, the Enclosure Acts, the Metropolitan Commons Acts, the Drainage and Improvement of Lands Acts, or under any other act, and the Commissioners of Works under the Survey Act, 1870, have been transferred to the Board. This department is responsible for orders for muzzling dogs to prevent rabies, and for the destruction of animals and the proclamation of districts in epidemics of pleuro-pneumonia and swine fever. Upon it depends the Ordnance Survey. In 1903 fisheries were also placed under its control. It consists of the Lord President of the Council, His Majesty's principal Secretaries of State, the First Commissioner of the Treasury, the Chancellor of the Exchequer, the Chancellor of the Duchy of Lancaster, and the Secretary for Scotland, together with other persons whom His Majesty may from time to time appoint during his pleasure. Offices, 4 Whitehall Place and 3 St. James's Square, S.W. The department issues an official journal quarterly, and annual returns of agricultural produce, etc.

Agricultural Gangs Act, 1867. This act, which does not apply to Scotland or to Ireland, defines an agricultural gang as a body of children (under 13), young persons (between 13 and 18), or women, under the control of a gangmaster, who hires them to work as agricultural labourers on land not in his own occupation. Every gangmaster must be licensed, under a penalty of 20s. a day, by a district council in a district, or by the council in a county borough, for six months only, on payment of a fee of 1s. and proof of good character. If the license is refused, there is an appeal to quarter sessions. Females may not be employed in the same gang with males, nor under a male gangmaster unless there is also a licensed female gangmaster. Fines are imposed for offences.

Agricultural Holdings Act. The Act of 1900 amends the English and Scottish Acts of 1883, and alters the common law by providing a simple, effectual code under which the outgoing tenant is entitled to compensation from his landlord for all improvements effected on the holding, and all outlays made which will benefit future holders, always providing that these improvements and outlays fall within the schedules of the act.

Agrigentum (Gr. *Akragas*), on the S. coast of Sicily, about 2½ m. from the sea. It was a colony of Gela—itself a colony of Rhodes—founded about 580 B.C. It attained great wealth and splendour, and contained several temples, including those to Jupiter and to Concordia; ruins of the former, one of the most magnificent in Sicily, still survive. Among its rulers were the tyrant Phalaris, and Theron (488-472). It was destroyed by the Carthaginians in 406 B.C. Timoleon rebuilt and recolonized it in 340, but it suffered again in the Punic wars, and from 210 B.C. was subject to Rome. Between 828 and 1086 it was in the hands of the Saracens. Noted as the birthplace of Empedocles. See GIRGENTI.

Agrimony, a general name for plants of the genus Agrimonia. *A. eupatoria*, the common agrimony, is a perennial herbaceous wayside plant, with an inflorescence about two feet high, bearing small yellow flowers and much-divided leaves. The underground stem yields a yellow dye.

Agrippa I. and II. See HEROD.

Agrippa, HEINRICH CORNELIUS, called also AGRIPPA VON NETTESHEIM (1486-1535), an eccentric German philosopher who professed alchemy and magic; author of *De Incertitudine et Vanitate Scientiarum* (1527) and *De Occulta Philosophia* (1531). See Henry Morley's *Life of C. Agrippa* (1856).

Agrippa, MARCUS VIPSANIUS (63-12 B.C.), a man of obscure family, but raised to the highest position by his friend Octavius, afterwards the Emperor Augustus. He married Julia, Augustus's daughter, and had by her five children, one of whom, Agrippina, became the wife of Germanicus. He pacified Gaul in 38 B.C.; beat Sextus Pompeius in the naval battle at Naulochos, Sicily; was in command of Octavian's naval forces at Actium. After Octavian became emperor he did much for the beautifying of Rome. Pacified afterwards the revolted provinces, Gaul, Spain, and Pannonia. He was also a great patron of arts, literature, and science.

Agrippa, MENENIUS, Roman consul (B.C. 502), conqueror of the Sabines and Samnites, reputed author of the fable of the *Stomach and the Members* (see Shakespeare's *Coriolanus*). He obtained certain modifications of the laws in favour of the *plebs*, and died in poverty after a life of public service (Livy, ii. 16, 32, 33).

Agrippina, THE ELDER, daughter of M. Vipsanius Agrippa and Julia, daughter of Augustus; wife of Germanicus, and mother of Caligula and the younger Agrippina. She was renowned for her noble character. Exiled by Tiberius to the island of Pandataria, she died there in 33 A.D. from starvation. Her statue in the Capitol Museum of Rome is one of the masterpieces of Roman sculpture.

Agrippina, THE YOUNGER, daughter of the above and Germanicus; married first to C. Domitius Ahenobarbus, by whom she had a son, afterwards the Emperor Nero, and then to the Emperor Claudius, whom she persuaded to adopt her son Nero, to the injury of his own son Britannicus, in 54 A.D. She had the emperor poisoned, and Nero succeeded to the throne. But he, to rid himself of her influence, caused her to be murdered in 59 A.D. See Merivale's *Romans under the Empire* (1859-62), and Baring-Gould's *Tragedy of the Cæsars* (1892).

Agro Romano, the territory subject administratively to the municipality of Rome, lies on both sides of the Tiber, and along the Mediterranean from the Alban to the Sabine Hills. It consists of pasturage (from October to May), scrub and forest (oak, elm, ash, beech, maple), arable land, vineyards, and marshes. In summer the district is extremely unhealthy, being one of the worst malaria-infected regions of Italy; and it was, and is, a menace to the health of the capital. Hence in 1878 and 1883, and subsequently, the Italian government has legislated for the purpose of compelling the owners to drain and till the soil. These measures have been attended with considerable success; and malaria is being further combated by the planting of eucalyptus trees, and by supplying the inhabitants with wire nets for doorways and windows, to keep out the mosquitoes. The percentage of people suffering from malaria in 1888 was 21·46 per cent.; in 1899 it was 6·22 per cent. See CAMPAGNA.

Aguada, tn., Porto Rico, near Bay of Aguadilla, 5 m. S.E. by S. of that town; said to have been the first landing-place of Columbus in 1493. Pop. (1899) 6,500.

Aguado, ALEXANDRE MARIE (1784-1842), a wealthy Parisian banker of Jewish origin, native of Seville; served with Soult in the Spanish war of Independence. His business, founded 1815, soon rose to the first rank, and he negotiated several Spanish loans and the Greek loan of 1834. Ferdinand VII. created him Marques de las Marismas del Guadalquivir. He died worth over £2,500,000.

Aguardiente ('burning water'), a Spanish brandy.

Aguas Calientes ('warm waters'). (1.) State, Anahuac plateau, Mexico; mountainous in W., with wide plains in E., on which grow wheat, barley, beans, etc. It produces also good building-stones and precious metals. Pop. (1900) 101,910. (2.) Town, Mexico, cap. of state Aguas Calientes, 270 m. N.W. of Mexico city; alt. 6,400 ft.; has many churches, convents, and a hospital; is surrounded by fruit gardens. In the vicinity are warm springs. Pop. (1900) 30,052. (3.) Town and ry. stn., Peru, 27 m. from Arequipa; alt. 9,737 ft.; with warm sulphur springs.

Ague. See MALARIA.

Aguesseau, HENRI FRANÇOIS D' (1668-1751), chancellor of France; born at Limoges; became advocate-general in 1690, and procurator-general in 1700. During the regency of the Duke of Orleans he was made chancellor of France, but fell into disgrace in 1718 by opposing Law's system of finance. Reinstated in 1720, he was again dismissed in 1722, and was not restored till 1737. He resigned office in 1750. Aguesseau was one of the most learned of French statesmen. His works were published (13 vols. 1759-89, 2 vols. 1865). See *Lives* by Boullée (1849) and Monier (1864).

Aguilar, GRACE (1816-47), author, born of Jewish parents in Hackney, London; published *Spirit of Judaism* (1841), *Women of Israel* (1845), *The Jewish Faith* (1846). After her death appeared also her *Home Influence* (1847), *A Mother's Recompense* (1850), and *The Vale of Cedars* (1850).

Aguilar de la Frontera, tn., Andalusia, Spain, 22 m. S.S.E. of Cordova, on the Cabra; has a dismantled Moorish castle. Pop. (1900) 13,311.

Aguilas, tn., prov. Murcia, Spain, 38 m. s.w. of Cartagena, on railway from Murcia to Granada; a busy port and bathing resort on Mediterranean; silver-lead mining and esparto production. Pop. (1900) 15,868.

Aguilera, VENTURA RUIZ (1820-81), Spanish poet, lived an active life at Madrid, filling several posts under the progressive governments, and carrying on journalistic work. He was ultimately placed at the head of the museum of antiquities. His poetical works include *Ecos nacionales; Elegias* (1862); the collections entitled *Armonias y Cantares* (1865); *El Libro de la Patria* (1869); *La Arcadia Moderna;* and *Leyenda de Noche-Buena* (1872). A complete edition appeared in 1873.

Aguinaldo, EMILIO (1870), Filipino patriot, fought against the Spaniards as leader of the Filipinos, latterly as ally of the Americans in their war with Spain. But the announcement (Nov. 1, 1898) by the Americans that they intended to annex the Philippine Islands, and their subsequent purchase of the archipelago from Spain (Dec. 10, 1898), led to a rupture between the allies, and a war of subjugation on the part of the United States. On Mar. 28, 1901, Aguinaldo and his entire staff were captured by the Americans, and on April 2 he took the oath of allegiance to them at Manila.

Agulhas, CAPE, or 'The Needles,' so named by the Portuguese on account of its sharp, jagged rocks, is the southernmost point of Africa; it is noted for its storms. A lighthouse stands on the cape.—AGULHAS BANK extends eastward from the cape to the mouth of the Great Fish R., a distance of 550 m.

Agur, a Hebrew sage, to whom is attributed the collection of wise sayings in Prov. 30. See PROVERBS.

Agustina (d. 1857), the Maid of Saragossa, who encouraged the Spaniards to maintain the defence of Saragossa against the French during the sieges of 1808-9. See Byron's *Childe Harold*, i. 54-56; and Southey's *Hist. of Peninsular War*. Her portrait was painted by Wilkie.

A.H. (*anno Hegiræ*, *i.e.* 'in the year of Hegira;' more correctly, *Hijra*), the recognized symbol for the Moslem era, as A.D. is for the Christian era. Mohammedanism is taken as dating from Mohammed's flight (*Hijra*) to Medina (see MOHAMMED), which took place in A.D. 622.

Ahab, king of Israel (875-853 B.C.), was the son and successor of Omri, and the contemporary and ally of Jehoshaphat, king of Judah. A man of undoubted patriotism and courage, Ahab joined these virtues to an unfortunate moral indifference or weakness. His marriage with Jezebel, daughter of Ethbaal, king of Tyre, cemented an alliance designed to act as a countercheck to the ambition of Benhadad II., king of Syria; but it fixed the worship of Baal upon Israel, and so brought the king into conflict with the prophet Elijah. Twice Ahab discomfited the Syrians, but in a third battle, at Ramoth-gilead, he was mortally wounded by a random arrow (1 Kings 16:29-33; 22:34-40). See Kittel's *Hist. of the Hebrews*, ii. 214 *ff.*

Ahasuerus. (1.) A king of Persia, prominent in the Book of Esther, whom he made his queen; identified with Xerxes. The Ahasuerus of Dan. 9:1 cannot be identified, as no Ahasuerus (or similar name) appears in the list of Median kings. See Sayce's *Higher Criticism and the Monuments* (1894). (2.) The name of the Wandering Jew.

Ahaz, king of Judah (*c.* 735-719 B.C.), the *Jauhazi* of the inscriptions, was the son and successor of Jotham. Being threatened by Rezin, king of Syria, and Pekah, king of Israel, he sought the protection of Assyria—an act denounced by Isaiah—and ultimately became tributary to that power. (See 2 Kings 16; Isa. 7.)

Ahaziah. (1.) King of Israel (*c.* 853-852 B.C.), the son and successor of Ahab. He died in consequence of a fall from an upper window. (See 1 Kings 22:40-2 Kings 1.) (2.) King of Judah (*c.* 843-842 B.C.), the son of Jehoram (of Judah) and Athaliah, and thus the nephew of the foregoing. In alliance with Jehoram (of Israel) he made an unsuccessful expedition against Hazael of Damascus; and afterwards, while Ahaziah was on a visit to his wounded kinsman at Jezreel, an insurrection broke out under Jehu, in which Jehoram was killed and Ahaziah mortally wounded. (See 2 Kings 8:25-9; 2 Chron. 22:9.)

Ahimelech, high priest of Israel, who at Nob fed David with the shewbread, and gave him the sword of Goliath (1 Sam. 21:1-10).

Ahithophel, a Gilonite, one of King David's ablest and most trusted counsellors, who nevertheless joined the revolt of Absalom. When a proposal which he had made for the procuring of David's death was rejected on the advice of Hushai, he rode home to Giloh and strangled himself. (2 Sam. 15-17.)

Ahlqvist, AUGUST ENGELBERT (1826-89), professor of Finnish language and literature at Helsingfors (1863); published works on the languages of the Wotjaks, Mordvins, and W. Finnish dialects; wrote on the structure of the Finnish language (1877), an inquiry into the origin of the Kalewala (1887), an account of his travels, and a volume of poetry.

Ahlwardt, THEODOR WILHELM (1828), Orientalist; born at Greifswald; became professor of Oriental languages there in 1861. His works, chiefly on ancient Arabic poetry and Saracen history, are: *Ueber Poesie und Poetik der Araber* (1856); *Diwan des Abu-Nowas* (1861); *Divans of the Six Ancient Arabic Poets* (1870); *Bemerkungen über die Echtheit der altarabischen Gedichte* (1872); *Anonyme arabische Chronik* (1883); and a Catalogue of Arabic MSS., Royal Library, Berlin (1887-99).

Ahmed I., or ACHMET, Sultan of Turkey (1589-1617), son of Mohammed III., whom he succeeded in 1603. In 1606 he concluded the peace of Sitvatorok with Austria, and in 1612 terminated an unsuccessful war with Persia.

Ahmed II., or ACHMET (1642-95), Sultan of Turkey, succeeded his brother Solyman II. in 1691. His forces, led by Kiuprili, were expelled from Hungary after their crushing defeat at Salankeman in 1691, when Kiuprili was slain.

Ahmed III., or ACHMET (1673-1736), Sultan of Turkey, a brother of Mustapha II., whom he succeeded. His campaign against Russia was concluded by the peace of the Pruth (1711). He regained the Morea from the Venetians in 1715, but was defeated by the Austrians at Peterwardein in 1716, and at Belgrade in 1717. His ineptitude as a ruler led to his dethronement in 1730.

Ahmed IV. See ABDUL HAMID I.

Ahmedabad, or AHMADABAD, an ancient city of India, Presidency of Bombay, on the Sabarmati R., 310 m. N. of Bombay. It was founded in 1412, and was long a splendid city of the Mogul empire, but has now fallen into utter decay. The British, under General Goddard, stormed the city in 1780; but it continued in the possession of the Mahrattas till 1818, when it was ceded to the East India Company. The great earthquake of 1819 destroyed a large part of the city and some of its finest edifices. Its architectural remains, however, are even now splendid, and often exhibit striking combinations of Jain and Saracenic characteristics. The most important buildings are the Jama Masjid, or Great Mosque (1824), remarkable for its wonderfully decorated minarets; and the Ivory Mosque, so called because, though a white marble structure, it is lined with ivory inlaid with gems. There is also a very beautiful modern Jain temple. The manufactures include gold-brocaded silks, pottery, paper, tin, electro-plating, cotton spinning, and weaving. It is the centre of Gujarat missions, and has many schools, both government and missionary, including a female training college—a state institution. There is a military cantonment, approached by a magnificent avenue of trees, 3¼ m. to the N. Pop. (1901) 185,889; of district (1901) 795,967.

Ahmednagar, or AHMADNAGAR. **(1.)** District, Deccan, Presidency of Bombay. Area, 6,647 sq. m. Spurs from the Sahyadri Hills, which bound it on the W., run into the district. Wheat, Indian millet, and grain are its chief agricultural products. Pop. (1901) 837,695. **(2.)** The cap. of the district, on l. bk. of the Sina (Seena), and about 126 m. E. of Bombay. The fort stands about half a mile to the E. of the city. The chief manufactures are the weaving of saris (women's dresses) and carpets, and the making of copper and brass vessels. Pop. (1901) 42,032.

Ahmedpur, or AHMADPUR, tn., W. India, native state of Bahawalpur, 36 m. W.S.W. of town of the same name; manufactures of matchlocks, gunpowder, cotton, and silks. Pop. (1901) 9,928.

Ahmed Shah (c. 1724-73), founder of the Afghan or Durani dynasty, was the son of Sammaun Khan, hereditary chief of the Abdali tribe. On the assassination (1747) of Nadir Shah, in whose bodyguard he had served, Ahmed retreated to Afghanistan, where he was chosen sovereign, and was crowned at Kandahar the same year.

Ahn, JOHANN FRANZ (1796-1865), educationist, was born at Aachen. His chief work, *Praktischer Lehrgang zur schnellen und leichten Erlernung der französischen Sprache* (1834 and 1840), was published in over two hundred editions, and was followed by similar text-books in English, Dutch, and Italian. He advocated a natural method of language teaching.

Ahriman, or ARIMANES, known to the general reader by the splendid invocation chanted by Saladin in Scott's *Talisman*, was the supreme evil spirit of the ancient Persian religion (Zoroastrianism). Coeval with Ormuzd, the Supreme Good, with whom he was ever in conflict, this 'Dark Spirit' inevitably suggests the Jewish Satan. The *Zendavesta* makes him the creator of all poisonous snakes, beasts of prey, obnoxious parasites, etc. See J. Darmesteter's *Ormazd et Ahriman* (1877).

Ahwaz, AHWUZ, or AHWAS, vil., prov. Khuzistan, Persia, 70 m. N.E. of Bassora; notable for its ruins of the capital of Artabanus, last king of Parthia.

Ai, also HAI, AIJA, AIATH, a Canaanite royal city, situated to the E. of Bethel. It is mentioned in connection with Abraham (Gen. 12:8), but is remembered chiefly by its capture and destruction by Joshua, after the severe reverse of the Israelites on account of the sin of Achan (Josh. 7:2 8:29). The site of Ai is probably marked by the modern Haiyan.

A.I.A., the abbreviation used to denote Associate of the Institute of Actuaries.

Aicard, JEAN FRANÇOIS VICTOR, French poet (1848), has published several volumes of verse—*e.g.* *Les Poèmes de Provence* (1874); *La Chanson de l'Enfant* (1876); *Miette et Noré* (1880), an idyll of Provence; *Lamartine* (1883); and *Jésus* (1896). He has also written novels, as *Le Roi de la Camargue* (1891), *L'Âme d'un Enfant* (1898), and *Tata* (1901). His dramatic works comprise *Au Clair de la Lune* (1870); *Othello, ou le More de Venise* (1882); and *Le Père Lebonnard* (1889).

Aidan (d. 606), king of the Scottish Dalriada (the modern Argyllshire), a Gaelic kingdom, founded in the 5th century by Fergus Môr. Crowned by St. Columba at Iona, he completed the separation of the Scottish Dalriada from the parent kingdom in Ireland, and in 588 conquered the Isle of Man. Aidan attempted to extend his kingdom southward by attacking Ethelfrith, king of Bernicia, but met with defeat (603). See Skene's *Celtic Scotland* (3 vols. 2nd ed. 1886-90), and his *Chronicles of the Picts and Scots* (1867).

Aidan, ST. (d. 651), a Columban monk of Iona, where he was consecrated bishop about 635, in which year he began his work of Christianizing Northumbria, in response to the invitation of Oswald, king of Bernicia. Fixing his see at Lindisfarne (the Holy Isle), Aidan founded there the church afterwards associated with St. Cuthbert. King Oswy, brother and successor of Oswald, continued to act as Aidan's patron until the latter's death. Bede testifies to the piety, humility, and fervour of this apostle of Northumbria. See Bede's *Ecclesiastical History;* M'Lauchlan's *Early Scottish Church* (1865).

Aïdé, CHARLES HAMILTON (b. 1830), English novelist; served from 1845-52 in the army. Among his works are *Eleonore, and other Poems* (1856); *Songs without Music* (1882). His novels and romances include *Rita* (1859); *Penruddocke* (1873); *Poet and Peer* (1880); *Jane Treachel* (1899); *Snares of the World* (1901). He is the author of the well-known songs *Remember or Forget* and *The Danube River.*

Aide-de-camp (Fr. 'an assistant of the camp')—now frequently Anglicized as aid-de-camp—an officer attendant on a general, primarily to carry his orders to commanders in the field, but also to act as his secretary, superintend his establishment, and generally facilitate his business and social engagements. An aide-de-camp may be of any rank, but it is rare that officers above the rank of captain are appointed. Officers who have not passed the final examination of the Staff College must have qualified for promotion to the rank of captain. General officers have three aides-de-camp, a major-general one, a lieutenant-general two, while four are appointed to the officer commanding in chief on the field. The sovereign, in his capacity as head of the army, appoints numerous aides-de-camp, some from the navy and militia, and others from the army—the latter usually being officers of distinguished war service, who are granted, if not otherwise possessing it, the rank of colonel in the army.

Aidin, vilayet (area, 19,960 sq. m.; pop. 1,397,000) and tn. (*Guzel-Hissar*), Asia Minor, in the valley of the Menderez, 55 m. S.E. of Smyrna. Morocco leather, cotton, figs, olives, and grapes are exported. Pop. 36,000.

Aids. Under the feudal system a vassal was obliged to grant a sum of money, called 'an aid,' to enable his lord to pay a relief to his overlord, to knight his eldest son or marry his eldest daughter. The king, in addition to the two last-mentioned aids, could claim one to ransom his person from captivity. Aids were restricted by *Magna Charta*, and abolished in 1660. See Digby's *History of the Law of Real Property.*

Aigle (Ger. *Aelen*), tn., Switzerland, canton Vaud, 6¼ m. from the S. end of the Lake of Geneva. Pop. (1900) 3,911.

Aiguesmortes, or AIGUES-MORTES ('dead waters'), tn., dep. Gard, France, 18 m. S. of Nîmes, and on extreme W. of the Rhone delta. Its ramparts, constructed about 1280 by Boccanegra, are well preserved. Pop. (1901) 4,511.

Aigun, AIKHUN, or SAKHALIN ULA, tn., Manchuria, on river Amur. Pop. 20 000.

Aikawa, tn., Japan, prov. and island of Sado, 40 m. from Niigata. Gold and silver mines are in the vicinity. Pop. 15,500.

Aikenhead, THOMAS (c. 1678-97), an Edinburgh apothecary's son, who was hanged for blasphemy and heterodox opinions. His execution was strongly condemned, among others, by John Locke. See Macaulay's *History;* and for Locke's letter to the king, *State Trials*, vol. xiii. pp. 917-39.

Aikin, JOHN (1747-1822), physician and author, was educated at Warrington Academy—'the cradle of Unitarianism,' of which his father was a tutor—in Edinburgh, and in London. He had little professional success at Great Yarmouth, but afterwards did well in London (1792). He wrote *Lives* of Howard, Selden, and Usher; *General Biography* (1799-1815); and, with his sister, Mrs. Barbauld, *Evenings at Home* (1792-5).

Aikin, LUCY (1781-1864), daughter of the above, author of a *Life of Addison* (1843), on which Macaulay has an essay; and of memoirs of the courts of Elizabeth (1818), James I. (1822), and Charles I. (1833). See *Lucy Aikin: Memoirs, Miscellanies, and Letters*, ed. by Le Breton (1864).

Ailanthus, a small genus of plants of the natural order Simarubaceæ (the Quassia order). Three species occur in China and the E. Indies; one, *A. glandulosa*, 'the tree of heaven,' introduced from China in 1751, is cultivated as an ornamental tree. Its leaves form the food of a kind of silkworm.

Ailly, PIERRE D' (1350-1419), theologian, philosopher, and prelate, born at Compiègne, France. He became cardinal, and Pope's legate in Germany and at Avignon. A determined opponent of Huss, he was designated 'The Hammer of the Heretics.'

Ailsa Craig, a rocky islet of gray trap, rising to 1,114 ft. in the Firth of Clyde, 10 m. W. of Girvan. The island gives the title of baron and marquis to the earls of Cassilis.

Aimak, a Mongol tribe which, with the Hazara, occupies the N.E. of Afghanistan, between Herat and Kabul. They number about 650,000 with the Hazara, and are an agricultural and warlike people.

Aimard, GUSTAVE (1818-83), French novelist. Of his many novels of adventure, *Les Trappeurs de l'Arkansas* (1858), *Les Pirates de la Prairie* (1859), *Les Scalpeurs Blancs* (1873), are the best known.

Ain, dep. of E. France, limited E. and S. by the Rhone, W. by the Saône; Bourg, cap. of dep., is 227 m. S.E. of Paris. Area of dep., 2,239 sq. m. The river Ain, which rises in the Jura Mountains, and after a course of 120 m. falls into the Rhone 18 m. above Lyons, divides it into two nearly equal parts. The dep. is agricultural and pastoral. Pop. (1901) 350,716.

Ainger, CANON ALFRED (1837-1904), Master of the Temple since 1894; curate of Alrewas, Lichfield (1860-4). He published *Sermons Preached in the Temple Church*, *Memoir of Charles Lamb*, and (Eng. Men of Letters) an edition of Lamb's works, and the volume on *Crabbe* in Eng. Men of Letters Series (1903). He contributed to the *Dict. Nat. Biog.* (Tennyson, Du Maurier, etc.). See *Athenæum*, Feb. 13, 1904.

Ainhum, a disease, afflicting only African peoples and their descendants, in which the little toe is gradually cut off by a tightening band of hard skin. It is of the nature of a local scleroderma.

Ainmiller, or AINMULLER, MAX EMANUEL (1807-70), reviver of the art of glass-staining; a native of Munich. The new windows in Ratisbon cathedral, and others at Munich, Cologne, and in St. Paul's, London, are by him.

Aïnos, or AÏNU (signifying 'men'), the name given to themselves by a primitive people inhabiting Yezo, the S. parts of Sakhalin, and the Kurile Is. as far as 48° N. lat. In former times they also occupied a large territory in Hondo, the main island of Japan, where, indeed, their mixed descendants form part of the present population. European in type, and aptly compared to the Russian *moujiks*, their most striking physical characteristic is their excessive hairiness of skin. Against the encroachments of the Japanese—to whom they are known as Ebisu, Yebisu, or Yemishi—they made a most obstinate resistance during a period of fully one thousand years.

The Great Annual Bear Feast of the Aïnos of Japan.

The Aïnos are polygamous, and live in huts, under their own chiefs. They are a race of hunters and fishers, dressed variously in furs, fish-skins, woven bark, and cloth garments adopted from the Japanese. Sometimes they dispense with clothes altogether. They are Shamans, and worship the sky, earth, fire, wind, and water, and in their worship employ idols or *inao* made of willow shavings. The great annual bear feast is also, in some sense, a religious ceremony; and then, and at every opportunity, they intoxicate themselves with rice beer. They are afflicted with various skin diseases, the result of their dirty habits. They have affinities in speech and blood with the people of Kamchatka and the Amur district. The number of true Aïnos does not probably exceed 12,000 (another account gave them as 17,500 in 1896). Nearly all the scientific works on the Aïnos are included by Von Wenckstern in his *Bibliography of Japan* (1895); and see also Baelz, in *Verh. d. Berliner Gesellsch. f. Anthropologie* (1901). The fullest English accounts are Romyn Hitchcock's *Aïnos of Yezo* (Smithsonian Institution Report for 1890), and MacRitchie's *Aïnos* (1892). Savage Landor's *Alone with the Hairy Aïnu* (1893) is very instructive, as, in a less degree, is Bird's (Bishop's) *Unbeaten Tracts in Japan* (1880).

Ainsworth, HENRY (1571-1622), forced to leave his native country (England) in 1593, became pastor of Brownist congregation at Amsterdam, and a leading Orientalist; left many controversial and other works. See Dexter's *Congregationalism of the last Three Hundred Years* (1880).

Ainsworth, WILLIAM HARRISON (1805-82), historical novelist, born at Manchester; in 1826 abandoned law, married a publisher's daughter, and for a year and a half followed his father-in-law's occupation. His first novel was *Rookwood* (1834), containing a spirited account of Dick Turpin's ride to York. Between 1834 and 1881 he wrote some forty novels, a few of them appearing originally in *Bentley's Miscellany*, *Ainsworth's Magazine*, and the *New Monthly*, during his editorship of these periodicals. His work is vivid and readable, and, notably in *Crichton* (1837), *Jack Sheppard* (1839), *Tower of London* (1840), *Old St. Paul's* (1841), and *Lancashire Witches* (1841), shows some literary merit.

Ainsworth, WILLIAM FRANCIS (1807-96), geographer, was born at Exeter. In 1835 he was appointed surgeon and geologist to the Chesney expedition to the Euphrates, and in 1838 was in command of an expedition to Asia Minor and Kurdistan. He published *Researches in Assyria, Babylonia, and Chaldæa* (1838); *Travels and Researches in Asia Minor, Mesopotamia, Chaldæa, and Armenia* (2 vols. 1842); *Illustrated Universal Gazetteer* (1863); *A Personal Narrative of the Euphrates Expedition* (1888), etc.

Ain-Tab, tn., Turkey in Asia, on the S. slope of Mt. Taurus, 60 m. N.N.E. of Aleppo, on the reputed site of the ancient *Antiochia ad Taurum.* There are manufactures of leather and a trade in hides; numerous vineyards. Pop. 40,000.

Air. See ATMOSPHERE. In Music, see ARIA.

Air, or ASBEN (21,000 sq. m.), an oasis of Central Sahara, in lat. 16°-20° N. and long. 6°-9° E. Its mountains (4,000 to 5,000 ft.) have a beneficial effect on rainfall. The climate is healthy; date-palms grow in the valleys. Pop. 60,000, mainly of Tuareg tribes. The cap. is Agades or Agadez. The town of Asben, in the S., is an important caravan centre between Central and N. Africa, fifty days from Tripoli.

Aira. See HAIR-GRASS.

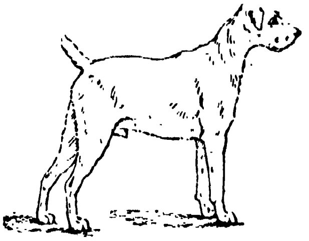
Air-bladder, or SWIM-BLADDER, a structure of much morphological interest, present in most, though not all, fishes. Like the lungs of air-breathing vertebrates, it arises as an outgrowth from the alimentary canal, and may either retain this connection throughout life, as in the herring, or become entirely shut off from the gut, as in the haddock. In the Dipnoi it functions as a lung; in other fish its function is hydrostatic, though it may also serve as an accessory organ of respiration. There is often a connection between the ear and the swim-bladder. Though the air-bladder arises dorsally instead of ventrally, and is usually single, it is entirely homologous with the lungs of the higher vertebrates.

Aird, riv. on S. coast of British New Guinea, one of the mouths of the river Philp. Owing to a bar at the mouth it is not navigable.

Airdrie, a parl. and munic. bur. of Lanarkshire, Scotland, 11 m. E. of Glasgow. It was made one of the five Falkirk burghs in 1832. In the neighbourhood are over forty collieries, as well as iron mines. The town owes its importance to its brass and iron foundries, engineering works, fire-clay factories, paper and soft goods manufactures. Pop. (1901) 22,288.

Airedale, in the W. Riding of Yorkshire, comprises the upper valley of the Aire from its source in Malham Cove to Leeds, a length of about 35 m. Factories and ironworks have sprung up along its banks. See Nicholson ('the Airedale poet'), *Airedale in Ancient Times* (1825).

Airedale Terrier. There are nearly twenty varieties in Britain, but they may be classified in two divisions—the smooth and the rough or broken-haired, the latter being of Scotch descent, developed in some instances by crossing with the Maltese. The Airedale terrier is the largest and tallest of the terriers, and weighs from 40 to 45 lbs. He will retrieve, and takes readily to water. Points:—Head long, with flat skull, not too broad between the ears, and narrowing slightly to eyes, but free from wrinkle; stop hardly visible, and cheeks free from fullness; jaw deep and powerful, well filled up under the eyes; lips tight; ears shaped like the letter V, with a side carriage, small, but not out of proportion to the size of the dog; nose black; eyes small, dark in colour, and full of 'terrier' expression; teeth strong and level; neck of moderate length and thickness, gradually widening towards the shoulders, and free from 'throatiness;' shoulders long, and sloping well into the back; shoulder-blades flat; chest deep, but not broad; back short, strong, and straight; ribs well sprung; hind quarters strong and muscular, with no drop; hocks well let down; tail set on high and carried gaily, but not curled; legs perfectly straight, with plenty of bone; feet small and round, with good depth of pad; coat hard and wiry, not ragged, lying straight and close; head and ears should be tan, with the exception of dark shadings on each side of the skull; the legs, up to the elbows and thighs, tan, and the rest of the body black or dark grizzle. The tail should be docked to about a third of its original length.



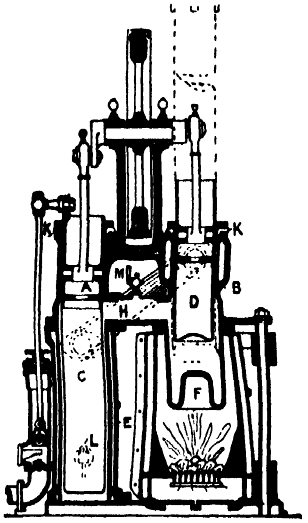
Rough Airedale Terrier.

Air-engines. In engines of this type, generally single-acting, the motive power is obtained by the alternate heating and cooling of a quantity of air within a closed vessel, part of which may form the motor cylinder. The expansion of the air drives a piston, which does the work, as in an ordinary steam-engine. In an air-engine it is possible to use very high temperatures without being inconvenienced by correspondingly high pressures; in this respect air differs from steam and other saturated vapours. An air-engine should therefore have a high thermal efficiency; but in practice the actual efficiency is in most cases less than in an ordinary steam-engine. An air-engine, with one or two exceptions, may be termed an *external-combustion* engine, since, like the steam-engine, it receives its heat by conduction from an external source. On the other hand, in gas and oil engines the heat is evolved within a closed cylinder containing the working substance: engines belonging to this latter class are called *internal-combustion* engines. In an external-combustion engine there must necessarily be a considerable loss of heat between the furnace and the working fluid; consequently the actual thermal efficiency of such engines is very low.

Most air-engines work with very low pressures, and are therefore bulky for the power they develop. Difficulty is also experienced in heating satisfactorily large quantities of air; and, in addition, that part of the air-vessel which is in immediate contact with the furnace is rapidly burnt away, on account of the high temperature to which it is subjected. Air-engines are seldom suitable to replace steam, gas, or oil engines, except for very small powers; but, at the same time, they are absolutely safe, easy to work, and do not require skilled or constant attention. Small-power air-engines are very suitable for pumping purposes in connection with the supply of water to country mansions, hotels, etc. Almost any form of cheap fuel may be used, such as coke, coal, peat, wood, sawdust, etc., and the cost of raising water is thus comparatively small.

The earliest hot-air engine was invented by Sir George Cayley in 1807, afterwards improved and modernized by Buckett. This engine is practically on the internal-combustion principle, as the coal or coke is burnt under pressure in a chamber which communicates through a valve-controlled passage with the motor cylinder, so that both the products of combustion from the furnace and the heated air come into contact with the working piston. Air for combustion is supplied by a compressing pump placed immediately over the motor cylinder, and worked from the same piston rod. The admission of the compressed air to the furnace is controlled by a valve, which allows part of the air to enter below the furnace bars, while the rest of the air mixes with the products of combustion as they come from the fuel; the proportion which goes to each is regulated by a governor through the above-mentioned valve. The products of combustion, together with the heated air, pass into the motor cylinder, the supply being stopped after a fraction of the stroke has been made. The gases then expand, doing more work, and are reduced in temperature. On the return stroke they are discharged into the atmosphere, and the pump takes in a fresh supply of air. The fuel is contained in a closed hopper over the furnace, and connected therewith by means of a double valve. Before the latter is lowered to admit fresh fuel to the furnace, the pressure in the hopper is equalized by making communication with the furnace chamber; the valve is then lowered, and the fuel falls into the furnace. The mechanical efficiency is low, and the actual thermal efficiency in the best cases is not more than eight per cent.

Of the true external-combustion engine, that invented by Robert Stirling of Edinburgh in 1827, and afterwards improved by his brother, James Stirling, is no doubt the pioneer. Although in its original form the Stirling engine is obsolete, it is represented in principle by several modern engines which work with more or less success. A very successful type of hot-air engine, in which the Stirling principle is carried out, is the 'Rider' engine, made by Messrs. Hayward-Tyler and Co. A sectional view of this engine is here shown. There are two cylinders, A and B, open at the top, and fitted with plunger pistons, C and D, which are connected to cranks nearly at right angles. The two cylinders are connected by means of a passage H, filled with very thin iron plates, and called a 'regenerator.' The heated air, in passing through the regenerator, gives up the greater portion of its heat to the iron plates, to be picked up and utilized on the return of the air through the heater. The same air is used continuously, and is passed alternately from one cylinder to the other. The piston C first compresses the cool air in the cylinder A into about one-third of its normal volume, when, on the up-stroke of the power piston D, and the completion of the down-stroke of the piston C, the air is transferred from the cylinder A, through the regenerator H, to the heater F, without appreciable change of volume. The result is a considerable increase of pressure corresponding to the increase of temperature, and the power piston is impelled to the end of its stroke. As shown in the figure, D is rising, and C is just beginning to rise; the pressure in B reacts on C, and forces the latter upwards till it reaches nearly to the top of its stroke. In the meantime the air is passing rapidly through the regenerator from B to A, giving up its heat, and is further cooled by means of a water-jacket E, through which water is constantly circulating. By this cooling of the air the pressure falls to its minimum, the piston D descends, and the compression begins again. In engines used for pumping, the water which is pumped is made to circulate through the cooler E. The heater F is kept at a dull red heat by a steady fire (of coke generally), which is underneath it. There is a small valve at L, which admits air when the engine is started, and also makes good any small leakage that may occur. To stop the engine, a cock M on the regenerator is opened, thereby releasing the pressure. The pistons are kept tight by packings K, those on the cylinder B being cooled by a water-jacket, as shown in the figure.



Rider' Air-engine (Section).

The 'Rider' engine is only used for small powers, from ¼ H.P. to 1 H.P. The speed is from 100 to 140 revolutions per minute. The consumption of coke per hour is approximately as follows:—

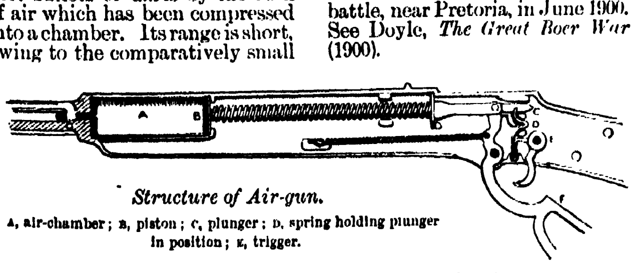
¼ H.P.	½ H.P.	1 H.P.
2·5 lbs.	4 lbs.	9 lbs.

The 'Bailey' hot-air engine, made by Messrs. W. H. Bailey and Co., Ltd., Salford, is another engine working on the Stirling principle. There are two forms made, a horizontal and a vertical. In the former there is one long cylinder, the back end of which is heated by the furnace gases coming from a stove; the front end is water-jacketed, and thus kept cool. There are two pistons—a displacer piston, which is loose-fitting, at the back, and a motor piston at the front. The piston rod of the former passes through the latter; both are connected by linkwork to a crank shaft, and have separate movements. The displacer piston is used merely to cause the air to travel backwards and forwards in the cylinder. When the displacer piston is moved inwards, the heated air from the back or hot end travels to the front, is cooled, and the pressure falls; the motor piston then makes its inward stroke. On the outward stroke of the displacer the cool air is forced to the hot end, becomes heated, the pressure rises, and the motor piston makes its out or working stroke. The air is used over and over again, and there are no valves in this engine. The 'Bailey' engine is only made in small sizes; it is very easy to work, and is specially suitable for pumping.

The 'Bénier' hot-air engine, constructed by the Compagnie Française des Moteurs à Air Chaud, Paris, is made in sizes varying from 4 to 20 H.P. It is provided with a single-acting vertical motor cylinder, the lower end of which forms the furnace. The motor piston is connected by a rod to a beam, which is coupled at the opposite end to a crank shaft. The air-pump, which is single-acting and horizontal, is driven by a system of linkwork from the crank shaft. The air-pump draws in and compresses the air, which is then admitted through a slide-valve to the furnace. Part of the air is forced through the incandescent fuel, becoming increased in volume, and is then used in the motor cylinder, where it expands, and from which it is finally exhausted. A portion of the compressed air is blown into a narrow clearance space surrounding the lower part of the motor cylinder; this tends to keep the piston and cylinder cool, and any grit or dust rising from the fuel is forced down again on to the furnace bars. The furnace is fed automatically by means of two hoppers. The proper quantity of coke for each charge is conveyed from the one hopper to the other, from which the contents are discharged into the port of a slide-valve. The coke is then carried along by this valve, and falls into the furnace when the port is opposite to an opening in the furnace. The valve prevents communication between the furnace and the atmosphere during the expansion of the air and the ascent of the piston. The Bénier appears to be one of the most efficient of hot-air engines, and is said to be economical in fuel. See *Gas, Oil, and Air Engines*, by Bryan Donkin; *The Steam-Engine, and other Heat-Engines*, by Professor Ewing.

Aire-sur-Lys (anc. *Aria*), tn., dep. Pas de Calais, France, 30 m. N.W. of Arras, on ry. line to Calais; possesses breweries, oil-mills, and a market for corn and live stock. Pop. (1901) 8,458.

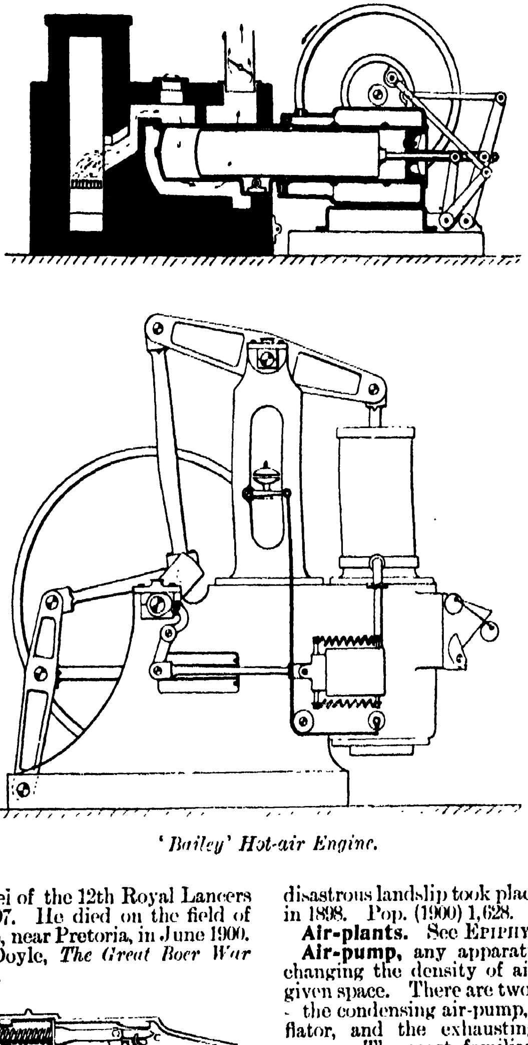
Air-gun, a weapon which propels bullets or darts by the rush of air which has been compressed into a chamber. Its range is short, owing to the comparatively small propulsive force of compressed air. In pneumatic guns used by the United States artillery since 1886, air at 1,000 lbs. pressure has been used for projecting shells containing nitro-gelatin and other explosives. A range of over 3,000 yards has been attained by the Sims-Dudley pneumatic gun. See GUNS.



Structure of Air-gun.

A, air-chamber; B, piston; C, plunger; D, spring holding plunger in position; E, trigger.

Airlie (1856-1900), DAVID WILLIAM STANLEY OGILVY, ELEVENTH EARL OF, succeeded his father in 1881; entered the army in 1874, served in the Nile expedition of 1884-5, and was appointed lieut.-colonel of the 12th Royal Lancers in 1897. He died on the field of battle, near Pretoria, in June 1900. See Doyle, *The Great Boer War* (1900).



'Bailey' Hot-air Engine.

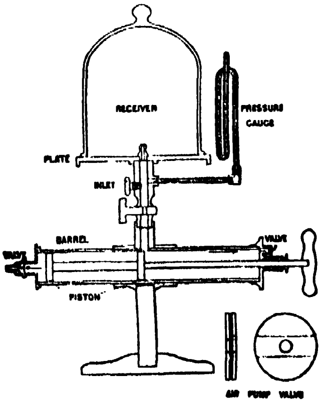
Air-lock. See CAISSON.

Airol, one of the most recently introduced antiseptics. It is composed of iodine, bismuth, and gallic acid, and is strongly advocated, especially by German surgeons, as a substitute for iodoform.

Airolo (Ger. *Eriels*), a small vil. [illegible] canton of Ticino. It is the station at the S. mouth of the St. Gothard Tunnel, being 10 m. by rail from Göschenen, at the N. end, and 40 m. from Bellinzona to the S.E. A disastrous landslip took place here in 1898. Pop. (1900) 1,628.

Air-plants. See EPIPHYTES.

Air-pump, any apparatus for changing the density of air in a given space. There are two kinds - the condensing air-pump, or inflator, and the exhausting air-pump. The most familiar form of the condensing air-pump is the inflator used in pumping up the pneumatic tyres of cycles. It consists of a tube in which a piston works. When the piston is pulled out, the tube fills with air; and when the piston is pushed in, the air is driven through the valve of the tyre. On the piston being pulled out again, the valve is closed by the pressure of the air in the tyre, the amount of air within it being increased by a definite quantity at every stroke. The mechanism of the usual form of exhausting air-pump is essentially the same as that just described, except that the valves open in the opposite directions, so that the action is reversed. As a general rule, the region to be exhausted of air is in permanent connection with the tube and piston by which the exhaustion is effected. It is enclosed in a glass bell-shaped jar, called the receiver, which rests on a perfectly plane plate, the junction being made air-tight by means of a layer of lard. From the centre of the plate a tube passes to the piston chamber, and brings the space within the receiver into communication with the space through which the piston works. This piston may be single-acting or double-acting. In the latter arrangement the valves are so adjusted as to bring into continuous communication the receiver and the end of the piston chamber which is being evacuated by the piston. During the return stroke this air is pushed out into the open air through an outward opening valve, while the valve through which the air from the receiver previously passed closes. Thus at every half-stroke the receiver loses a definite fraction of the air contained within it, the fraction being the proportion of the volume of the piston chamber to the combined volume of the receiver and piston chamber. Suppose, for example, that the volume of the piston chamber which is put into communication with the receiver is $\frac{1}{9}$ of the volume of the receiver. Then at the first half-stroke $\frac{1}{10}$ of the contents of the receiver passes into the piston chamber and is expelled. Hence $\frac{9}{10}$ of the original volume is left in the receiver. At the second half $\frac{9}{10}$ of this is left—*i.e.* $\frac{81}{100}$ of the original volume; and so on indefinitely. After, say, 20 full strokes, the quantity of air in the receiver will be the fraction 0·81 raised to the power 20—*i.e.* 0·0148 nearly. After 50 full strokes the fraction will be 0·000046.



Exhausting Air-pump, double-acting.

The ordinary atmospheric pressure is balanced by the weight of a column of mercury 30 in. or 760 mm. high. Hence a convenient measure of low pressures is in terms of the corresponding height of the mercurial barometric column. (See BAROMETER.) Thus if only 0·0148 of the original amount of air is left in the receiver, the pressure will be about 0·44 of an inch of mercury, or 11·25 mm. If the fraction is 0·000046, the pressure will be 0·035 mm.

To obtain lower pressures, or higher vacua as they are called, recourse is had to what is known as a mercury air-pump. There are two fundamental types of this kind of exhauster, distinguished as the Geissler (invented in 1855) and Sprengel (1865) pump, of which many modifications have been devised by later experimenters. Both depend upon the properties of the Torricellian vacuum—the region above the mercury barometric column, which has been as far as possible emptied of air. In pumps of the Sprengel pattern the gradual reduction of the pressure in a closed vessel is effected by means of the flow of an interrupted stream of mercury down a vertical tube whose upper part is in communication with the interior of the vessel. The air gets entrapped between the successive drops of mercury which constitute the interrupted stream, is carried down the tube, and expelled at the lower end. With pumps of this type it is possible to reduce the pressure to 4-millionths of a millimetre of mercury—*i.e.* less than 100-millionths of an atmosphere. This form of pump is greatly used in the manufacture of the vacuum tubes for the production of the Röntgen rays, now so serviceable in surgery.

Air-sacs are thin-walled chambers communicating with the lungs in birds. They not only occur within the body cavity, but are usually continued into the cavities of the bones, rendering these *pneumatic*. The presence of these air-sacs lowers the specific gravity of the body; but their main function is undoubtedly respiratory, and the superficial ones also assist in regulating the body temperature. In the chameleon, among reptiles, the lungs develop prolongations which seem to foreshadow the air-sacs of birds.

Air-ship. See BALLOON; FLYING MACHINE.

Air-space, the number of cubic feet of air in any apartment or building. It is held that every healthy adult should be allowed 800 cub. ft. of air-space. See VENTILATION. For air-spaces in plants, see STOMATA.

Air-valve. Air is apt to collect at the tops of undulations in water-pipe lines, thus impeding the flow of water, and air-valves are introduced at these points to expel it. A simple type consists of a cast-iron box bolted to the upper surface of the main pipe. At the top of the box there is an opening for the escape of the air from within. A float is attached to a spindle, which is guided so that it can only rise and fall. When the pipe is empty, the float is down; when the pipe has filled, the float closes the valve.

Air-vessel. In single-acting pumps, in which motion is only given during the forward stroke, the column of water in the rising main comes to rest during the back stroke. This necessitates a great expenditure of energy in starting the column of water from rest at every stroke. To obviate this an air-vessel is used. It consists of a strong cylindrical air-tight iron box, bolted just beyond the pump to the main, and communicating freely with it. The vessel is full of air, which is compressed at each forward stroke, thus storing energy. This is given up during the back stroke, thus forcing the water on, and giving a more uniform delivery. The air also acts as an air-cushion, relieving the pipes from shocks which might otherwise fracture them. The air is absorbed by the water in time, so that a fresh supply has to be introduced. A stand-pipe is sometimes used instead of an air-vessel.

Air-way, a passage for ventilation in a mine. Malicious tampering with an air-way is regarded as felony.

Airy, SIR GEORGE BIDDELL (1801-92), astronomer-royal, was born at Alnwick. He graduated as senior wrangler and first Smith's prizeman of Trinity College, Cambridge, in 1823; was nominated Lucasian professor of mathematics in 1826, and astronomer-royal June 18, 1835. His administration at Greenwich extended over forty-six strenuous years. The magnetic department was created by him in 1838, the spectroscopic department in 1868; he initiated the electrical registration of transits, and the photographic record of sun spots. The solar eclipses of 1842, 1851, and 1860 were observed by him in Italy, Sweden, and Spain respectively; and he organized the transit of Venus expeditions in 1854. See his *Autobiography* (1896).

Aisle, the lateral subdivision of a church parallel to the choir, nave, or transept, from which it is divided by a row of columns or wall-piers. In Gothic architecture the breadth of the church is divided into three or five parts by two or four rows of pillars. The middle division is called the nave, the others the side aisles. The word is misapplied to the passage in a church between pews.

Aislé, in heraldry, used when the wings are blazoned of a different tincture from the animal.

Aismunderby, a township in the West Riding of Yorkshire, adjoining Ripon, in which borough the urban part is included.

Aisne. **(1.)** Department, N. France, forming for a few miles the French frontier towards Belgium. It is crossed in a S.W. direction by the Oise R. (having its source in Belgium), by the Aisne towards its middle in a W. direction, and by the Marne in the S. The department is fertile, two-thirds being under crops. Wheat, and beetroot for sugar, are the staple crops; but flax, hemp, and hops are extensively cultivated. Market gardening is carried on along the railway line; and the industries, more chemical than metallurgic, are clustered in a few centres. Cap. Laon. Area, 2,868 sq. m. Pop. (1901) 535,583. **(2.)** River (ancient *Axona*), 175 m. long; flows into the Oise, near Compiègne; passes through Vouziers and Soissons. Great part of it is navigable. It is connected by canals with all the other important rivers of the region.

Aïssé, MADEMOISELLE (1694-1733), daughter of a Circassian chief; carried off in early childhood by the Turks, and sold in the slave market at Constantinople to the Count de Ferriol, French ambassador (1698). Brought by him to France and educated, she became famous for her extraordinary beauty and accomplishments, as well as for her virtuous life amid the profligacies of the court during the regency. Her letters to Mme. de Calandrini and Chevalier d'Aydie were published with Voltaire's notes (1787); best edition that of Sainte-Beuve in 1846. See Courteault's *Une Idylle au XVIII. Siècle* (1900).

Aistulf, or ASTOLF (d. 756), king of the Lombards, took possession of Ravenna (752) and threatened Rome, where Stephen III. occupied the papal throne. By the armed intervention, in 755, of Pepin, king of the Franks, he was, however, forced to abandon his threatening attitude and make amends to the Pope. Nevertheless in the following year Aistulf laid siege to Rome, but was attacked by Pepin, who compelled him to retire, and to surrender Ravenna.

Aitchison, SIR CHARLES UMPHERSTON (1832-96), Indian administrator, born in Edinburgh; joined the Indian Civil Service in 1855. From 1859-65 he served as under-secretary in the political department of the government of India, and as foreign secretary from 1868-78. He was chief commissioner of British Burma from 1878-81, lieutenant-governor of the Punjab from 1882-7. He published *A Collection of Treaties, Engagements, and Sanads* (*patents of appointment*) *relating to India and the Neighbouring Countries* (11 vols. 1862-92); *The Native States of India* (1875); *Lord Lawrence* in Rulers of India Series (1892).

Aivalik, AIWALIK, or KYDONIA (anc. *Heracleia*), seapt. tn., Asia Minor, 66 m. N.N.W. of Smyrna, on Gulf of Edremid. Formerly a place of considerable trade, it was burnt by the Turks in 1821, but has since revived. Trades in olives and oil. Pop. over 30,000.

Aivazovski, IVAN KONSTANTINOVITCH (1817 1900), Russian marine painter, studied at the St. Petersburg Academy of Art. His works include *Sunrise on the Black Sea*, *Wreck of the Frigate Ingermannland*, *Naples by Moonlight*, *View of Constantinople*.

Aix, small isl. opposite mouth of the Charente, dep. Charente-Inférieure, France; forms the outer defence for Rochefort. In the roads naval battles took place between English and French in 1806 and 1809. Here Napoleon surrendered to the English on board the *Bellerophon* on July 15, 1815.

Aix (AIX-EN-PROVENCE; anc. *Aquæ Sextiæ*), tn., Bouches-du-Rhône, France, the former cap. of Provence, 17 m. N. of Marseilles, on the ry. to Lyons by Grenoble. The town has grown up round a hot sulphur spring known before the Roman invasion. It is the seat of an archbishop (cathedral of the 12th century), and has a university and a technical college. The Facultés d'Aix were two celebrated schools which were organized in 1409 as the university, one of the famous seats of learning in the middle ages. It is now incorporated with that of Marseilles (*L'Université d'Aix-Marseille*), and consists of faculties of law and letters (with an honorary professor 'of the ancient faculty of Catholic theology of Aix'), and faculties of science and medicine at Marseilles. Aix is a centre for the trade in olive oil, wine, corn, cotton spinning. Pop. (1901) 29,418.

Aix-la-Chapelle. See AACHEN.

Aix-les-Bains (anc. *Aquæ Gratianæ*), tn., dep. Savoie, France, 1 m. from the E. shore of Lac du Bourget, stn. on the main line from Paris to Turin (360 m.), 9 m. N. of Chambéry. Though surrounded by high mountains, Aix enjoys a very temperate climate, and is a popular health resort. There are copious warm springs (103° and 107° F.), charged with alum and sulphur, used especially in douches and baths. Pop. (1901) 8,120.

Ajaccio (anc. *Adjacium*), cap. of Corsica, on the W. coast, at the N.E. extremity of a deep gulf bearing the same name, and the terminus of a railway crossing the island. Ajaccio is a healthy winter resort, and has a good harbour. Trade in corn, wines, leather, wood, sardines, anchovies, corals, cigars, and ship-building. It has been the seat of a bishop since the 7th century. It was the birthplace of Napoleon Bonaparte; the 'Casa Bonaparte' is now national property. Pop. (1901) 21,779.

Ajaigarh, native state, Bundelkhand, Central India, 105 m. S.W. of Allahabad. The fortress (9th century) is on a granite rock 1,744 ft. high. Pop. 93,000.

Ajalon, or AIJALON, now YALO, a town in the territory of Dan, near which Joshua won a great victory over five Canaanite kings, the sun and the moon being described (Josh. 10) as standing still (Heb. 'were silent') till the rout was complete.

Ajax. **(1.)** Son of Telamon, one of the leading Greek heroes in the Trojan war. After the death of Achilles, and the award of his armour to Odysseus, he committed suicide. From his blood, according to the legend, sprang up a purple flower bearing the letters *αι*—his initials, and the expression of a sigh—on its leaves. (See Homer, *Iliad*, and Sophocles, *Ajax*.) **(2.)** Son of Oileus, one of the lesser Greek heroes before Troy.

Ajax, a British second-class battleship, launched 1880. The name is associated with Rodney's victories off Cape St. Vincent (1780), off Les Saintes (1728); Egypt (1801); Calder's victory off Ferrol (1805); Trafalgar (1805); San Sebastian (1813); Bomarsund (1854).

Ajmere, or AJMIR, prov., Rajputana, India; also ancient city, cap. of the prov., 220 m. S.W. of Delhi, on the lower slopes of Taragarh Hill. It contains the Daulat Bagh (or Garden of Splendour), a fine mosque (originally a Jain temple), and, above all, the *dargah* or tomb of the Mohammedan saint Kwaja (13th century), which is a venerated place of pilgrimage. There are two colleges—Ajmere College, affiliated to Calcutta University, and Mayo Rajkumar College (1875), for the education of noble Rajputs. There is considerable trade in cotton. Pop. (1901) 75,800. The lofty district of Ajmere-Merwara, to the S., was conquered in 1820. Pop. (1901) 476,330 (80 per cent. Hindus).

Ajodhya, city, near Faizabad, Oudh, India, on r. bk. of the Gogra, and 77 m. E. of Lucknow. The old city, now in ruins, was the former capital of the kingdom of Kosala, the modern Oudh. Its glories are portrayed in the *Ramayana*. The city is small (about 12,000), but its Jain temples attract about 500,000 pilgrims at the annual fair.

Ajowan, the Indian name for the fruit of a plant of the same genus as caraway, used as spice. The antiseptic thymol is extracted from it.

Ajurnoca, tn., Minas Geraes, Brazil, 117 m. N.E. of Rio de Janeiro. In the neighbourhood pigs are reared for the Rio de Janeiro market, and tobacco, manioc, sugar-cane, millet, and coffee are cultivated. Pop. 12,000.

Akabah, the E. arm at the head of the Red Sea; also a town there, near the Elath of Scripture (Deut. 2:8).

Akashi, tn., prov. Harima, S. of Hondo I., Japan, 12 m. S.W. of Kobe; a seaside resort on N.E. corner of Inland Sea. It is the Greenwich of Japan, as Japanese time is regulated from it. Pop. (1898) 21,196.

Akbar, JELLAL-UD-DIN MOHAMMED (1542-1605), greatest of Mogul emperors. His father, Humayun, died when Akbar was fourteen years old; and he remained for four years under the tutelage of Bairam Khan, a Turcoman general, who in 1556, by the victory of Paniput, secured for him the provinces of Delhi and Agra. He dismissed Bairam in 1560, and at the age of eighteen commenced his conquest of Hindustan. His empire, at its greatest, extended from Kashmir in the N. to Ahmedabad in the S., and from Kabul in the W. to Dacca in the E. The peculiar glory of Akbar's reign was his daring change of policy from fanatical Mohammedanism to universal toleration. By skilful manœuvring, and with the help of the able but crafty Abul Fazl, his historian, he induced the learned doctors of his court to declare him 'a just ruler,' 'infallible,' and the sole source of legislation; and, armed with this authority, he modified freely principles and practices which had the sanction of the Koran. In the carrying out of his principles he promoted capable men of any creed to high office in his court and army; he prohibited slavery and the sale of the wives, children, and dependants of the conquered; he abolished the *jazuja*, or poll-tax on infidels, and the pilgrimage-tax on Hindus; he prohibited early marriages, and he permitted Hindu widows to refuse to perform suttee, and to remarry. Having publicly consulted Mohammedans, Hindus, Parsis, Jews, and Christians, he drew up a new faith on eclectic principles, and substituted for the well-known 'kalma' another formula—*viz.* 'There is one God, and Akbar is His Khalifa.' His fiscal arrangements, under the charge of Bajah Todar Mal, resemble in many respects those now in force. The principal authorities for his reign are the *Ain-i-Akbari* and *Akbar Namah* of Abul Fazl, and the *Tabakat-i-Akbari* of Nizam-ud-din-Ahmed. See INDIA.

Akee Fruit, the produce of one of the trees of the Soapberry family (Sapindaceæ). A native of W. Africa, it was introduced into the W. Indies. The red fruit is 3 in. long, and contains three black seeds, surrounded by a pale pulpy aril which is cooked and eaten.

À Kempis, THOMAS. See KEMPIS.

Akenside, MARK (1721-70), physician and poet, the son of a butcher of Newcastle. At seventeen he began his chief work, *The Pleasures of Imagination* (1744). Obtaining the degree of Doctor of Physic at Leyden, he practised at Northampton, where he published his *Epistle to Curio* (1744), a tirade on the party desertion of William Pulteney. At the end of 1745 (during which year he published ten odes on various subjects) Akenside started practice in London; but his arrogance repelled his patients, and he provoked Smollett to satirize him in *Peregrine Pickle*. His *Hymn to the Naiads*, published in 1746, was his last important piece. Akenside's works display much fine writing and pompous rhetoric, but little originality. They were first collected by Dyson (1 vol. 4to, 1772); best edition that of Dyce (1834), whose excellent *Life* is also prefixed to the Aldine edition (1886) of the poems. See also Bucke's *Life of Akenside* (1832); Beers's *Hist. of Eng. Romanticism in the 18th Cent.* (1899).

Akers-Douglas, RT. HON. ARETAS (1851), since 1902 Secretary of State for the Home Department. He was called to the bar at the Inner Temple in 1874; represented E. Kent div., latterly St. Augustine's div., in Parliament since 1880; parliamentary secretary to the Treasury (1885-92); Conservative whip (1883-95); First Commissioner of Works (1895-1902); Privy Councillor (1891).

Akershus, a fortress in county of same name, Norway, at the head of the Christiania fjord, on a peninsula S. of Christiania. It was originally built in the 13th century, rebuilt by Christian IV. of Denmark, and down to 1740 was a royal residence of the Danish kings. The county has an area of 2,075 sq. m., and a pop. (1900) of 115,113.

Akhal, oasis of Transcaspia (often called Akhal-Tekke, from its Tekke Turcoman inhabitants), near the Atek oasis, at the foot of the Kopet Dagh, between the towns of Kizil Arvat and Luxtabad. Length (with Atek) over 30 m.; average breadth about 1¼ m. The soil is rich, formed of loess and alluvion; fruit-trees and cereals flourish. The region is populous, and has greatly thriven since the Russian conquest in 1881.

Akhaltsikh, tn., gov. Tiflis, Transcaucasia, on the Potskhofchai, near the Kura, 3,300 ft. above sea-level, and 125 m. from Tiflis; the seat of a Greek archbishop. It yields excellent apples and pears. Most of the silver ornaments sold at Tiflis are manufactured here. Pop. (1897) 15,387.

Ak-Hissar (anc. *Thyatira*), tn., Asia Minor, 58 m. N.E. of Smyrna; has marble quarries and cotton factories. Pop. 12,000.

Akhlat, or KHELAT, tn., Asiatic Turkey, on the shore of Lake Van; once the capital of the Armenian kings, now the see of an Armenian bishop. Pop. 5,000.

Akhmim, or EKHMIM (anc. *Khmin*; Gr. *Panopolis*), tn. of Upper Egypt, on r. bk. of Nile, 85 m. S.S.E. of Assiut; famous now, as it was anciently, for the manufacture of cotton textiles. Pop. about 10,000.

Akhtirka, tn., gov. Kharkov, Russia, 70 m. N.W. of Kharkov; founded by the Poles (1641). A famous image of the Holy Virgin is visited by many pilgrims. Annual fair (May 9). Pop. (1897) 23,400.

Akiba, BEN JOSEPH, a Jewish rabbi of the 2nd century; born in Syria; principal teacher in a school at Jaffa. Akiba was executed by the Romans in 135 A.D. for his participation in the revolt of the false Messiah Bar-Cochba. He is believed to have written the *Mishna of Rabbi Eliezer*.

Akita (*Kubota*), rice-exporting seapt., Hondo, Japan. Spun silk, cloth, and white *chijimi* are extensively made. Pop. (1898) 29,477.

Akka. See ACRE.

Akka (called *Tikki-Tikki* by their Niam-Niam neighbours), a dwarf people of Equatorial Africa, discovered by Schweinfurth in 1869. They inhabit the region between 1° and 2° N. lat., among the N. affluents of the R. Welle. Height, 4 to 5 ft.; complexion brown; head disproportionately large, and very prognathous; facial angle, 60°-66°; mouth large; woolly hair; hirsute, pot-bellied body. They live in amity with the surrounding tall races, for whom they act as hunters, being very expert with spear and arrows. See DWARFS; also Schweinfurth's *Heart of Africa* (1873); Stanley's *In Darkest Africa*.

Akkad, or ACCAD, a district and a dialect of ancient Babylonia. The former seems to have coincided approximately with N. Babylonia. The latter was at first thought to belong to the Ural-Altaic family of speech; but that view is now abandoned, and all that can, with any degree of certainty, be stated, is that it was an early form of agglutinative language, and was strongly influenced by Semitic speech. See BABYLONIA.

Akkerman, AKERMAN, or AKYERMAN ('white water'), chief tn., Bessarabia, Russia, on W. side of the great *liman* or coastal lake where the Dniester joins the Black Sea, about 30 m. S.W. of Odessa. The town contains many Jews, Armenians, and Greeks, as well as Russians. Its main industry is the cultivation of grapes and other fruits. There is a good harbour, and fishing and carrying trades are pursued. Treaty of 1826 signed here between Russia and Turkey. Pop. (1897) 28,303.

Akmolinsk (*Akmolinskaya Oblast*). (**1.**) A prov., Siberia, slightly larger than France, of the general government of the Steppes, E. of the Sea of Aral. Area, 229,609 sq. m. Pop. (1897) 687,957, now probably 800,000. Only 140,000 of these are Kirghiz and other Asiatics, mostly shepherds and nomads; the rest, almost all agriculturists, are Russians. Chief town Omsk. The N. part is sandy, but fertile in the river valleys; the centre is undulating, with good pasture and minerals; the S. part ('Famine Steppe') is a hopeless region. Corn and millet are grown in the N.; copper, gold, and other minerals are plentiful; hides, horn, and salt are important products. The climate is milder than that of W. Siberia; the rainfall is moderate. (**2.**) Town of above, 280 m. S.W. of Omsk, on the Ishim. Founded in 1862, it is now an important market, the meeting-place of the caravans passing between Siberia, Tashkend, and Bokhara. Pop. (1897) 9,560.

Akola, munic. tn., Berar dist., India, on the river Morna, 53 m. S.W. of Amraoti. Assigned to the British government by the Nizam; now the headquarters of the British commissionership of W. Berar. Pop. (1901) 29,289. Pop. of the dist. Akola (1901) 582,540.

Akron, city, Ohio, U.S.A., the co. seat of Summit co., on the Ohio Canal, 36 m. S. of Cleveland. Wheat is shipped in large quantities; the principal manufactures are flour and woollen goods. Site of Buchtel College. Pop. (1900) 42,728.

Aksaiskaya (*Aksai, Aksei*), tn. (stanitsa) in Don Cossack gov., Russia, about 18 m. S.W. of Novo-Cherkask, at the point where the right arm of the Don rejoins the main stream. Candle-making and trade in fish, cereals, wood, iron, and salt. Pop. 6,000.

Aksakov, IVAN SERGEIEVITCH (1823-86), Russian poet and publicist, son of Sergei Timofeievitch; born at Moscow; was editor of several Panslavist journals, including the *Den* (*The Day*; 1861-5), the *Moskva* (1867-8), and the *Moskvich*. His works were collected and published by his wife.

Aksakov, KONSTANTIN SERGEIEVITCH (1817-60), Russian author and poet, brother of Ivan. His works were collected and published in 5 vols.: Historical Works, vols. i.-iii., and Philological Works, vols. iv., v. (1861-80).

Aksakov, SERGEI TIMOFEIEVITCH (1791-1859), born at Ufa; occupied many official appointments until 1839, when he devoted himself to literature. His principal works are, *Family History and Recollections* (1856), a masterpiece of Russian literature; *Memoirs of a Hunter* (1855); *Winter Morning; Natasha.*

Group of Akka, with Zanzibaris to show comparative size.

Akshehr, or AK-SHEHER, city, dist. Karamania, Asiatic Turkey, 70 m. N.W. of Konieh; has carpet manufactures. Pop. 15,000.

Ak-su ('white water'), lat. 41° 9' N., long. 79° 13' E., a very ancient city of E. Turkestan, formerly called Arpadil or Ardabil, on the l. bk. of the Aksu Daria, a confluent of the Tarim R.; alt.

3,500 ft. It is on the S. Tian-Shan route from China to Samarkand. By the Musart Pass it is connected with Ili or Kuldja, and by a caravan route with Khotan. Manufactures tobacco, saddlery, pottery, and rude hide jars. Mines of lead, copper, and sulphur in the district. Pop. about 20,000.

Akyab, seapt. in Arakan div., Akyab dist., British Burma, about 190 m. S.E. of Calcutta. It has a good harbour; its chief export is rice. Pop. (1901) 31,687. The district of the same name has an area of 5,136 sq. m. Pop. (1901) 482,374.

Al, or El (*cf.* Heb. *hal*), the Arabic definite article. When it comes before words beginning with dentals, sibilants, and liquids, the *l* is assimilated to the following consonant: thus, Abd-al-Rahman becomes Abd-ar-Rahman. When it follows a word ending with a vowel the *a* is elided, as in Abu'l-Islam, and the following words when in the nominative case, ending *u*: Abdu'l-Kadir, Abdu'r-Rahman, Harunu'r-Rashid. In adjectival phrases it is used with both noun and adjective—al-Khalafa'u-'l-Rashidun, 'the Orthodox Caliphs;' but in compound phrases only with the second noun—Amiru'l-Mu'minin, 'the Commander of the Faithful.' It is seen as a first syllable in many English words derived from Arabic—alcohol, alcove, alembic, alkali, almanac, etc., and alcoran, alchemy, algebra, Algeria, Alhambra, almagest, etc.

Alabama (recognized abbreviation, Ala.), a southern state, U.S.A., bordering on the Gulf of Mexico; organized as a territory in 1817; admitted as a state in 1819. It has a length of about 336 m. from N. to S., and an average width of 175 m. Total area, 52,250 sq. m. The surface of the N.E. part consists of the S. portion of the Cumberland plateau, which here appears as more or less detached table-lands, with an elevation of approximately 2,000 ft., cut deeply and broadly by stream valleys. The remainder of the state is a plain, more or less rolling, and sloping gently southward. The N. part is drained by the Tennessee R., which flows across it from the N.E. to the N.W. corner. Mobile R., with its branches the Alabama and Tombigbee, drains nearly all the remainder of its area. The principal crop is cotton; the next in importance is Indian corn. The principal industry is the manufacture of iron and steel products, in a district of which Birmingham is the centre. The mineral products consist mainly of coal and iron, which are to a large extent mined in close juxtaposition, making Alabama iron among the cheapest in the world. The lumber industry is a large and growing one. Nearly all the area of the state was originally covered with forest, and is still so in great measure, except as it has been removed for cultivation. The principal growth is yellow pine timber. The state is not yet well supplied with means of transportation. In 1900 there were in operation only 4,220 m. of railway. The population in 1900 was 1,828,697, the rate of increase during the preceding decade being 20·9 per cent., and the average number of inhabitants to a square mile 35. The chief cities are Mobile, its seaport, with a population of 38,469; Birmingham, with 38,415; and Montgomery, the capital, with 30,346.

Alabama River flows through the states of Alabama and Georgia, U.S.A. It rises in the N. part of the latter state in two main branches, Coosa and Tallapoosa, which join about 10 m. N. of Montgomery, Alabama. Its general course is W., then S.W. to its junction with the Tombigbee, to form the Mobile. It is 320 m. long, and is navigable for vessels of six feet draught as far as Claiborne, 60 m. above its junction with the Tombigbee.

Alabama, The, a celebrated Confederate cruiser during the American civil war. She was originally known as 'No. 290,' her number in the yard of the builders, Messrs. Laird of Birkenhead, and was a wooden, barquentine-rigged screw steamer of 1,040 tons, with a speed under steam of about eleven knots. On July 29, 1862, the vessel, under pretext of making a trial trip, slipped out to sea. She made for the Azores, where she was met by two other vessels which brought her armament; and having been thus armed, she was, on August 24, commissioned by Capt. Semmes, of the Confederate navy, as the *Alabama*. She at once began to cruise in the neighbourhood of the Azores, and by September 14 had captured ten ships belonging to the Northern States, all of which, as Semmes had no port to take his prizes to, were destroyed. After making several other captures between the Banks of Newfoundland and Martinique, the *Alabama* next proceeded to Galveston, then blockaded by Federal vessels, one of which (the *Hatteras*) she succeeded in drawing off and destroying. Thereafter she sailed for Cape San Roque, where she captured many valuable prizes. The Federal government now took more adequate measures for hunting her down, and Semmes made for Cape Town, coaled there, and went on to the Strait of Sunda. Here he took several prizes; but being hampered by the presence of the Federal vessel *Wyoming*, he sailed for the Cape in the end of 1863, and finally arrived at Cherbourg in June 1864. The United States warship *Kearsarge*, Captain Winslow, which was then off Flushing, promptly set off for Cherbourg, and awaited her outside the territorial limit. After a challenge, the *Alabama*, on Sunday, June 19, steamed out to engage her antagonist. After a close engagement lasting about an hour, Semmes found the *Alabama* sinking, and struck his flag. During her short existence, the *Alabama* captured one steamer and no less than sixty-seven sailing vessels. The direct loss was great, but greater still was the indirect injury; for the *Alabama* and several other commerce-destroyers paralyzed the American shipping trade, and caused the transfer of 348 ships, aggregating more than 250,000 tons, in one year alone, to the British flag. For the damage done by the *Alabama* and several other cruisers, claims were made by the United States against the British government for breach of neutrality, on the ground that they had 'failed to use due diligence,' and that after the escape of the vessel the measures taken for pursuit and arrest led to no result, and that on several occasions the *Alabama* had been freely admitted into the ports of Great Britain's colonies. Under the treaty of Washington, 1871, the *Alabama* claims (as they were generally called) were submitted to an international tribunal which sat at Geneva in 1872. The arbitrators rejected the claims for indirect damage and a few of the others as well, but upheld the claims for the damage done by the *Alabama*, as well as some of the claims in respect of the *Florida* and the *Shenandoah*, and awarded an indemnity of £3,229,166. The character of the award has met with general but by no means universal approval. It has been contended that there was no breach of what at the time was recognized to be the duty of neutrals, and that *ex post facto* rules laid down in the treaty were applied retrospectively.

See Semmes's *Service Afloat* (1887); Haywood's *The Cruise of the 'Alabama'* (1886); Admiral Porter's *Naval History of the Civil War* (1887); Scharf's *History of the Confederate States Navy* (1894); Wilson's *Ironclads in Action* (1897); Phillimore's *International Law* (1873); Calvo's *Le Droit International* (1888); Ellicott's *Life of Admiral Winslow* (1902).

The name *Alabama* is also borne by a United States first-class battleship, built in 1898.

Alabaster is usually understood to be a massive form of gypsum, hydrated calcium sulphate, $CaSO_4 2H_2O$; though the variety known as 'oriental alabaster' is a carbonate of lime (calcite) which has been deposited in caves as stalagmite. The white alabaster of Florence is composed of sulphate of lime; and this variety is also found in Derbyshire, but inferior in purity to the Florentine. Alabaster columns, statues, and smaller objects occur among Egyptian and Roman relics. See SELENITE.

Alacoque, MARGUERITE MARIE (1647-90), a nun and religious enthusiast; born at Lauthecour, France. She was the founder of the devotion of the Sacred Heart, and wrote several works on religious subjects. See *Lives* by Barry (1889), Tickell (1890), and Bougaud (1900).

Aladdin, a name chiefly associated with the well-known tale of the Wonderful Lamp, signifies literally, 'Glory of the Faith' (*'Ala al-Din*). This name is borne by another hero of the *Arabian Nights;* and also by the 'Old Man of the Mountain,' king of the Assassins, and an Osmanli prince, son of the great Osman.

Alaghez, or ALI-GHEZ, mts., Transcaucasia, in N. of dist. of Erivan; direction, W. to E. Alaghez (13,436 ft.), the highest point, is an extinct volcano. See *Scot. Geog. Mag.*, 1896, p. 472.

Alagoas, a state of Brazil, on the Atlantic coast, between Pernambuco and Sergipe. The interior is mountainous, and contains iron and other minerals. The woods yield Brazil wood, copaiva balsam, and timber; and in the low coast zone cotton, sugar, and tobacco are grown, which furnish the material for a few factories. Railways run to Pernambuco, and from Piranhas to Jatoba, past the Paulo Affonso Fall on the San Francisco. The capital and chief port is Maceio. Area, 22,580 sq. m. Pop. 560,000.

Alai Mountains (*Alai Tagh*), the S.W. branch of the Tian-Shan, in 40° N. lat., which spreads out like a fan as it drops towards the lowlands of Russian Turkestan. This range has two parallel lines, Alai proper and Trans-Alai, on the N. and S. sides of the Alai River (trib. of the Vaksh, a main branch of the Upper Oxus or Amu Daria). They stretch for about 250 m. along the N. edge of the Pamir, average 15,000 to 18,000 ft. in the E., and contain Peak Kaufmann, 25,000 ft.

Alais (anc. *Alestum*), tn., dep. Gard, France, on the l. bk. of Gardon d'Alais, where it issues from the Cevennes into the plain, 26 m. N. of Nîmes. Very important centre for silk trade. It gives its name to a coal-basin, including Bessèges and La Grande Combe, producing yearly between two and three million tons of coal. Glass, bricks, tiles, cloth are manufactured. A treaty was concluded here in 1629, which ended the Huguenot wars in France. Pop. (1901) 24,940.

Alajuela, chief tn. of prov. of same name, 11 m. N.W. of San José, Costa Rica, Central America; has a large trade in sugar-cane. Pop. (1897): tn. 15,000; prov. 60,000.

Ala-kul, the 'variegated lake' of the Kirghiz, lies 120 m. E. of Lake Balkhash, in the prov. of Semiryechensk, between 45° 45′ and 46° 25′ N. lat., and between 81° and 82° E. long., at the height of 790 ft. above sea-level. Its length from N. to S. is 50 m., its mean breadth 23 m.

Alaman, LUCAS (1775-1855), Mexican statesman and historian, author of *Disertaciones sobre la Historia Mejicana* (1844-9) and *Historia de Mejico* (1849-52), both works of high authority; represented the colony in the Spanish Cortes until 1823, when he returned to Mexico, and became successively Secretary of the Interior and Foreign Minister.

Alamanni, LUIGI (1495-1556), Italian poet; born at Florence, died at Amboise. Detected in a conspiracy against Cardinal Giuliano, he escaped to Venice, and thence to France (1522), where he enjoyed the favour of Francis I., and later of Henry II., by both of whom he was sent on important embassies. His life thereafter was spent in France, where most of his poems were written. His works were various: *La Coltivazione* (1546), a didactic poem on agriculture (his principal work, and one of the best of its kind in Italian literature); *Girone il Cortese* (1548), an epic; *L'Avarchide* (1570); collections of shorter poems, *Opere Toscane* (1532) and *Epigrammi Toscani* (1570); *Flora*, a drama; etc. See *Life* by Raffaelli (1859).

Alameda, city, co. Alameda, California, U.S.A., on San Francisco Bay, and on the line of the S. Pacific Ry. Pop. (1900) 16,464.

Alamos ('poplar trees'), gold and silver mining tn., Sonora, Mexico, N. of the N. end of Sierra de Alamos. Pop. about 10,000.

Aland Islands (300, of which 80 are inhabited), at mouth of Gulf of Bothnia, Finland, Russia; Swedish until 1809; majority of the 18,413 (1897) inhabitants are Swedes.

Alans, a Sarmatian people who inhabited the steppes N. of the Caucasus Mts. and the Black Sea during the first three centuries of the Christian era. A large section of them were subdued and incorporated by the Huns in 370. Subsequently they settled in Pannonia, Lusitania (411), and Africa (429).

Alanus ab Insulis. See L'ISLE, ALAIN DE.

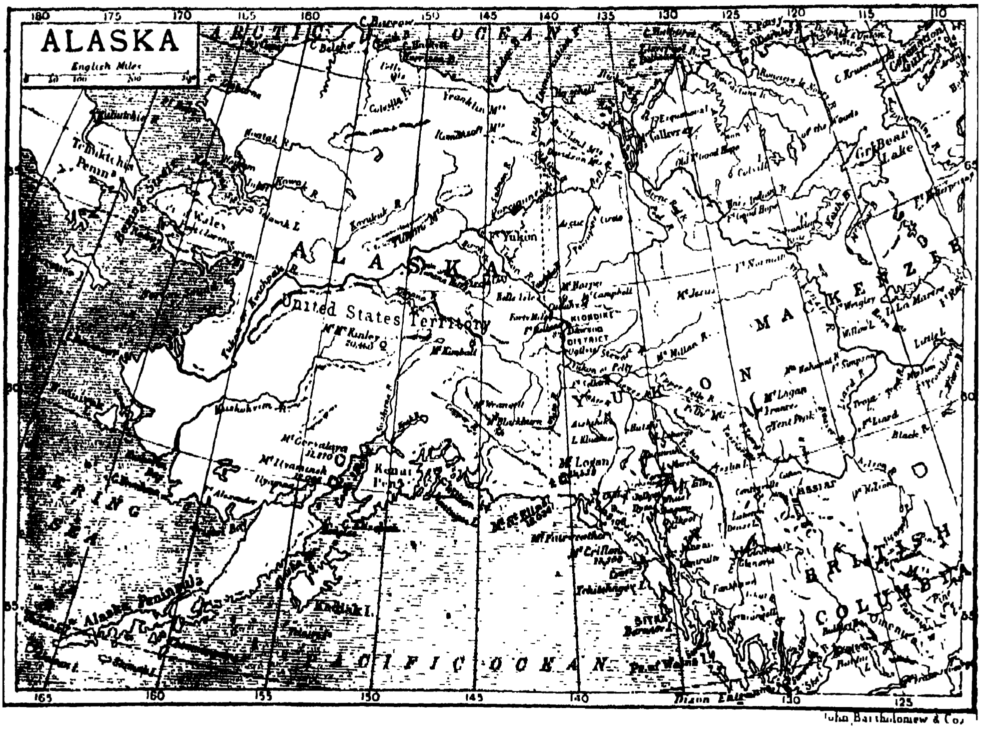
Alaotra, the largest lake in Madagascar, about 125 m. N.E. of Antananarivo. Now about 25 m. long, and still shrinking, it formerly ran N. and S. for 200 m.

Alarcon, HERNANDO DE, Spanish navigator of the 16th century, sailed from Acapulco in 1540, and disproved the idea that California was an island. He was the first European to explore the Colorado River, the lower course of which, with the Gulf of California, was mapped by a member of the expedition. The map appears in Winsor's *Narrative and Critical Hist. of America* (1886).

Alarcon, PEDRO ANTONIO DE (1833-91), Spanish author, revolutionary soldier, and politician, was a native of Guadix, in the prov. of Granada. In 1859, having previously (1857) published his *El Hijo prodigo*, he followed the Spanish army in Morocco as newspaper correspondent, and chronicled these experiences in his *Diario de un Testigo de la Guerra de Africa* (1860). He was sent to the Cortes by Cadiz in 1864, and in 1868 he fought at the battle of Alcolea. His novels enjoyed great popularity by reason of their national spirit, and light, humorous, yet sincere tone. Among the best are *La Nochebuena del Poeta* (many eds.), *El Escandalo* (1875), *Las Alpujarras*, *El Sombrero de tres Picos* (1874), and *El Niño de la Bola* (1880). His poems are represented by the *Poesias serias y humoristicas* (1870). See his *Obras Escogidas*, with biography (1874). A collected edition of his works was begun in 1899.

Alarcon y Mendoza, JUAN RUIZ DE (1581-1639), Spanish dramatist; born in Mexico, died in Madrid. He was for a time professor at the university of Mexico and a magistrate of the supreme court. He lived in Spain from 1611 until his death, as an officer of the council of the Indies. Alarcon was one of the first modern Spanish playwrights to embody types in his characters, and to make each of his plays convey a moral lesson. His most famous comedy, *La Verdad Sospechosa*, for instance, enforces the folly of lying and hypocrisy. It is to this play that Corneille is indebted, as he acknowledges, for the plot of *Le Menteur.* Twenty of Alarcon's plays still survive, the most notable of which, besides the above, are *El Tejedor de Segovia*, *El Semejante á si mismo*, *Todo es Ventura*, *Las Paredes Oyen*, and *Ganar Amigos*. His style is chaste and elegant. Alarcon's principal plays are included in Moratin's *Teatro Escogido* (1838), and in Garcia Ramon's edition of the same (1884).

Alaric I. (*c.* 375-410), king of the Visigoths or Western Goths, was a scion of the noble family of the Balthings. During his minority the Visigoths were in vassalage to the Romans; but on the death of the Emperor Theodosius in 395, Alaric led the great revolt of the Visigoths, and was elected as their king. He overran Greece, and exacted a heavy ransom from Athens itself. As a result, he was able to conclude a treaty with the emperor of the East (Arcadius), by which he became vicegerent of the greater part of the Balkan Peninsula. His growing power and ambition led him in 400 to invade Italy, the northern provinces remaining in his power for eighteen months, until his defeat at Pollentia by Stilicho. In 409, however, Alaric once more invaded Italy, and this time laid siege to Rome. He spared the city, contenting himself with a heavy ransom; but in the following year, on August 24, 410, the imperial city was entered and plundered. The Empire of the West was now almost within his grasp, when he died suddenly at Cosenza.



Alaric II. (*c.* 484-507), eighth of the Visigothic kings of Spain, succeeded to the throne in infancy on the death of his father, Evaric or Euric, in 485. At that period the Visigothic kingdom included almost the whole of Spain, together with the greater part of Central and Southern France. Nearly the whole of his French possessions, however, were wrested from him by Clovis, king of the Franks, who inflicted a crushing defeat on the Visigoths at Vouglé, near Poitiers, in 507, when Alaric was among the slain. Although a zealous Arian, he showed great tolerance in religious matters. He enacted several useful statutes, and compiled a code of laws, 'The Breviary of Alaric II.'

Alarm, a British first-class torpedo gunboat, launched in 1892. The ship-name is associated with Rodney's capture of Martinique (1762), capture of two French corvettes (1762), capture of the *Fenix* and *Thetis* (1762), Havana (1762), and the Nicaragua Expedition (1848).

Alarodian Languages, the group of languages of the Caucasus, of which Georgian is the chief division. The Alarodian group is distinctly inflectional. Sayce is inclined to think that the cuneiform inscriptions of Van represent an extinct form of Alarodian speech. See De Brosset's *Éléments de la Langue Géorgienne* (1837); Sayce's *Introd. to the Science of Language* (1880).

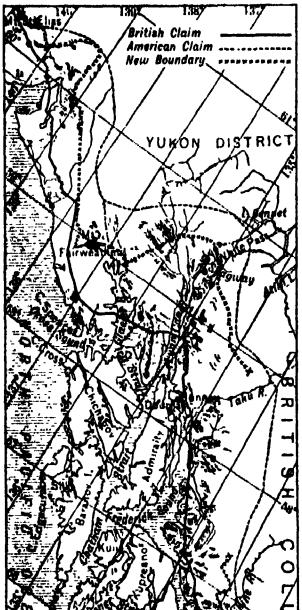
A Lasco, Johannes. See Lasco.

Ala-Shan, prov., S. Mongolia, lying between the desert of Gobi (Golbiin-Gobi) to the N., the prov. of Kan-su and the Great Wall to the S., the Hoang-ho and Ala-Shan range, or Khara-Narim (11,000 ft.), to the E. The area is about 5,700 sq. m., the extreme length about 800 m., the mean breadth about 480 m.; the pop. is not more than 20,000. It is mostly a vast plain of sand, broken by grassy steppes, chalk downs covered with saline deposits, and low, unstable, sandy hills rising to 80 ft. or so. West of the Ala-Shan are four low ranges of hills, never more than 1,000 ft. above the desert (3,600 to 5,700 ft. above sea-level). Vegetation is almost absent; and the fauna is poor—the wolf, fox, hare, crow, crane, lizard, and serpent. The population is mostly composed of the Kalmuck stock, near relatives of the Kalmucks of the Lower Volga basin (E.). Their live stock are mainly goats and yaks. Kirghiz and Chinese compose the rest of the inhabitants. Chinese and Mongol caravans traverse Ala-Shan on their way to and from Tibet. The province was annexed to the empire of China in 1636.

Alashehr (anc. *Philadelphia*), walled city, on railway, 74 m. E. of Smyrna, Asia Minor; has many ruined columns and fountains; is seat of a Greek archbishop; considerable trade. Pop. over 22,000.

Alaska consists of the N.W. extremity of N. America W. of 141° W. long., and a strip of coast extending S. to 56° N. lat., together with the adjacent islands. Its area is about 578,000 sq. m., and its general coast-line measures 4,000 m.; inlets and islands included, the coast is some 18,000 m. long. The coast ranges of British Columbia traverse the S. part of Alaska, pass along the Alaskan peninsula, and appear partially submerged in the Aleutian Is. West of Cross Sound

thousands of glaciers. Along a belt of 2,000 m., from Cross Sound



Alaska—The Disputed Territory.

to the Aleutian Is., there are ten active volcanoes, and numerous hot springs highly charged with mineral matter. North of this coastal region lies a mountainous region of older rocks, rising to heights of 4,000 to 5,000 ft. Along the shores of Bering Sea and the Arctic Ocean, low, nearly level tundras extend inland for 70 to 100 m. South-eastern Alaska is an archipelago formed by submergence. The forests of this region are remarkably fine and valuable, mostly composed of the Menzies or Sitka spruce and the Marten spruce or hemlock. In the Yukon valley the trees are small, and the white spruce is the only timber of any value. The Yukon R., with its tributaries, drains the centre of Alaska. On the Kowak, the subsoil ice, common in Alaska, rises in cliffs 125 to 150 ft. above the water. The climate presents marked contrasts. The mean temperature at Juneau and Sitka is about 50° F., and the thermometer seldom falls below 0° F. In the interior the thermometer sometimes rises in summer above 90°, but in winter temperatures of 40° and 50° below zero are frequently experienced. Sitka has an annual rainfall of 83 in.; on the S. coast 100 in. fall, and still more in the islands; yet in the interior and on the N. coast there is little rain.

The most important product is gold. At the Treadwell mine in Douglas I., near Juneau, and other workings in the vicinity, although the ore yields only ten to twelve shillings-worth of gold per ton, it is easily worked, and returns large profits. Auriferous veins have also been found at Silverbow basin, 3 m. E. of Juneau, at Sumdum, 5 m. to the S.E., and on Admiralty I. Gold-bearing rocks occur all along the Yukon, from the ramparts W. of Birch Creek, and about 900 m. from the mouth, into Canadian territory; and Circle City, in 65° 40′ N. lat., very near the Arctic Circle, was a great mining centre till the discovery of coarse gold on the Klondike drew the miners across the frontier. The gold is alloyed with a small quantity of silver; and native silver, lead, and copper are frequently found. Platinum has also been reported from several localities. Brown coal occurs near the gold-producing district, on the E. shores of Cooks Inlet, on the S. shore of the Alaskan peninsula, in the Alexander archipelago, and elsewhere. Fur seals are taken at their chief breeding-place, the Pribylov Is., and hair seals occur along the entire coast-line. Large quantities of halibut, cod, and herring may be caught off the coast, and salmon and trout abound in all the rivers. In the interior there are still some valuable fur-bearing animals, also moose, caribou, deer, bears, mountain sheep, and wild goats. The traffic in fur has fallen off. A railway runs from Skagway to Whitehorse Rapids, through the White Pass, and is to be continued to Fort Selkirk, on the Pelley R. St. Michael's, Nome, and other ports in the W. are accessible only in July, August, and September. In summer flat-bottomed steamboats ply up and down the Yukon. A project for a train ferry between Alaska and Siberia, across Bering Strait, is taking shape. The Americans propose to construct a railway, 800 m. long, from Cooks Inlet to Bering Strait, and to make the gauge the same as on the Siberian line, which would connect Bering Strait with Irkutsk, so that the trains may be carried backwards and forwards by boat.

The natives belong to two main stocks, known as Eskimo and Indian. The Eskimos are divided into the Innuits, dwelling on the N. and W. coasts, and the Aleuts of the Alaskan peninsula and the Aleutian Is. The Indians of the interior are known as Tinneh or Athabascans, and those of S.E. Alaska as Thlinkets. In 1900 the total population was 60,043, of whom 30,507 were whites and 29,536 natives, more than one-half of the latter being Eskimos.

This part of the world was first sighted by the Russian navigator Bering in 1740, and the Russians began to settle there in 1784. In 1867 Alaska was sold to the United States for £1,440,000. Gold was discovered at Dawson City in 1896-97, and at Nome in 1898-9. The boundary line between Canada and Alaska was finally adjudicated by a joint commission, which reported in November 1903. See Dall's *Alaska and its Resources* (1870); Jackson's *Alaska* (1880); Wardman's *A Trip to Alaska;* Elliott's *Our Arctic Prov.* (1886); Seton-Karr's *Shores and Alps of Alaska* (1889); Stevenson's 'Notes on S.E. Alaska and its People,' *S.G.M.* (1894); *The Fisheries and Fishing Industries of the U.S.* (U.S. Commission of Fish and Fisheries); Russell's 'Alaska: its Phys. Geog.,' *S.G.M.* (1894); *The Mineral Resources of the U.S.* (U.S. Geol. Survey).

Alassio, seapt. tn., bathing and winter resort of Italy, prov. Genoa, in the W. Riviera, 30 m. S.W. of Savona. Fishing and fruit-growing are thriving industries. Pop. (1901) 5,247.

Alastor, in Greek mythology, a name applied to any avenging demon, but principally to Zeus as the vindicator.

Ala-tau, four mountain ranges in the Russian (Asiatic) province of Semiryechensk. (1) The Kunghei Ala-tau and (2) the Trans-Ili Ala-tau stretch E. and W. on the N. side of Lake Issyk-kul (alt. 6,000 to 13,000 ft.), while (3) the Terskei Ala-tau lies parallel to them on the S. side of the lake: all three form part of the Tian-Shan system. (4) The Dzungarian Ala-tau stretches farther to the N. across 80° and 82° E. long. and 45° N. lat., and reaches 11,000 ft.

Alatri, tn., prov. Rome, Italy, 45 m. S.E. of Rome, with remains of Cyclopean walls. Manufacture of tapestry and cloth. Close by is the Carthusian monastery of Trisulti. Pop. (1901) 15,450.

Alatyr. (**1.**) Town of Russia, Simbirsk gov., 102 m. N.W. of Simbirsk. Large grain trade. Pop. (1897) 11,086. (**2.**) River of E. Russia (Volga basin), rising in the Penza hills, flowing E. across Nijni-Novgorod gov., and falling into the Sura at Alatyr.

Alausi, tn. in valley of same name, over 60 m. E. of Guayaquil, Ecuador; *hot springs*; valley produces great crops of grain and fruit. Pop. 6,000.

Alaux, JEAN, called LE ROMAIN (1786-1864), French painter, studied under Vincent and Guérin, and in 1815 won the Grand Prix de Rome with *Briseis finding the Body of Patroclus in the Tent of Achilles.* He was at the head of the French Academy at Rome from 1847-50.

Alava, MIGUEL RICARDO DE (1771-1843), served first in the navy, then in the army, of Spain. During 1808-11 he fought on the side of the French, then joined the Spanish independents, and served under Wellington, who gave him command of a brigade. Later he was Spanish ambassador in the Netherlands (1819), London (1834), and Paris (1835). In 1822 he was elected president of the Cortes.

Alava, prov., N. Spain, one of the three formerly autonomous Basque Provinces; intersected by river Zadorra (trib. of Ebro), traversed by N. of Spain Ry. Pop. (1900) 96,385. Cap. Vitoria.

Alb, or ALBE, an ecclesiastical garment in use since the 4th century, though now commonly worn only in the Roman Catholic Church. It consists of a tunic of white linen fastened with a girdle. The surplice is a modification of it.

Alb, ALP, or ALF, in Teutonic and Scandinavian traditional lore, denotes a kind of being believed to have existed contemporaneously with man, although differing from man in some respects. The elf-king Alfrigg or Elberich has assumed, through a French medium, the more familiar form of Oberon. See ELF and DWARF RACES; also Jacob Grimm's *Teutonic Mythology.*

Alba, tn. and episc. see, prov. Cuneo, Italy, on the Tanaro, 42 m. by rail S.W. of Alessandria; manufactures silk. Its cathedral dates from 1486. Pop. (1901) 13,637.

Alba Longa, the ancient political and religious cap. of the Latin League, was built on a ridge above Lake Albano, 20 m. E. of Rome. The supposition that Alba Longa stood on the E. side of the lake, near the modern Palazzuolo, was generally accepted from 1624 to 1899; but in the latter year T. Ashby (*Jour. of Philology,* No. 53) advanced good reasons for placing the site of the ancient city on the S. of the lake, near Castel Gandolfo and the ancient *Bovillæ.*

Albacete. (**1.**) Prov. in S.E. of Spain, formerly part of kingdom of Murcia; traversed by main line ry. from Madrid to Murcia. Pop. (1900) 237,877. (**2.**) Capital of prov. of same name, on main line ry. Madrid to Murcia, 184 m. from Madrid; famous for cutlery; centre of great agricultural district. Pop. (1900) 21,512.

Alban, ST., the first British martyr, was born at Verulamium in the 3rd century. After a journey to Rome in company with Amphibalus, he adopted the Christian religion, and suffered martyrdom in 286 or 303, during the reign of Diocletian. Offa, king of the Mercians, erected in his memory a monastery near Verulamium, and around it grew up the town of St. Albans.

Alban Hills, in Italy, a volcanic girdle which overlooks the Campagna, 15 to 20 m. E. of Rome. The slopes of the hills (2,500 ft.) are for the most part covered with woods, groves, and orchards, and the tops crowned with numerous small towns—*e.g.* Albano, Ariccia, Frascati, Castel Gandolfo, Genzano. On the S. edge of the girdle are the crater lakes of Albano and Nemi. Lake Albano, about 6 m. in circumference, lies 960 ft. above sea-level. The water in the lake is regulated by an artificial sluice and outflow channel driven through the tuff by the Romans when Veii was captured (396 B.C.)—such is the story of Livy; but the works are probably older than the 4th century B.C. The *Mons Albanus* of the ancients was the isolated volcanic cone Monte Cavo (3,115 ft.). Roman generals to whom a triumphal entry into Rome was not accorded used to make a military parade up the Alban Mount to the great temple on its summit.

Albani, a Roman family who in the 15th century were driven by the Turks from Albania, and took refuge in Italy. They produced five cardinals and a Pope—*viz.* Clemens XI. (1700). The most important members of the family are:—ANNIBALE ALBANI (1682-1759), cardinal, author of *Memorie sopra la Città d'Urbino* (1724). ALESSANDRO ALBANI (1692-1779), cardinal, antiquary, and literary patron. His home, the Villa Albani, contains a valuable collection of works of art. GIOVANNI FRANCESCO ALBANI (1720-1809), bishop of Ostia, and then, when only twenty-seven, cardinal. GIOVANNI GEROLAMO ALBANI (1504-91), cardinal, author of several works on jurisprudence. GIUSEPPE ALBANI (1750-1834), cardinal, a patron of music. See Tipaldo's *Biografia Italiana.*

Albani, or ALBANO, FRANCESCO (1578-1660), Bolognese painter; studied at the celebrated school of Ludovico Caracci, and later at Rome. He was the first Italian to paint cabinet pictures. He is represented in the Wallace Collection, London, by *Venus and Cupid,* and in the Louvre by twenty-two religious and classical pictures; nine of his works are in Florence, ten in Dresden, and others are in Milan, Turin, and St. Petersburg.

Madame Albani, the famous Soprano.

(*Photo by London Stereoscopic Co.*)

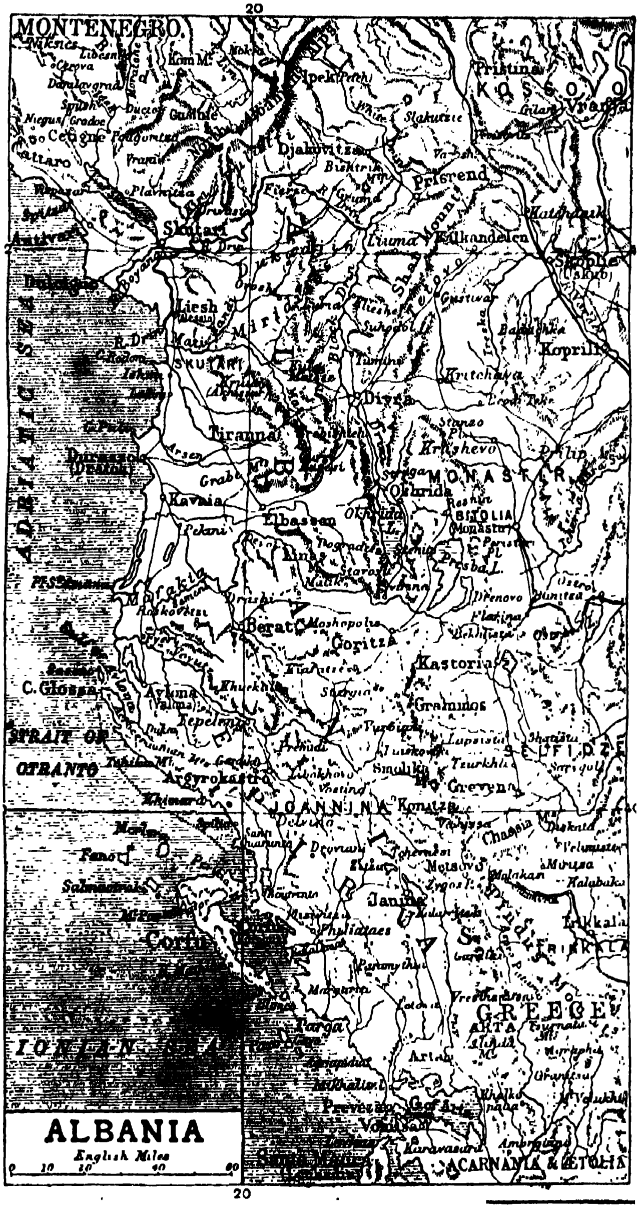
Albani (*née* MARIE LOUISE EMMA CECILIA LAJEUNESSE) (1852), soprano vocalist, known professionally as MADAME ALBANI; born at Chambly, near Montreal, Canada; was trained by her father, Joseph Lajeunesse, a native of Brittany, who was a professional harpist; made her first appearance in public when eight years of age, and at fourteen was leading soprano at the Roman Catholic cathedral, Albany, N.Y.; afterwards studied with Duprez at Paris, and subsequently with Lamperti at Milan; made her début in opera in 1870 at Messina in *La Sonnambula,* and since then has won a great reputation both in oratorio and opera. In 1878 she married Mr. Ernest Gye, who succeeded his father as director of Italian Opera, Covent Garden.

Albani, MATTHIAS (1621-73), celebrated Tyrolese violin-maker, a native of Bozen, trained by Stainer. His son MATTHIAS gained experience under the great violin-makers of Cremona, and settled at Rome.

Albania, an ethnographical rather than a geographical region in the W. of European Turkey, draining towards the Adriatic and Ionian Seas, and extending from Montenegro in the N. to the Gulf of Arta in the S., and from the Adriatic to the Shar Dagh and its extensions southward. The country is mountainous and rugged in the interior, and swampy and unhealthy towards the coast. It consists of the vilayets of Janina in the S., Scutari in the N., and part of Monastir and Kosovo towards the E. The Drin is the chief river. Other rivers are Shkumbi, Semeni, Viosa, and Artino. The principal lakes are Scutari, Okhrida, and Janina. The inhabitants (called by themselves *Shkipetars*, and by the Turks *Arnauts*) are much given to intertribal feuds and brigandage. Formerly all Christians, many Albanians have become Mohammedans; some are Roman Catholics, others belong to the Greek Church. Olives, hides, and wool are exported, chiefly at Durazzo, Avlona, Parga, and Prevesa, at entrance of Gulf of Arta, S. of Epirus. The chief towns are Scutari (35,000), on river Drin, in the N.; and Janina (25,000), in S. Prezren or Perzerin (so called by the Turks), at the entrance of Shar Dagh Pass, which was formerly the capital of the Servian kings. It has extensive manufactures of firearms. The Albanians number about 1,500,000. In antiquity this region was called Illyria. In the 2nd century B.C. it became a Roman province. In the middle ages it was invaded and settled by various Slav tribes. When the Turks invaded Europe, the Albanians fought stubbornly for their independence. The hero of this period is Scanderbeg, who fought successfully against the Turks from 1443-67. In 1478 Albania became a Turkish province. From 1807-22 it was practically independent under the rule of Ali Pasha (called the Lion of Janina), who is best known from Byron's life and poems. The Albanian language belongs to the Indo-European family of languages. It is spoken in a variety of dialects, the most important being the Gegh and the Tosk dialects. Among others, Miklosich, in *Albanische Forschungen* (Vienna, 1870-1), has greatly contributed to the study of this language. The principal works of Albanian literature (which, however, is very scanty) are Gerolamo de Rada's *Poesie Albanesi* (Corigliano, 1889); and his collection of popular songs under the title *Rapsodie di un Poema Albanese* (Florence, 1866), celebrating the heroic past of the nation, forms one of the best folklore collections extant. At the present day, among the writers who endeavour to create a literary language the most active is Constantin Kristoforidis, who, in addition to many didactic works, has published a good grammar of both dialects, and, at the request of the British and Foreign Bible Society, has translated the Bible into the Tosk dialect. See Hahn's *Albanesische Studien* (1854); Pedersen's *Albanesische Texte* (1895).

Albano, or ALBANO LAZIALE, tn. and episc. see, Italy, 19 m. E. of Rome, on the S. slope of the Alban Hills, 1,230 ft. above sea-level, a favourite summer resort of the inhabitants of Rome. Here was a country house of Pompey the Great; also an imperial villa of Tiberius, Caligula, Nero, and Domitian. Pop. (1901) 8,038.

Albany. (1.) City, New York, U.S.A., cap. of the state, and co. seat of Albany co., on the W. bank of the Hudson. It is connected with Lake Erie at Buffalo by the Erie Canal, and is an important commercial and industrial city. Pop. (1900) 94,151. (2.) District N. of Algoa Bay, Cape Colony. Area, 1,685 sq. m. Pop. 23,335. (3.) Seaport tn., N. side of Princess Royal Harbour, King George Sound, W. Australia; port of call for the principal lines of steamers, and a fortified coaling station. Pop. (1901) 3,650. (4.) River in Ontario, Canada; issues from Lake St. Joseph, and after a course of 500 m. flows into James Bay.



John Bartholomew & Co.

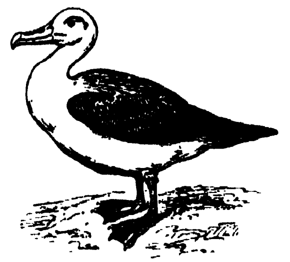
Albany, Convention of, a convention of twenty-five representatives of seven American colonies and delegates from the Six Nations (Indian), held at Albany, U.S.A., in 1754, when, under the lead of Franklin, a plan of confederation (with a president-general and a grand council) was prepared, which was so closely followed two decades later as to entitle Albany to the name bestowed upon it by President Garfield—'the birthplace of the American Union.' See Bryant and Gay's *Hist. of the United States*.

Albany, Count d', the title assumed by two brothers, John Sobieski Stolberg Stuart (1797-1872) and Charles Edward Stuart (1799-1880), who claimed to be the lineal descendants of the Young Pretender. They were certainly the sons of Lieut. Thomas Allen, R.N., but it has not been definitely proved that Allen was, as he contended, the son of Prince Charles Edward. Both brothers were in the service of Napoleon, and fought at Dresden, Leipzig, and Waterloo. After Napoleon's downfall they came to London to learn Gaelic, and thereafter, from 1817-46, they resided at various places in the Scottish Highlands. Their last years were spent in Austria and in London. They wrote several poetical and other works. See *Bookman*, Sept. 1892, and *Cath. Mag.*, 1843.

Albany, Leopold George Duncan Albert, Duke of (1853-84), youngest son of Queen Victoria, was very delicate from his birth. In 1881 the ancient dukedom of Albany was revived in his favour, and his marriage to the Princess Helene of Waldeck-Pyrmont was celebrated in April 1882. In the early spring of 1884 he died at Cannes, after an illness of only one day.

Albany, Louise Marie Karoline von Stolberg-Gedern, Countess of (1753-1824), daughter of the last reigning prince of Stolberg-Gedern, was born at Mons. She married (1772) Prince Charles Edward, the Young Pretender, who was then a dipsomaniac of fifty-two. His ill-treatment compelled her to seek refuge in a convent in 1780. She obtained a legal separation from him in 1783. The poet Alfieri, whose mistress she was, has immortalized her memory. After Alfieri's death she married the French painter Fabre de Montpellier. See *Lives* by Von Reumont (1860) and Vernon Lee (1884), and *Le Portefeuille de la Comtesse d'Albany, 1806-24*, ed. by Pélissier (1902).

Albatross, a name applied to several species of the genus Diomedea, but specially to *D. exulans*, one of the largest birds capable of sustained flight. It is a true sea-bird, following ships for great distances, and rarely found on land except at the breeding season. Like many of its allies, it chiefly haunts the southern oceans, though it also breeds in the N. Pacific. The albatrosses and their allies the petrels are often placed near the gulls; but great as is their power of flight, they are really much more primitive than the gulls.



The Albatross.

Al-Battani, Mohammed ben Jabir ben Sinan, Abu Abdullah (*c.* 850-930), great Arabian astronomer, carried on his observations chiefly at Rakka, in Mesopotamia, from which he has also received the name 'Mohammedes Aractensis.' A brilliant mathematician, he made important advances in trigonometry. He also fixed the length of the year at 365 days, 5 hrs., 46 min., 24 sec.—a calculation which was short of the true length by 2 min. 26 sec. A translation of his works by Plato of Tivoli was printed at Nuremberg in 1537. See Chwolsohn's *Die Ssabier* (1856).

Albay, prov. (2,262 sq. m.), tn., and bay, S.W. extremity of Luzon I., Philippines. The province is very fertile, and has dense forests. Mayon or Albay volcano, in the N.E., is still active. Pop. (1899) 247,075. Albay, the cap., is a seapt. on W. shore of Albay Bay. Pop. (1899) 34,000.

Albedo, a term used in astronomy to signify the proportion of incident light reflected by a non-luminous surface. This is determined for the various planets by comparing the total light received from each with the size of its visible disc and the intensity of the solar rays falling upon it. The following table gives some of the best-authenticated results, absolute whiteness being taken as 1:—

Name of Object.	Albedo.	
The Moon	0·17.	..
Mercury	0·13.	..
Venus	0·50.	**Zöllner.**
Mars	0·26.	**Zöllner.**
Ceres	0·18.	**Barnard.**
Pallas	0·23.	**Barnard.**
Vesta	0·74.	**Barnard.**
Juno	0·45.	**Barnard.**
Jupiter	0·62.	**Zöllner.**
Saturn	0·52.	**Zöllner.**
Uranus	0·62.	**Zöllner.**
Neptune	0·45.	**Zöllner.**

It may be added, for purposes of comparison, that new-fallen snow has an albedo of 0·78; white paper, of 0·70; gray sandstone, clay marl, and quartz porphyry, severally, of 0·24, 0·16, and 0·11.

Albemarle, Dukes and Earls of. See Keppel and Monck.

Albemarle Sound, on E. coast of U.S.A., penetrating the coast of N. Carolina. It extends inland in a W. direction more than 100 m. The shores are everywhere low and marshy, and the entrance is closed by a sand-bar.

Albenga (anc. *Albium Ingaunum*), tn. and episc. see, prov. Genoa, Italy, on the W. Riviera, 26 m. by rail S.W. of Savona, with mediæval walls and towers, remains of a Roman bridge built by the Emperor Constantius in 414-418, and a cathedral dating in part from the 13th century. Pop. (1901) 6,231.

Alberi, Eugenio (1817-78), Italian historian, born at Padua; published, at the age of twenty-three, *Guerre d'Italia del Principe Eugenio di Savoia* (1839), which was much admired for the historical knowledge and scholarship displayed. Other works are *Vita di Caterina de Medici* (1838); *Relazioni degli Ambasciatori Veneti al Senato* (1839). Alberi founded the *Annuario Storico Universale* (1843). He was an advocate of liberal principles. His last work is *Il problema dell' Umano Destino* (1872). He died at Vichy.

Alberni, lumber-shipping port and inlet on Pacific coast of Vancouver I., British N. America. The inlet is 20 m. long, and from ½ to 1 m. wide, with a fine natural harbour at its head.

Alberoni, Giulio (1664-1752), Spanish statesman, was the son of an Italian gardener. During the war of the Spanish Succession he served under Vendôme, and in 1713 was appointed agent of the Duke of Parma at the court of Philip V. of Spain, where he ingratiated himself with the king, and eventually became cardinal and prime minister. His policy aimed, first, at checking the decline of Spain by drastic reforms and by the development of her resources; and, secondly, at annulling the treaties of Utrecht and Rastadt, as being subversive of the balance of power, and disastrous to Spain and Italy. Between 1715-17, under his vigorous policy of reorganization and reform, commerce revived, the revenue was increased, manufactures flourished. His opposition to provincial as well as to class privilege made him, however, very unpopular with the Spanish nobles. His ambitious foreign policy, in which, backed by the queen (Elizabeth Farnese), he aimed at reannexing Milan, Naples, Sardinia, and Sicily to the Spanish crown, and the

Spanish occupation of Sardinia in 1717, gave rise to a quadruple alliance against Spain between England, France, Austria, and Holland, and the destruction of the Spanish fleet by the British fleet, under Byng, in the battle of Cape Passaro (1718). At length, under pressure from the allies, Philip dismissed his minister in December 1719. After his departure from Spain, Alberoni's life has not many points of interest. He took part in the election of Innocent XIII. Clement XII. made him legate of Ravenna; but in 1740 he retired to Piacenza, where he founded a college, and where he died. See Bersani's *Storia del Cardinale Giulio Alberoni* (1862); Professione's *Il Ministro in Spagna ed il Processo del Cardinale Giulio Alberoni* (1897); Bourgeois's *Lettres intimes d'Alberoni adressés* (1893) *au Comte J. Rocca.*

Albert. (1.) District N. of Cape Colony, bounded by the Orange R. The whole country lies high, and has a cold climate in winter. There are three coal mines in the district — two at the village of Molteno, and one at Cyphergat. Area, 2,635 sq. m. Pop. 16,649. (2.) Town, dep. Somme, France, on riv. Ancre, 18 m. N.E. of Amiens. Cotton-spinning and manufactures of paper, cast iron, and beetroot sugar. Pop. (1901) 7,348.

Albert (1490-1568), son of the Margrave of Ansbach, nephew of Sigismund, king of Poland, became last grand-master of the Teutonic Order in 1512. He refused to do homage to the king of Poland, who in 1519 declared war, which was concluded by a four years' truce in 1521. Four years later, Albert, now a zealous reformer, made a treaty with his uncle, and became hereditary Duke of Prussia under the Polish crown, with the right of succession to the estates of the Teutonic Order. Thereafter he devoted himself to his dukedom, establishing schools and the Königsberg University.

Albert, Margrave of Brandenburg, surnamed the German Alcibiades (1522-58), fought in the cause of the Emperor Charles V. in 1544, and subsequently in that of the king of France. Returning to his former allegiance, his conduct in Germany earned for him so much hatred that a league was formed against him. Defeated in a conflict with his enemies, he was placed under the ban of the empire, and died a victim of his own excesses.

Albert I. (1250-1308), Duke of Austria and German Emperor, eldest son of Rudolph of Hapsburg. His arrogant claim to the throne on the death of his father in 1292 was met by the election of Adolphus of Nassau, who was deposed in 1298, and in the same year defeated and slain by his rival. Albert was elected and crowned (1298), and first joined France against the Pope, and then the Pope against France. Wars with the Netherlands, Hungary, and Bohemia followed. His despotic measures in Switzerland provoked (1308) the revolution which led to the formation of the Swiss Confederation. It is to this period that the story of William Tell belongs. Albert's refusal to recognize the claim of his nephew, Don John, to the dukedom of Swabia aroused a conspiracy against him, and he was murdered by the disappointed claimant.

Albert I., Duke of Brandenburg (1100-70), called the 'Bear,' founder of the house of Anhalt; succeeded his father in 1123, and in 1125 became duke of the Ostmark and Lusatia; in 1134 he was invested by the emperor with the province of the Nordmark, or the territories on the left bank of the Elbe taken from the Slavs. These Albert transformed into a German province. In 1147 he undertook a crusade against the Wends, and in 1150 came into possession of the margravate of Brandenburg, and took the title of Duke of Brandenburg. In 1169 he resigned in favour of his eldest son.

Albert III., surnamed Achilles, and also Ulysses (1414-86), was third son of Frederick I., Elector of Brandenburg, whom he succeeded (1440) in the principality of Ansbach. From his brother John he inherited the principality of Baireuth in 1464, and in 1470 received the electorate of Brandenburg from his brother, Frederick II. Under his rule the Franconian lands were reunited with Brandenburg. He effectually resisted the attempts of the Teutonic knights to repossess themselves of the Neumark, and engaged in successful wars with Mecklenburg and Pomerania. He wrote the *Dispositio Achillea,* a family ordinance which provided for the future separation of Brandenburg and Ansbach-Baireuth, and, according to Hallam, first legally established primogeniture.

Albert V., Archbishop of Magdeburg and Elector of Mainz, commonly known as Albert of Brandenburg (1490-1545), was the second son of the elector, John Cicero of Brandenburg; entered holy orders, became in 1513 archbishop of Magdeburg, in 1514 archbishop and elector of Mainz, and in 1518 cardinal. He was one of the principal adversaries of the reformation, and Luther attacked him in a pamphlet, though at first Albert had tried to bring about reconciliation between the two parties. In return for the payment of 500,000 fl. he granted his Protestant subjects in the see of Magdeburg the free exercise of their religion. He was the first German prince to admit the newly-created order of the Jesuits into his dominions, and took a prominent part in the preparation for the religious wars which broke out shortly after his death. See Schum's *Kardinal A. von Mainz* (1878).

Albert the Bold, Duke of Saxony, younger son of the Elector Frederick (1443-1500), passed a portion of his early life at the court of Frederick III. in Vienna. On their father's death, the brothers Ernest and Albert ruled Saxony in partnership; but subsequently, by the agreement of Leipzig (1485), Ernest received Thuringia, and Albert Meissen. A brave and accomplished soldier, Albert fought in the wars of Frederick of Austria, against Charles the Bold (Duke of Burgundy) and others. His intervention on behalf of Maximilian I. gained him the stadtholdership of the Netherlands, as well as the hereditary governorship of Friesland. He was the founder of the present royal house of Saxony. See Abramoffski's *Zur Geschichte Albrechts des Beherzten* (1890).

Albert the Pious (1559-1621), Archduke of Austria, sixth son of the Emperor Maximilian II. Brought up at the Spanish court, he entered the church, and in 1577 he became cardinal, archbishop of Toledo (1584), and, in 1594, viceroy of Portugal. In 1596 he was appointed stadtholder of the Netherlands, and carried on the war against the revolted people. Defeated at Nieuwpoort, he took Ostend (1604) after a three years' siege, and concluded a twelve years' truce with the Dutch (1609). He ruled with justice and moderation until his death.

Albert, Alexandre Martin (1815-95), French politician, played an active part in the revolution of February 1848. He became a member of the provisional government, and presided over the commission for the organization of Louis Blanc's national workshops. He represented the department of the Seine in the Assembly, but suffered ten years' imprisonment for a political offence. In the siege of Paris, in 1870, he served on the Commission of Barricades.

Albert, Eduard (1841-1900), surgeon, native of Bohemia, studied at Vienna, where, in 1881, he became professor of clinical surgery, after acting as professor of surgery at Innsbruck. Results of his important researches appear in his *Beiträge zur Geschichte der Chirurgie* (1878); *Beiträge zur operativen Chirurgie* (1878-80); *Lehrbuch der Chirurgie* (1889-91); *Diagnostik der chirurgischen Krankheiten* (1890); *Zur Theorie der Skoliose* (1890).

Albert, Eugen Francis Chas. d' (1864), pianist and composer, son of a French musician; was trained first by his father, and subsequently in London under Sir Arthur Sullivan and others, but he owes much to Liszt and Hans Richter. With the latter he went to Vienna in 1881, where he achieved marked success. His compositions include the operas *Ghismonda* (1895), *Die Abreise* (1898), *Kain* (1900), and two others.

Albert, Francis Charles Augustus Emanuel (1819-61), Prince Consort, husband of Queen Victoria, was the younger of the two sons of Ernest, Duke of Saxe-Coburg-Gotha. He was carefully educated at Brussels and Bonn (1836-8), where he showed himself an ardent student, acquired many accomplishments, and developed a taste for music and the fine arts. King Leopold and Baron Stockmar had long contemplated an alliance between Prince Albert and Princess Victoria, and the pair were brought together in 1836. When the succession of Victoria was assured the betrothal took place, and on Feb. 10, 1840, the marriage, which was one of real affection on both sides, was solemnized in the Chapel Royal, St. James's Palace. The Prince Consort's position as the husband of a constitutional sovereign was difficult, and in the early years of his married life his interference in matters of state was resented. Ultimately he became 'a sort of minister, without portfolio, of art and education,' and in this capacity won much esteem and popularity. He also interested himself in agriculture and in social and industrial reform. To him was due the Great Exhibition of 1851, which resulted in a balance of £200,000, available for the encouragement of science and art. His personal character was very high, and he exercised great influence on his children. He was an ideal consort, and entirely worthy of the title 'Albert the Good.' On Dec. 14, 1861, he succumbed to an attack of fever, and was buried in St. George's Chapel, Windsor. His remains were afterwards removed to the mausoleum at Frogmore. See Sir Theodore Martin's *Life of Prince Consort* (5 vols. 1875-80); Rimmer's *Early Homes of the Prince Consort* (1883); Grey's *Early Years of the Prince Consort* (1867); *Memoirs of Baron Stockmar* (1873).

Albert, Prince Consort.

Albert, Frederick Rudolf, Archduke of Austria (1817-95), son of the Archduke Charles, was born at Vienna. He fought at Santa Lucia, Gravellona, Mortara, and Novara (all 1848), under Radetzky, and as field-marshal commanded the army at Custozza (1866). He did much to reorganize the Austrian army, and was the author of works on military subjects. See *Life* by Emmer (1899).

Albert, Heinrich (1604-55 or 56), musical composer, was born at Lobenstein, in Vogtland; studied music under his uncle Schütz in Dresden, and was appointed organist in the cathedral at Königsberg in 1631. His poems, consisting chiefly of hymns, have been set to music by himself. Those still in use include *Gott des Himmels und der Erde; Zum Sterben ich bereitet bin.* His secular poems are noted for their grace and lightness. They are collected, with those of Dach and Robertin, in *Poetisch-musikalischen Lustwäldlein* (1642-8); a selection, set to music, and edited by Eitner, appeared in 1883-4.

Albert, Joseph (1825-86), photographer, began his professional career at Augsburg in 1850, and in 1858 settled at Munich. He produced a large number of copies of famous pictures and drawings.

Alberta, one of the four N.W. Territories of the Dominion of Canada, bounded on the w. by British Columbia, on the s. by the international boundary (49° n. lat.), on the e. by Assiniboia and Saskatchewan, and extending n. to 55°. Its length from n. to s. is 430 m., its average width from e. to w. is 250 m., and its area 106,100 sq. m. Topographic and climatic conditions divide the territory into a southern region of open, rolling country without trees, except along the streams and foothills of the Rocky Mts., and a northern region of timbered country, broken here and there by patches of prairie. S. Alberta is an ideal ranching and dairying country of high plains, cleft by the courses of large streams which rise in the Rocky Mts., and covered by luxuriant grasses. The soil is a rich alluvial loam, but irrigation is necessary for grain and fodder crops. N. Alberta is essentially an agricultural district, and is well adapted for the growth of all kinds of grain, vegetable, and root crops. The winters are cold, the mean average winter temp. at Edmonton being 11·3° f.; but even here the beneficent influence of the Chinook winds tempers the climate. Calgary, the chief town of S. Alberta, has an average winter temp. of 12·2° f., and a summer temp. of 58·3° f., or 3·1° higher than that of Edmonton, the capital of the territory. Alberta is well watered by the upper courses of the Smoky, Athabasca, N. Saskatchewan, Battle, Red Deer, Bow, Belly, and Milk rivers. It is traversed from e. to w. by the main line of the C.P.R., and from n. to s. by the Calgary and Edmonton Ry., which extends to Fort M'Leod, and thence by Lethbridge to the American railway system. A branch of the C.P.R. traverses S. Alberta to the s. of the main line, and crossing Crow's Nest Pass gives access to the British Columbian mining districts of E. and W. Kootenay. The whole territory is underlaid by coal measures, which near Edmonton crop out on the bank of the N. Saskatchewan. The coal of Lethbridge is of good quality, and bituminous coal and anthracite abound in the foothills and in the mountain mines of Canmore and Banff. Placer-mining for gold is carried on near Edmonton, on the Saskatchewan R., and elsewhere; iron, silver, galena, copper, and petroleum are found; and there are sulphur springs at Banff, where the Bow R. breaks through the 'gap' in the Rockies. Banff, which has a sanatorium, is the station for the Rocky Mt. Park, 20 m. long by 10 m. wide. Pop. of territory (1901) 65,876. See *Reports of the Geol. and Nat. Hist. Survey:* Alberta District - Southern, G. M. Dawson (1882-4); Northern, J. B. Tyrrell (1886).

Albert Edward. See Edward VII.

Albert Edward Nyanza, a lake in the upper part of the Nile basin, Central Africa, of nearly circular form, lying just south of the equator, about 3,240 ft. above sea-level, between Ankole (Uganda Protectorate) and the Congo Free State; has a circuit of 140 m. and a diameter of 45 m.; drains the s. slopes of the Ruwenzori Mt. through the Wami and Mpanga rivers, and sends its overflow through the Semliki n. to the Albert Nyanza. Discovered by Stanley in 1889, and named after the Prince of Wales. On most maps the Albert Edward is shown projecting n.e. some distance beyond the equator; but this sheet of water, formerly supposed to form part of the Albert Nyanza, and named Beatrice Gulf by Stanley, is now known to form an independent basin, the saline Lake Rusango or Ruisamba, separated from the Albert Edward by a tongue of land, and of crater-like formation, without any outflow.

Alberti, KONRAD (1862), pen-name of Konrad Sittenfeld, German novelist and dramatist. His works include *Wer ist der Stärkere*, *Die Alten und die Jungen*, *Die Rose von Hildesheim*, and *Die Schöne Theotaki*.

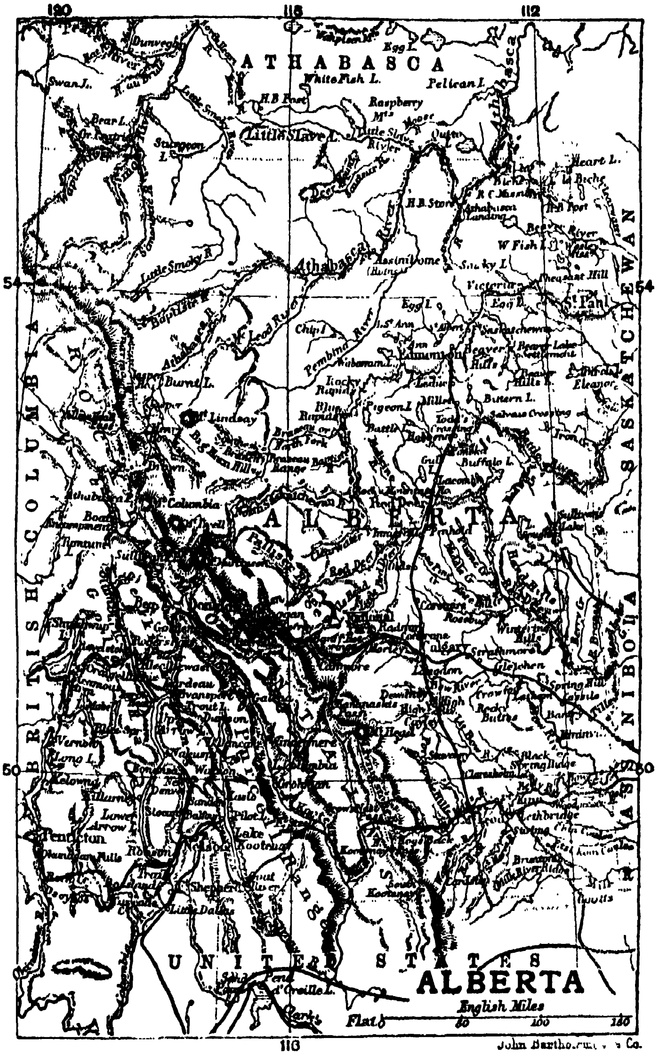
Alberti, LEONE BATTISTA DEGLI (1404-72), Italian writer, architect, sculptor, painter, and scholar; spent most of his life at Rome, where, from 1432-72, he was papal abbreviator. Buildings at Florence and Mantua testify to his architectural skill, his constant endeavour being to revive the classical style. His work, *De Re Ædificatoria* (1485), appeared in numerous editions, and in 1565 was translated into Italian. He also wrote on painting and sculpture. His great work in literature is *Della Famiglia* (1437-41), which discusses education and domestic economy, and contains a picture of Italian life at the time of the renaissance. Other important works are the *Teogenio* (the influence of fortune on man) and *Della Tranquillità dell' Anima*. He also wrote in Latin, and imitated classical models so skilfully that his comedy of *Philodoxius* was long held to be the work of an ancient writer. He is credited with the invention of the camera obscura. See Tiraboschi's *Storia della Letteratura Ital.*; G. Mancini's *Vita de Leon Battista Albert* (1882); also the *Nuovi documenti e notizie*, etc., of the Arch. Soc. Ital., 4th Series, vol. xix.

Albertine Line, the younger of the two dynasties of the German (Saxon) family of Wettin; founded in 1485; gained the electoral dignity in 1547; ascended the throne of Poland in 1697, but lost it in 1763; and since its foundation has ruled in what is now the kingdom (since 1806) of Saxony. The elder branch is known as the Ernestine line, and now rules several of the small Thuringian (Saxon) states of Germany.

Albertinelli, MARIOTTO (1474-1515), Florentine painter, apprenticed to Cosimo Rosselli; friend and assistant to Fra Bartolommeo, whose work his paintings closely resemble. The National Gallery, London, has a *Virgin and Child* attributed to him; his most important paintings are in Florence, Louvre in Paris, and Munich.

Albert Medal, a British decoration, established in 1866, for gallantry in the saving of life.

Albert Memorial, in Hyde Park, London, erected in memory of Prince Albert, is an Eleanor cross, 150 ft. high, embellished with statues, after the design of Sir George Gilbert Scott. It was completed in 1872, and contains a gilt statue of Prince Albert by Foley, unveiled Mar. 9, 1876. (See Bell's *Account of Albert Mem.*, 1873.) The Albert Hall, opposite, also a memorial to the Prince Consort, was opened March 29, 1871. It is seated for 10,000 persons, and has a fine organ.



ALBERTA

Albert Nyanza, a lake in British E. Africa, in the basin of the Nile, extending N.E. to S.W. from about 2° 20′ to 1° 10′ N. lat., about 110 m. long by about 20 to 25 m. broad, from 30° to 31° E. long. Together with Tanganyika and Albert Edward Nyanza, it occupies the W. rift-valley of Eastern Equatorial Africa, at an altitude of 2,400 ft. At its S.W. end it receives the Semliki R., and at its N.E. end the Somerset Nile, while at its extreme N. its waters find an outlet in the White Nile. On the E. and W. the lake is hemmed in by high escarpments. The S. end of the lake is occupied by impenetrable ambash forest. Discovered by Sir S. Baker (1864), and circumnavigated by Romolo Gessi (1876).

Albertus Magnus (1193-1280), known also as the UNIVERSAL DOCTOR, came of a Swabian family; a Dominican monk, and afterwards (1260) archbishop of Ratisbon; was a celebrated teacher of science, theology, and philosophy in the University of Paris (1230), and also at Cologne, where he died. His vast knowledge of science brought on him the accusation of wizardry and black magic.

Albert Victor, PRINCE. See CLARENCE, DUKE OF.

Albertville, tn., dep. Savoie, France, on river Arly, close to its junction with the Isère; 24 m. from Chambéry, on the branch line from Chambéry to Moûtiers. It has a large trade in slates, earthenware, and tiles. Pop. (1901) 6,164.

Alberus (ALBER), ERASMUS (c. 1500-53), theologian and reformer; born near Frankfort-on-the-Main. In 1518, at Wittenberg, he became intimate with Luther and Melanchthon. From 1528-39 he was pastor at Sprendlingen, and afterwards at Brandenburg. He was active in the propagation of Lutheranism, and was well known as a pamphleteer, hymn-writer, and fabulist; the final edition of his fables, *Das Buch von der Tugend und Weisheit*, appeared in 1550. See Schnorr von Carolsfeld, *Erasmus Alberus* (1893).

Albi (anc. *Albiga*), tn., cap. of dep. Tarn, France, on the l. bk. of the Tarn. It is the seat of an archbishop, and has a trade in aniseed, wines, and canvas. Pop. (1901) 22,571.

Albigenses, a name applied, from the end of the 12th century, to a sect of heretics living in the S. of France; probably derived from the town Albi, where it is said the heresy first appeared. They professed the same religious views as the Cathari, the Patarenes, and similar sects, which originated in the 11th century among the Slavs in the Balkan peninsula. Thence they spread to Italy, the S. of France, Germany, and Flanders. They believed in the existence of two principles, good and evil, equally eternal; they denied the incarnation, passion, and resurrection of our Lord. Their morality was pure, even to asceticism; they condemned the procreation of children. The Albigenses were destroyed by the so-called crusade against them promoted by Innocent III., which was headed by Simon de Montfort; it was directed principally against Raymond VI., Count of Toulouse, in whose dominions the heretics were numerous. These unfortunate people were slaughtered without pity; whole towns were destroyed, including Béziers, where 20,000 perished at one time; and that part of France was utterly devastated. The struggle lasted twenty years (1209-29), and was concluded only by the complete submission of Raymond VII. (who succeeded his father in 1222) to the conditions of the king of France, who, after the death of Simon de Montfort, carried on the crusade. The Albigenses were utterly rooted out, except a few who fled to Piedmont; and the Inquisition was established at Toulouse. See Donais's *Les Albigeos* (1878); Peyrat's *Histoire des Albigeois* (1882).

Albinism, the absence of pigment in man or animals; sometimes occurring in patches, giving a piebald appearance; often affecting the whole body, and, in the true albino, even the iris and choroid membrane of the eye. In the human albino the skin is transparent, white and pink; the hair white as in old age; the iris a pinkish gray, or, in negroes, blue; the pupil contracted and bright red; and the eye painfully sensitive to light—the albino being, consequently, short-sighted by day, and seeing best at dusk. The chief predisposing cause appears to be unhealthiness of climate, such as that of low-lying tropical countries; it may also be due to congenital arrest of development, and is sometimes associated with other malformations; but it often occurs in persons who are otherwise normal. White mice, white rabbits, white crows, white elephants, etc., are albinos.

Albion, an ancient name, in use (probably) among the early Celtic inhabitants for *Britain*. In the form *Alban* or *Albany* it is restricted to Scotland, and especially to the Highlands of Scotland. Its origin is conjecturally connected with Gaelic *alp*, 'a hill,' and Latin *albus*, 'white.'

Albion, a British first-class battleship, launched in 1898. The name is associated with the bombardment of Algiers (1816), Navarino (1827), and Sebastopol (1854).

Albion Metal, a mechanical compound of tin and lead, formed by pressing sheets of these metals together.

Albion, NEW, the name given to the N.W. coast of America by Sir Francis Drake on his voyage of exploration in 1579. Humboldt held that this designation applied only to the district between the Columbia River and the Bay of San Francisco.

Albion Press, a hand-press invented about 1823 by R. W. Cope of London. Still used for pulling proofs. The impression is given by means of a piston moving up and down, which propels the platen.

Albistan, or EL BOSTAN, tn., 40 m. N.E. of Marash, Asiatic Turkey. Pop. 6,400.

Albite, a very widespread mineral, especially in such rocks as gneiss and mica-schist. It is a soda felspar (see FELSPAR), consisting of soda, alumina, and silica; and forms colourless or white transparent crystals. See Rutley's *The Study of Rocks* (1870).

Albocarbon, a name for naphthalene, $C_{10}H_8$, when used to enrich coal-gas. See NAPHTHALENE.

Alboin (reigned 561-572 or 574), the Lombard conqueror of Italy; succeeded his father, Audoin, in the kingship of the tribe while they were yet settled in Pannonia. He twice defeated the Gepidæ (551 and 566), on the second occasion slaying their king, Kunimond, whose daughter, Rosamond, he then made his queen. In 568 the Lombards left Pannonia, and descended upon Italy by the plain between Venice and the Carnic Alps. Alboin took Milan (569) and Pavia, which he made his capital. His rule was wise and moderate. But having made his wife drink, at a feast in Verona, from a wine-cup made of her father's skull, he was murdered by her paramour. (See Paulus Diaconus, *Hist. Langobardorum*, I. i. and ii.; *Gregory of Tours*, I. iv. c. 35.) The story has been much used by dramatists, from the *Rosmunda* of Rucellai (1525), through Bandello (18th novel of Part iii.), to the Elizabethan stage. Later versions are Davenant's first play, *The Tragedy of Albovine* (1629), Alfieri's *Rosmunda*, and Swinburne's *Rosamund, Queen of the Lombards* (1899).

Albona, tn., Austria, on the E. side of Istria, 20 m. N.E. of Pola, near lignite mines. Pop. (1900) 10,963.

Alboni, MARIETTA (1823-94), celebrated contralto vocalist; born at Cesena, near Ravenna; became a pupil of Bertolotti and Rossini, and made her début at Bologna and Milan when only fifteen; attained remarkable success in London, Paris, and America. She was married to Count Pepoli in 1854, and retired from the stage in 1866. Her voice had a range of two and a half octaves.

Albornoz, ÆGIDIUS (c. 1300-67), cardinal; born at Cuença, in Spain; a notable prelate warrior; created (1339) archbishop of Toledo by Alfonso XI. of Castile; fought against the Moors, led the siege of Algeciras, and was made a knight. On account of his denunciation of Peter the Cruel he had to flee to Avignon, where he was received by Pope Clement VI. and made a cardinal (1350). He restored the papal authority in Rome after the death of Rienzi (1354), and prepared the way for the Pope's return. He drafted a code of laws for the Papal States, known as the Ægidian Constitutions.

Albox, tn., prov. Almeria, Spain, 2 m. from Almanzora station, on railway from Albacete to Valencia. Considerable textile manufactures. Notable fairs, May and November. Pop. (1900) 10,049.

Albrecht. See ALBERT.

Albret, JEANNE D' (1528-72), only daughter of Henry II. of Navarre and Margaret of Valois, sister of Francis I. of France, took an active part in the defence of the Protestants in times of persecution. She married Antony of Bourbon, and after his death (1562) became ruler of Navarre; she governed wisely, and introduced the reformation. Her son was Henry of Navarre, later Henry IV., king of France.

Albrizzi, ISABELLA THEOTOKI, COUNTESS OF (1770–1836), called by Byron the Mme. de Stäel of Venice; born in Corfu; married Joseph d'Albrizzi, state inquisitor. Her beauty and talents brought her the friendship of Alfieri, Canova, and Byron; and her circle was frequented by many artists and savants. She died in Venice. She left *Ritratti* (1807), a series of portraits of the distinguished Italian men of her time; and *Opere di Plastica di Canova* (1822), a study of this artist's sculptures. A collection of her letters was published by Barozzi (1872).

Albrun Pass (7,907 ft.) leads from the Swiss valley of Binn (a trib. of the Upper Rhone valley in the canton Valais) to the Italian glen of Devero, which joins the Tosa valley above Domo d'Ossola (on the Simplon road). It is a very easy pass, and much used by smugglers. In 1420 a Swiss army crossed it when making a raid on the Ossola valley.

Albuera, tn., prov. Badajoz, Spain, 15 m. from Badajoz; here was fought the battle, May 16, 1811, in which the Anglo-Spanish forces under Beresford defeated the French under Soult. Pop. (1900) 820.

Albugo. See LEUCOMA.

Albula Pass (7,595 ft.) leads from Bergün (at the head of an affluent of the Hinter Rhine, in the Swiss canton Grisons) to Ponte, in the Upper Engadine. It has a carriage road, and a hospice at the summit. A railway tunnel was pierced beneath it in 1898 1902, at an alt. of 5,981 ft.; it is 3 m. 1,150 yds. in length.

Album, in literature the name given to a once popular class of publications distinguished for the beauty of their illustrations and the magnificence of their bindings. The first work of the kind was Ackermann's *Forget-me-not*, issued in 1823. It was followed by, among others, *Friendship's Offering*, *The Literary Souvenir*, and *The Keepsake*, all of which enjoyed an immense yearly circulation. The general characteristics of these works are pleasantly satirized by Thackeray in *Pendennis*. Almost every contemporary artist of note, including Stothard, Turner, Maclise, and Cattermole, contributed plates; and among the writers were Wordsworth, Coleridge, Macaulay, Southey, Lamb (*Album Verses*), Scott (*Bonnie Dundee*, etc.), and Tennyson (*St. Agnes's Eve*). The last annual, *The Keepsake*, was issued in 1856. (See Andrew Lang, *The Library*, p. 135.) ALBUM is also used in various other meanings: at the present day it generally refers to a book for holding photographs, autographs, postage stamps, etc., or a portfolio of prints, drawings, or engravings of artistic or other interest.

Albumazar (805–85), celebrated Arabian astronomer, born at Balkh. His works were published in Latin at Augsburg (1489) and and at Venice (1506–15).

Albumin is one of the simpler proteids present in animal protoplasm. Like all proteids, it contains the elements carbon, oxygen, hydrogen, nitrogen, and sulphur. The form in which it is most widely known and easily experimented with is egg-albumin, which, together with globulin, forms the white of egg. Other known forms are serum-albumin, found in animal serum, and lact-albumin, found in milk. Albumins are soluble in distilled water. Their solutions are coagulable by a heat of from 70°-73° c. They are also soluble in saturated solutions of sodium chloride and magnesium sulphate, and in dilute saline solutions, but are precipitated by saturating their solutions with ammonium sulphate. Their action on polarized light is levorotatory, like that of all proteids; but it differs in degree from the levorotatory action of other proteids. Also, like all other proteids save peptones, albumin is colloid—*i.e.* it will not pass through an animal membrane. It is coagulated by strong acids, such as nitric acid, by tannin, picric and acetic acids, and by salts of the heavy metals, such as nitrate of silver and sulphate of copper (hence used as caustics), by acetate of lead (whence the astringent qualities of that salt), and by other metallic salts. Alcohol precipitates it, but the fresh precipitate will readily redissolve in water. If albumin, however, be left long in alcohol, it will be not merely precipitated, but coagulated. In digestion, egg-albumin, lact-albumin, and serum-albumin, all of which are present in an ordinary diet, go through the same stages. In the stomach they first change to acid-albumin and to albumoses, through the action of pepsin, with the help of hydrochloric acid. Albumoses are differentiated from albumins by the following qualities: they are not coagulated by heat or alcohol; they are precipitated by nitric acid, but the precipitate disappears with the application of heat, and reappears on cooling; they are slightly, though only slightly, diffusible through an animal membrane; and some albumose is absorbed in digestion as such. From acid-albumin and albumoses albumins change to peptones, under the prolonged action of pepsin, before they leave the stomach. Peptones are distinguished from the earlier stage of albumose by being readily diffusible through an animal membrane (and therefore prepared for assimilation); they are not precipitated by cold nitric acid; nor by ammonium sulphate, which precipitates all other proteids. Most of the albumin which enters the stomach passes into the small intestine in the form of the readily diffusible peptones, and is so absorbed. Whatever part may pass from the stomach as such, or in the intermediate condition of albumose, is acted on by the trypsin of the pancreatic juice, and then forms alkali-albumin and peptones. If the action of trypsin upon peptones be prolonged, it splits them up into simpler bodies, of which the chief are leucin and tyrosin; and these are absorbed without further change. Peptones introduced directly into the blood, without undergoing the changes induced by the absorbing cells, produce toxic symptoms. Some small proportion passes from the small intestine into the lymphatics, but the greater part goes directly to the blood-stream. Peptones, however, do not reach the blood as such, but as albumin, being reconverted in their passage through the gastric and intestinal walls. Albumin is used as a mordant in dyeing, as a vehicle for the sensitive salts in photography, and in sugar refining. See Halliburton's *Essentials of Chem. Physiol.*; Foster's *Text-book of Physiol.*; also PROTEIDS, DIGESTION.

Albuminoid Disease. See WAXY DEGENERATION.

Albuminoids, compound organic nitrogenous substances chemically allied to proteids, but differing from them and from one another in various ways. The chief recognized albuminoids are collagen, gelatin, keratin, elastin, ossein, and chitin. Collagen forms the white fibres of connective tissue; elastin (a particularly insoluble albuminoid) forms the yellow fibres. Ossein is the chief organic constituent of bone, and in chemical composition is similar to collagen. Keratin occurs in nails, hair, horns, and hoofs, all of which are histologically related to the epidermis. Keratin is remarkable for its insolubility, and for its large percentage of sulphur. Chitin is peculiar to the exo-skeleton of many invertebrate animals. Gelatin is the most important of the albuminoids, and is much used as an article of diet. It is obtained by boiling collagen in water, the result being a solution of gelatin, which solidifies or gelatinizes on cooling. Gelatin answers to the colour tests for proteids, but the fact that it does not coagulate in hot solution separates it from many of the proteid group. It is readily digestible, and is converted in the stomach into a form not to be distinguished from peptones; but whereas the peptones formed from albumins and other proteids are highly nutritious, the product of the digestion of gelatin cannot take the place of proteids. Though gelatin alone will not support life, it is a useful supplement to other nitrogenous food. It is therefore valuable when the alimentary tract needs comparative rest and the body can bear a modified fast. Elastin and keratin are particularly indigestible forms of albuminoids. Elastin is apparently digested more by the pancreatic juice than by the gastric, while keratin is excreted practically undigested. The vegetable substance gluten, prepared from wheat flour, and as a by-product in the manufacture of starch, is of a similar character to the animal albuminoids.

Albuminuria. The presence of albumin in the urine, formerly looked on as a sign of Bright's disease, is now known to occur under many circumstances not indicating serious change in the kidneys. Albumin may appear in the urine as a result of modification of the mechanical condition of the renal circulation—as, for example, ligature of the renal vein; in pregnancy, when pressure is exerted on that vein; in the later stages of certain diseases of the heart; in ague; and in cholera. It may appear as the result of changes in the blood consequent on pyæmia, septicæmia, and purpura, and associated with scarlet fever, diphtheria, measles, enteric and other fevers; it is also a result of such diseases of the kidney as interstitial nephritis, waxy kidney, and fatty degeneration of the kidney. Certain dietaries containing albumin in excess may produce it temporarily. Renal casts, consisting of detached epithelial cells and of epithelial cylinders showing various degrees of degeneration, are often associated in the urine with the albuminuria of kidney disease. A simple test for the presence of albumin in the urine is to boil the urine: if turbidity appears which is not dissolved by nitric acid, albumin is most likely present. If the urine be alkaline, it must be acidified by acetic acid before boiling. Long-continued albuminuria leads to great anæmia and exhaustion. The treatment varies with the several causes.

Albumosuria, or PROPEPTONURIA, is a morbid condition in which albumoses are present in the urine. Traces are found in chronic suppuration, in febrile diseases, in inflammatory eruptions of the skin, such as pemphigus and urticaria, and in nervous diseases. Recently albumose in the urine has been found associated with multiple myelomata of bones. As it is not normally present, its occurrence is evidence of pathological cell-destruction. For tests, see URINE.

Albunol, tn., prov. Granada, Spain, 43 m. S.E. of Granada, and near Mediterranean. Produces and exports wine and almonds. Some lead mines in district. Pop. (1900) 8,646.

Albuquerque. (**1.**) Town, prov. Badajoz, Spain, 27 m. by road from Badajoz. Ancient castle and walls (13th century). Great cattle fairs, May and September. Pop. (1900) 9,030. (**2.**) City, New Mexico, U.S.A., co. seat of Bernalillo co., on the Rio Grande, and on the Atchison, Topeka, and Santa Fé, and the Santa Fé Pacific Rys. Pop. (1900) 6,238.

Albuquerque, AFFONSO D' (1453–1515), surnamed the 'Great,' also 'The Portuguese Mars,' a man of extraordinary ability and force of character, who upheld and extended the power of Portugal in India and the East from 1503-15. He captured Goa, making it his capital (1510), the island of Ormuz (1507 and 1515), and Malacca (1511); and gradually subdued Malabar, Ceylon, and other parts of the East. His *Commentaries*, issued by his natural son Braz, were translated by Birch, and published by the Hakluyt Soc. (4 vols. 1875-84). See Stephens's *Albuquerque and the Early Portuguese Settlements in India* (1892).

Alburnum, or SAPWOOD, is that portion of the wood of a dicotyledonous or coniferous tree which lies between the heart-wood and the bark. It is light in colour (hence its name), carries the root-sap upwards, and consists of a variable number of the last-formed annual rings of wood.

Albury, or 'THE FEDERAL CITY,' tn., N.E. of upper reaches of Murray R., Goulburn co., New South Wales, connected by a bridge with the colony of Victoria; terminus of N.S.W. part of Southern Ry.; is at the head of river navigation, in vicinity of gold-mining district. Pop. (1901) 5,820.

Alcæus (*c.* 600 B.C.) of Lesbos, one of the greatest of Greek lyric poets, who gave his name to, if he did not invent, the metre called Alcaic. He was an aristocrat, and after a civil war was exiled from Lesbos. Only fragments of his poems survive, but they reveal the spirit and vigour with which he sings of war, love, and wine. The greater Alcaic consists of a four-footed line, of which the first foot is generally spondaic, sometimes iambic, the second foot iambic hypermetrical, and the last two feet dactylic. The distinguishing characteristic of the line is the cæsura, which ought to occur after the catalectic syllable at the end of the second foot. This catalectic syllable must, either naturally or in virtue of its position, be a long syllable, and it is considered best for it to end a word; but it may be a separate monosyllabic word, or even the first syllable of a compound word. The lesser Alcaic consists of a four-footed line, the first two feet of which are dactylic, and the last two iambic. Horace employs Alcaics in his favourite form, known as 'Horatian verse.' In it the first two lines are greater Alcaics, the third line Archilochian iambic dimeter hypercatalectic, and the fourth line a lesser Alcaic. Tennyson imitates the stanza in his *Ode to Milton*.

Alcala de Guadaira, tn., prov. Seville, Spain, 7 m. S.E. of Seville; olive cultivation. Beautiful Moorish castle. Pop. (1900) 8,198.

Alcala de Henares, tn., prov. Madrid, Spain, 21 m. from Madrid, on riv. Henares, trib. of Tagus; birthplace of Cervantes; seat of university founded by Cardinal Jimenez in 1508, transferred to Madrid in 1836; garrison town for province of Madrid. Pop. (1900) 11,206.

Alcala de los Gazules, tn., prov. Cadiz, Spain; prosperous, busy place, 10 m. from Medina Sidonia, on highroad. Captured from the Moors by Alfonso X., 1248; seat of military district of Gibraltar. Black jasper and coal mines in district. In March 1810 suffered greatly from the French troops under Latour-Malbourg. Pop. (1900) 8,877.

Alcala, GALIANO. See GALIANO.

Alcala la Real, tn., prov. Jaen, Spain, 31 m. by coach from Granada. Alfonso XI. took the fortress from the Moors (1340), hence the name ('the royal castle'). Milling and olive-oil pressing. Pop. (1900) 15,973.

Alcalde. See AYUNTAMIENTO.

Alcamo, tn., prov. Trapani, Sicily, built on the N. slope (837 ft.) of Mt. Bonifato, 24 m. S.W. of Palermo. It was founded by Saracens, and still preserves remains of mediæval buildings. Pop. (1901) 51,798.

Alcaniz, tn., prov. Teruel, Spain, 21 m. from Caspe stn. on Saragossa-Tarragona Ry. Fine mediæval castle, and bridge over river Guadalupe. Country well irrigated artificially. Pop. (1900) 7,806.

Alcantara. (**1.**) Town, prov. Caceres, Spain; takes its name from a Roman six-arched bridge over river Tagus, built by Trajan 105 A.D. Pop. 4,100. (**2.**) Port, Maranhão, Brazil, on St. Marcos Bay, 16 m. from St. Luiz. Vessels anchor 1½ m. S.E. of town. Pop. (1900) 3,248.

Alcantara, ORDER OF, one of the old Spanish religious and military orders created during the wars against the Moors. Founded in 1156, it was recognized as a religious order by Pope Alexander III. in 1177. In 1221 it took the name of the Order of Alcantara, from the town of that name.

Alcaraz, range of mts., prov. Albacete, Spain; the prolongation to the N. of the E. end of Sierra Morena. The copper mines of San Juan de Alcaraz are near the town of same name, which stands N. of the range, and has a ruined castle and a Roman aqueduct. Pop. of tn. (1900) 4,503.

Alcarria, La, fertile dist., prov. Guadalajara, Spain; basin of former lake N.E. of Guadalajara. The town of Brihuega is the centre of this district, which supplies grain, cattle, and honey for the Madrid market. It lies 4,000 ft. above sea-level, and is watered by a branch of the Tajura, a trib. of the Tagus.

Alcaudete, tn., Jaen, Spain, 7 m. from Alcala la Real, on road from Granada to Cordova; dried and candied fruits. Pop. 6,500.

Alcazar, name given to several palaces built by the Moors in Spain. The Alcazar of Segovia formerly contained many objects of historic value remaining from the Moorish period; these were destroyed in 1862 by a fire which left the mere shell of the building. The Alcazar of Seville ranks second only to the Alhambra in architectural beauty, although since its construction by the Moors in the 12th century it has been enlarged by several Spanish kings, who united the Gothic with the original style of architecture. It contains many ancient treasures.

Alcazar de San Juan, tn., prov. Ciudad Real, Spain, 41 m. from Ciudad Real; important ry. junction. Pop. (1900) 11,499.

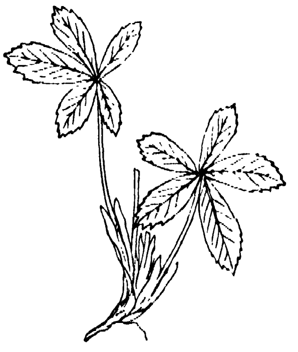
Alcedo. See KINGFISHER.

Alcedo y Herrera, ANTONIO, Peruvian soldier and author; his work, *Diccionario geográfico histórico de las Indias Occidentales* (1786-9), was published in English by Thompson (1812-15). The *Biblioteca Americana,* in MS., was also the work of Alcedo.

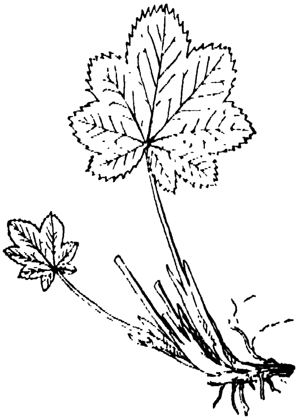
Alcester, FREDERICK BEAUCHAMP PAGET SEYMOUR, BARON (1821-95), English naval officer; commanded the naval brigade during the Maori war (1860-1); was commander-in-chief of Mediterranean fleet (1880-3); and for the bombardment of Alexandria (1882) he received a parliamentary grant of £25,000, and was raised to the peerage as Baron Alcester of Alcester.

Alcestis, wife of Admetus; the heroine of Euripides's drama, in which her self-sacrifice is contrasted with the selfishness of Admetus's aged parents, who refuse to give up their few remaining years to deliver him from death. While Admetus is mourning her death, he receives a visit from Heracles, who rewards him for his hospitality, and rescues Alcestis from the lower world. Browning's *Balaustion* is a free translation of the play. For other editions, see EURIPIDES.

Alchemilla, a genus of the order Rosaceæ; flowers greenish, small; leaves rounded in outline. The alpine species has compound leaves like a miniature lupine, and is found in abundance over the Scottish Highlands. The common alchemilla is plentiful at low levels. The name 'lady's mantle' is applied to the common species.



Alchemilla alpina.



Alchemilla vulgaris.

Alchemy, the early form of chemistry, was occupied chiefly with the supposed art of making gold and silver from the baser metals. The dominant theory of the alchemists was that any of the baser metals—*e.g.* lead—contains the same constituents as gold, mixed with impurities; and that when the latter are removed by using 'the philosopher's stone,' the transmutation is effected. The great quest of the early alchemists was, therefore, to discover the philosopher's stone. At a later date was added the search for the *alkahest,* or universal solvent, and (when the adepts had gained some knowledge of physiology and drugs) the *magisterium,* a substance which could not only convert all metals into gold, but could also heal all diseases, and the *elixir vitæ,* a universal medicine by which human life might be prolonged indefinitely. It was believed that metals were compounds of mercury, sulphur, and salt, and that by altering the proportions of the ingredients a new metal could be formed.

The chief alchemists were:—HERMES, surnamed *Trismegistus,* from whom the term 'hermetic' is derived; GEBER, an Arabian, the author of the first authentic work on alchemy; ALBERTUS MAGNUS, German Dominican friar of the 13th century, said to have invented the word 'amalgam,' though other authorities attribute this to Thomas Aquinas, who also wrote on alchemy; RAYMOND LULLY, born at Majorca in 1235, who was the first to apply nitric acid to dissolve gold; ROGER BACON, a monk of Somerset, the contemporary of Magnus and Lully, and, although a keen alchemist, an opponent of necromancy and magic. During the century after Bacon the practice of alchemy increased greatly, but not without opposition, for in England an Act of Henry IV. declared the attempted transmutation of metals to be a felony. With every generation, however, alchemy was becoming the serious pioneer of chemistry, and PARACELSUS (a Swiss of the name of Von Hohenheim), although described as an alchemist, was a qualified lecturer in medicine at the University of Basel in the first half of the 16th century. The many treatises on alchemy ascribed to a 'Basil Valentine' of the 15th century are now known to have been written in the 17th century by Johann Thölde. The last professional British alchemist appears to have been DR. PRYCE of Guildford (d. 1782), who pretended to transmute mercury. It is said, however, that at the present day there are at least three secret societies whose avowed object is to continue the work of the alchemists on a quasi-religious basis. Pope John XXII. and King Charles VII. of France, the Emperor Rudolph II. and the Elector Augustus of Saxony, were all great patrons of the alchemists. See Thomson's *Hist. of Alchemy,* and also Bergman's; Kopp's *Die Alchemie in älterer und neuerer Zeit* (1886); G. Rodwell's *Birth of Chemistry* (1874).

Alciati, ANDREA (1492-1550), Italian lawyer, was successively professor of civil law at Avignon, Bourges, Bologna, Pavia, and Ferrara. He wrote commentaries on the Pandects, and on the code of Justinian; a history of the Roman magistrature, and a history of Milan (1625); but his best-known work is *Emblematum Libellus* (Eng. trans. by Green, 1872).

Alcibiades (*c.* 450-404 B.C.), the Athenian, son of Clinias, was brought up after the death of his father (447) by his kinsman Pericles, the great statesman. Born of a noble and wealthy family, and distinguished by great personal beauty and transcendent ability, he soon became one of the leading men in Athens, but by reason of the extravagance and irregularity of his private life, and the masterfulness of his character, was always regarded with suspicion by the democracy. The Athenians feared that he might attempt to overthrow their constitution and make himself despot of the city, and their distrust prevented them from making full use of his genius, and so, according to Thucydides, led to their own ruin. He was a favourite pupil of Socrates, who saved his life in battle near Potidæa (431 B.C.), and whose life he saved at Delium (424). About 422 he became head of the war party in opposition to Nicias. He induced Athens to fight with Argos against Sparta at Mantinea (418), and to undertake the great expedition to Sicily (415), of which he and Nicias and Lamachus were commanders. Implicated in the religious scandal caused by the mutilation of the busts of the Hermæ, he was summoned to trial, but escaped, and took refuge in Sparta. Having been condemned to death in absence, he assisted the Spartans against Athens. But he deserted again in 411, owing to the hostility of the Spartan king, Agis II., and secured the favour of the Athenians by detaching the Persian satrap Tissaphernes from the Spartan side. During the next four years he gained the victories of Abydos (411) and Cyzicus (410), captured Chalcedon and Byzantium, and in 407 returned to Athens, where he was appointed commander-in-chief of all the forces. But next year, in his absence, his lieutenant Antiochus lost the battle of Notium, and the Athenians superseded him. He went into voluntary exile in Bithynia, and, after three years of inactivity, was assassinated in Phrygia. Alcibiades was equally brilliant as statesman and soldier, and showed great versatility in other directions; but his passion for personal aggrandizement and his want of principle did much to mar his career. See *Life* by Plutarch, and Plato's *Symposium*.

Alcides, a patronymic by which Hercules is often called, as his supposed father, Amphitryon, was the son of Alcæus.

Alcinous, son of Nausithous, and grandson of Poseidon; mentioned in the *Odyssey* as king of the Phæacians, in the isle of Scheria, which later writers have identified with Corcyra (Corfu). He entertained Odysseus hospitably, and sent him home after ten years' wanderings. He also comes into the story of the Argonauts. His garden, as described by Homer, was famous, and the phrase 'apples to Alcinous' became proverbial in the same sense as our 'coals to Newcastle.' See Homer's *Odyssey*, and Apollonius Rhodius's *Argonautica*.

Alciphron, Greek rhetorician (end of 2nd century), and one of the most eminent of Greek epistolographers. The 116 letters (character studies) attributed to him have been edited by Hercher (in *Epistolographi Græci*, 1873), Schepers (1902), and others.

Alcira, tn., prov. Valencia, Spain, 17 m. from Valencia, on an island formed by two branches of the river Jucar; depôt for timber brought down by this river from the Cuença Mts. Oranges and rice are much cultivated in the surrounding plain, the 'Garden of Valencia,' which is very fertile, but marshy and malarial. Alcira was a Carthaginian colony, and flourished under both the Roman and the Moorish occupation. Pop. (1900) 19,906.

Alclyde, an ancient Celtic kingdom of Britain, stretched south from the lower Clyde to the Solway Firth; was merged in the kingdom of Alban in 945. Its capital was Alclyth or Alclyde, now Dumbarton.

Alcmæon, son of Amphiaraus, and a member of the second expedition of the Seven against Thebes. On his return he slew his mother Eriphyle at his father's command. Pursued by the Furies, he was purified by Phegeus, whose daughter he married. But as the land became barren from his presence, he fled to the islands at the mouth of the Achelous. There he married Callirrhoë, daughter of the river-god; and having dishonestly obtained for her a necklace which he had given to his former wife, he was murdered by the brothers of the latter.

Alcmæon, physician and philosopher (6th century B.C.), was a native of Crotona, in S. Italy. He is said to have been a disciple of Pythagoras, and is chiefly distinguished for his experimental researches in anatomy and physiology, as discoverer of the optic nerve and the Eustachian tube, of the connections between the brain and the organs of sense, and of the spinal cord, etc. He was the first to practise dissection, and to distinguish between veins and arteries. He wrote also on physics and metaphysics.

Alcmæonidæ, a celebrated family at Athens, from which Cleisthenes, Pericles, Alcibiades, and other great Athenians, were descended. A member of the family, Megacles, was one of the archons who treacherously killed the adherents of Cylon after their surrender, and about 594 B.C. the whole family was banished as blood-guilty. Having bribed the Delphic oracle to influence the Spartans to restore them, they returned in 509 B.C. But at the outbreak of the Peloponnesian war (432 B.C.) the Spartans struck at Pericles by demanding that Athens should expel this family, 'the accursed.'

Alcman, one of the earliest lyric poets; a Lydian by birth, but lived at Sparta, probably about 670-630 B.C. Few fragments of his works survive. They comprised love poems, hymns to the gods, and especially lyrics to be sung by choruses at public festivals. The fragments are collected in Bergk's *Lyrici Græci*. Alcmanian verse, the metre of Alcman, consists of a line composed of three dactyls or three spondees, followed by a spondee or a trochee.

Alcmena, wife of Amphitryon and mother, by Zeus, of Hercules.

Alcobaça, tn., prov. Estremadura, Portugal, 60 m. N. of Lisbon. Before its partial destruction by the French in 1811, it possessed the most splendid monastery (Cistercian) in Portugal. In the monastery church lie buried Kings Alfonso I. and II., Sancho I., Pedro I., and his ill-fated mistress Ines de Castro. Pop. (1900) 2,306.

Alcock, Sir Rutherford (1809-97), diplomatist, born in London, joined the medical staff of the British auxiliary forces in the Peninsula (1832-6). He was British consul in China (1844), and in 1858 he became consul-general in Japan. Seven years later he was appointed minister-plenipotentiary at Pekin, from which post he retired in 1871, and returned to England, where he interested himself in hospital nursing establishments. Among other works he wrote *Elements of Japanese Grammar* (1861), *The Capital of the Tycoon* (1863), and *Art and Art Industries in Japan* (1878). See Michie's *The Englishman in China during the Victorian Era* (1900), with two portraits.

Alcoforado, Marianna (1640-1723), a nun of the Portuguese town of Beja, and author of the passionate love-letters *Lettres Portugaises* (1669), which she addressed to the Count of St. Léger, afterwards marshal of France, and which were translated into almost every language of Europe (Eng. trans. by Edgar Prestage, 1893). They may be compared with Heloïse's letters to Abélard.

Alcofribas Nasier, the *nom de plume* under which François Rabelais published *Pantagruel*; an anagram formed from his own name.

Alcohol (Ar.), a generic term in chemistry for a number of compounds which are the hydroxides of hydrocarbon radicals, but usually applied to one member of the series—*viz.* ethyl alcohol, C_2H_5OH, the active principle of intoxicating liquors. Alcohol may be formed synthetically from its elements carbon, hydrogen, oxygen, but in practice it is always produced by the fermentation of a saccharine liquid. Originally the juice of the grape was used, as it still is in the preparation of wine and brandy; but the alcohol of commerce is now made from malt and one or other of the following raw materials—wheat, maize, rice, millet, potatoes, molasses, glucose, cane or beet sugar, honey, milk, apples, and cherries. The manufacturing operations, the details of which vary in different countries, are divided into three distinct stages: (1) the preparation of the saccharine liquid or *wort;* (2) the fermentation of the wort, producing what is technically known as *wash;* and (3) the distillation of the wash. Fusel oil and furfurol are most important by-products of distillation. They are difficult to remove entirely, and are responsible for many of the objectionable qualities of alcoholic drinks. Small quantities of other alcohols, of greater toxicity in proportion to their greater atomic weight, are also often found mixed with ethyl alcohol.

Alcohol is a colourless liquid of sp. gr. ·79, and a boiling-point of 78° C.; is the characteristic component of brandy, whisky, gin, and other beverages; is used in the manufacture of many pharmaceutical products—chloroform, chloral, ether, essences, tinctures, alkaloids, linaments, and lotions; as a solvent for oils, fats, resins, and gums; in making transparent soap; and for burning in spirit lamps. No simple chemical test has been devised by means of which alcohol can be readily detected. When in quantity, it may be obtained, mixed only with water, by distillation, and is then recognized by its odour and taste. When in small proportions, the best test is to add a solution of potassium iodide saturated with iodine, till the liquid is a permanent brown colour; then add dilute caustic potash solution, drop by drop, till the brown colour is removed. A yellow crystalline deposit of iodoform is produced. As several alcohol derivatives produce iodoform under similar conditions, the test should be confirmed by the oxidation of a portion of the suspected liquid: if alcohol is present, acetic acid would be produced. Alcohol is rarely adulterated for the purposes of fraud, unless by the addition of water, and the presence of traces of impurities produced during manufacture are unavoidable. See Allen's *Commercial Organic Analysis*, vol. i.; Thorpe's *Dict. of Applied Chem.;* Duplais's *Industrial Organic Chem.;* Wagner's *Chemical Technology* (1872).

Alcoholism, a nervous disease occasioned by excessive drinking of alcohol, characterized by numerous profound disturbances, always including, in the first instance, a loss of power to resist alcohol, and frequently associated with disorders of digestion and diseases in the stomach, liver, kidneys, and blood-vessels. The more remote causes of alcoholism are constitutional; but the hereditary effect of alcoholism, as such, has been much exaggerated, though patients who suffer from it are likely to beget epileptic or imbecile children. In most cases alcoholism is the result of insidious habit rather than of a constitutional craving. A common incident of alcoholism is *delirium tremens.* In such a crisis a doctor must, of course, be called in. But, in the meantime, food and drink should be given to the patient—soda and milk, porridge and eggs, are most useful. *Alcoholic neuritis* is an inflammation of the nerves, common in women, accompanied by tenderness and muscular paralysis, generally affecting the legs. *Alcoholic epilepsy* may supervene, and the patient suffer convulsions; or *alcoholic insanity* may necessitate removal to an asylum. The treatment of alcoholism consists in every case in a withdrawal of alcohol as rapidly as possible. See 'Report of the Edin. Med. Chir. Soc.,' *Brit. Med. Jour.*, July 13, 1901, with views of Prof. T. R. Fraser, Sims Woodhead, Dr. Clouston, etc.; *De l'Alcoolisme* (1874), by Magnan; Dr. Legrain's *Dégénérescence Sociale et l'Alcoolisme* (1895); Norman Kerr's *Inebriety* (3rd ed. 1894); G. R. Wilson's *Clinical Study in Vice and Insanity* (1899).

Alcoholometry, the determination of the percentage of alcohol in a liquid. When the alcohol is mixed with water only, the proportion is estimated from the specific gravity, which is found by means of the specific gravity bottle or by a hydrometer. Tables are published showing the percentage of alcohol (by volume and weight) and of proof spirit, corresponding to the specific gravity. Sykes's hydrometer is used by the excise authorities. In liquors containing substances other than alcohol, such as beer, the strength can be determined only after the alcohol and water have been separated by distillation. See Allen's *Commercial Organic Analysis*, vol. i.; Thorpe's *Dict. of Chem.;* and, for alcoholic tables, *Analyst*, vol. v. (1880).

Alcott, Amos Bronson (1799-1888), American philosophical writer. In 1834 he opened the seminary in Boston of which Miss Peabody has given an account in her *Recollections of a School* (1834). Opposition to his methods caused his withdrawal to Concord, where he became the friend of Emerson, Thoreau, Hawthorne, and Channing, and was made dean of the Concord School of Philosophy. In 1842 he visited England, where he met Carlyle, who described him as 'the good Alcott, with his long, lean face and figure, with his gray, worn temples and mild, radiant eyes; all bent on saving the world by a return to acorns and the golden age.' Alcott was a Neoplatonist, his central doctrine being the lapse of the soul from holiness. His chief works are, *Orphic Sayings* (1840); *Tablets* (1868); *Concord Days* (1872); *Table Talk* (1877); *New Connecticut* (1881 and 1887); and *Ralph W. Emerson* (1882). See *Life* by Sanborn and Harris (1893).

Alcott, Louisa May (1832-88), American writer for the young; born at Germantown, Pennsylvania, U.S.A.; daughter of the above; began life as a schoolmistress. During the civil war she acted as a hospital nurse. Wrote *Hospital Sketches* (1865), *Little Women* (1867-9), *Little Men* (1871), *Jack and Jill* (1880), etc.

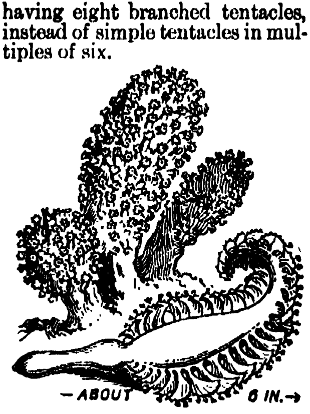
Alcoy, tn., prov. Alicante, Spain, 24 m. N. of Alicante; one of the most prosperous towns in Spain; the Molinar and Barchel rivers supply power for paper, cloth, and match factories. Pop. (1900) 32,053.

Alcuin, or Albinus (735-804), surnamed Flaccus, whose name in English was Ealhwine, was born at York. Educated there under Archbishop Egbert and the teacher Ethelbert, he succeeded the latter on his promotion to the archbishopric in 767, and, with Ethelbert's resignation in 778, became head of both school and library. In 781, on his return from Rome with the pallium for Eanbald, Ethelbert's successor in the archbishopric of York, he met Charlemagne at Parma, and the emperor urged him to settle in France. Alcuin acceded to the emperor's wish (782), and received the abbeys of Ferrières in Gâtinais, St. Loup at Troyes, and St. Martin at Tours. The intellectual torpor of the 7th and early 8th centuries—the hour of deepest slumber for the mediæval mind—was giving place to the stirrings of a general, if as yet childish, curiosity; and Alcuin's service to his time was to foster this revival. In the court at Aachen he had among his pupils the emperor, his sons Charles, Pepin, and Louis, imperial counsellors such as Adalhard, the archbishops of Mayence and Trèves, Charlemagne's sister and daughter, the nuns of the dioceses, and

Adalhard's sister Gundrade, to which lady Alcuin dedicates his philosophical essay, *De Ratione Animæ*. The instruction embraced the stages of the *trivium* and *quadrivium*, in the usual lines of such rhetoricians and grammarians as Martianus Capella, Isidore, Priscian, etc.; but even in these it found methods and symbols allying it with that of later periods of renaissance. The dialogue, and especially the dialogue in allegorical character, was Alcuin's favourite device. In his letters, too, he conveyed instruction; and of the 232 that have come down to us, 30 are addressed to Charlemagne. In these he congratulates the emperor on victories over the Huns, advises clemency, outlines missionary schemes, expounds astronomy, and touches on ecclesiastical events and heresies of the day. Manners and the state of society are also recorded, together with the surroundings of his earlier manhood, in the most notable of his poems, *Carmen de Pontificibus et Sanctis Ecclesiæ Eboracensis* (ed. Raine, Rolls Series, 1878). Alcuin revisited England (790-792) in connection with a renewed treaty between the emperor and Offa, king of Mercia. In 796 he settled at Tours as abbot and head of the great school, and died in 804.

Alcuin's theological writings are not of the first importance. They include allegorical commentaries on Scripture, liturgical works, and treatises on the Adoptian heresy. Nor are any of his 280 poems (mainly occasional pieces) very remarkable. What interest his remains possess lies almost wholly in scholastic and historical work. The former includes treatises on grammar, orthography, rhetoric, and dialectic, and the discourse *De Virtutibus et Vitiis*—the latter the four lives of St. Waast, St. Martin, St. Riquier (or Richarius), and St. Willibrord. The earliest edition of Alcuin's works is that of Duchesne (1617), the best that of Frobenius (1777), incorporated in Migne's *Patrologiæ Cursus Completus* (1851), vols. c. and ci. Additions to these are included in Jaffé's *Monumenta Alcuiniana* (1873), and Halm's *Rhetores Latini Minores* (1863). See also Guizot's *Civilisation en France*, vol. ii. lec. 22, an admirable exposition; Lorenz's *Alcuin's Leben* (Eng. trans. 1837); Monnier's *Alcuin et Charlemagne* (2nd ed. 1863); Werner's *Alcuin und sein Jahrhundert* (1876); Mullinger's *Schools of Charles the Great* (1877); and West's *Alcuin and the Christian Schools* (1892).

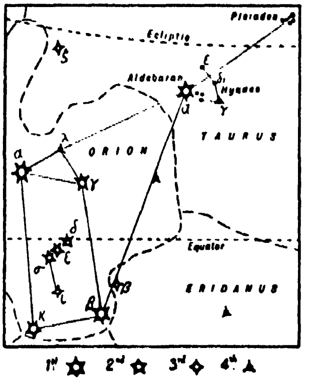
Alcyonaria, a subdivision of the Actinozoa, including *Alcyonium* or dead men's fingers, the sea-pen (*Pennatula*), the red coral of commerce (*Corallium*), and numerous other beautiful forms. The Alcyonarians are mostly colonial; and the polypes, or single members of the colony, differ from sea anemones and the reef corals in having eight branched tentacles, instead of simple tentacles in multiples of six.



Alcyonaria.

Alcyone, or HALCYONE, in ancient Greek legend, a daughter of Æolus and Enarete, and wife of Ceyx. When her husband was shipwrecked and drowned, Alcyone in her grief cast herself into the sea. The gods pitied the devoted pair, and changed them into birds, the alcyons or halcyons (kingfishers): it was believed that during the breeding-time of these birds the sea was always calm.

Aldborough, vil., W. Riding of Yorkshire, England, near the confluence of the Swale and Ure, on Watling Street, 1 m. s. of Boroughbridge stn., on N.E.R. Near it was *Isurium*, the ancient capital of the Brigantes, and an important Roman station. Remains of ancient walls, aqueducts, pavements, urns, and coins have been discovered.



Aldebaran.

Aldebaran = α Tauri, a standard first-magnitude star of a light-red colour, showing a spectrum of 'advanced' solar type. The name signifies the 'follower' (of the Pleiades), and an alternative Arabic appellation, *Ain-at-Thaur*, means the 'eye of the bull.' The Romans called the star 'Palilicium,' because it set for the last time visibly in evening twilight on April 21, when the Palilia, or feast of Pales, was celebrated. Its parallax of 0·11″ corresponds to a light-journey of just thirty years, and involves the consequence that Aldebaran shines with a total brilliancy twenty-seven times that of the sun. It is retreating from the earth with a velocity (according to Vogel) of 30 miles a second.

Aldeburgh, munic. bor., Suffolk, England, 7 m. S.E. of Saxmundham, with terminal station on the G.E.R. Since the 17th century the sea has seriously encroached upon the town. Birthplace of the poet Crabbe (1754). Pop. (1901) 2,405.

Aldegrever, or ALDEGRAVE, HEINRICH, whose real name was TRIPPENMAKER (1502-60), German painter and engraver. His work was greatly influenced by Dürer, Beham, and Pencz. His few known paintings are in Breslau, Brunswick, and Vienna. Later he gave himself wholly to engraving. He worked entirely with the graver, and his plates are finished with precision and delicacy. There is a good collection of them (1522-55) in the British Museum; he produced over 300 altogether. See *The Little Masters of Germany* (1880), in the Great Artists Series, by William Bell Scott; Adam von Bartsch, *Peintre-Graveur: Catalogue raisonné* (1802-21).

Aldehyde, a generic term applied to a class of organic compounds which are produced by the partial oxidation of the primary alcohols, and contain a group—CH.O. They are intermediate compounds between the alcohols and acids; by reducing agents they are converted into alcohols, and by oxidizing agents into acids. The first member of the series is formaldehyde, which is made by the oxidation of methyl alcohol; it is a gas with a pungent smell, and is sold in a 40 per cent. solution under the name of formalin. It is largely used as a food preservative and as an antiseptic. Common aldehyde (acetic aldehyde), which is made by oxidizing ordinary alcohol by means of chromic acid, is a volatile liquid with a peculiar, penetrating odour. An isomeric modification is used in medicine. All the aldehydes are easily oxidized to acids—*e.g.*, on exposure to air, formaldehyde becomes formic acid, and common aldehyde acetic acid. The aldehydes also unite chemically with ammonia, the acid sulphites of the alkalis, and hydrocyanic acid. They also precipitate metallic silver from an ammoniacal solution of silver nitrate, and this property is sometimes utilized in the manufacture of mirrors. See CHLORAL and FORMALDEHYDE.

Aldeia Gallega, tn., dist. Lisbon, Portugal, 10 m. E. of Lisbon; sulphur springs. Pop. (1900) 8,129.

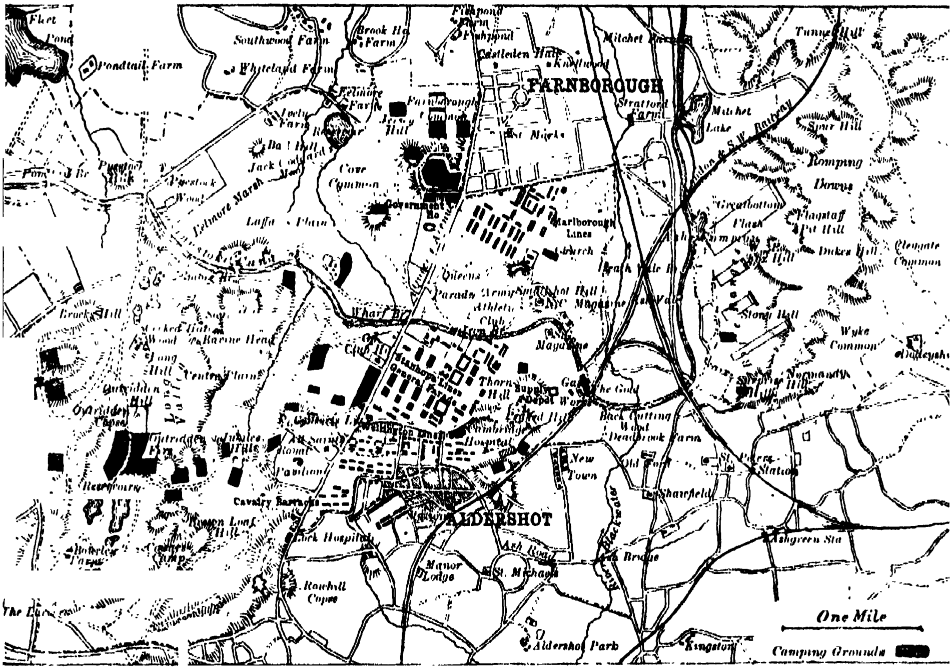
Alden, JOHN (1599-1686), one of the Pilgrim Fathers who sailed in the *Mayflower.* His wooing of Priscilla Mullens has been immortalized in Longfellow's *Courtship of Miles Standish.*

Alderman, or EALDORMAN (*ealdor,* 'elder'), originally applied to a Teutonic chief of a privileged family, seems to refer to a primitive constitution, in which the chief authority was held by the oldest member of a tribe. In Egbert's time the title denoted a magistrate appointed by the king and Witan. When the Danish *jarl* (earl) superseded the *ealdorman,* in the 11th century, the latter title declined in dignity.

In English boroughs, under the Municipal Corporations Acts, aldermen are elected by the council from persons who are councillors, or are qualified to be so. The number of aldermen is one-third the number of the councillors, and their term of office is six years, half of them retiring at the end of every third year. A councillor who is elected an alderman vacates his seat as councillor, and *vice versâ.* Aldermen have the same powers and duties as councillors, and are a constituent part of a municipal corporation, which consists of the mayor, aldermen, and burgesses, acting by the council. County aldermen are elected under the Local Government Act, 1888, by the county councillors. Their position, number, and term of office are the same as in the case of borough aldermen, except in the county of London, where they number only one-sixth of the councillors; and their qualification is practically the same, except that clerks in holy orders, and other ministers of religion, are not disqualified, and peers owning property in the county, and persons registered as parliamentary electors in respect of the ownership of property in the county, are eligible. Aldermen of the metropolitan boroughs created by the London Government Act, 1899, must be qualified in each borough in the same way as county aldermen, and they number one-sixth of the council. Aldermen of the city of London are elected for life, one for each ward of the city. They are justices by charter, and are in a different position in many respects from borough or county aldermen. See LONDON; Macmorran and Dill, *On Local Government Acts, 1888* (3rd ed. 1898) and *1894* (3rd ed. 1896); Jenkin, *On the London Government Act, 1899.*

Alderney (Fr. *Aurigny; anc. Riduna*), Brit. isl., most N. of the Channel Islands, 10 m. W. of Cape La Hague, and separated from Normandy by the Race of Alderney. The treacherous Casket Rocks, to the W., are marked by three lighthouses. There is a harbour of refuge at Braye, on the N. side. The local legislative body—consisting of a judge appointed by the crown, six *jurats,* and twelve *douzeniers* popularly elected, the last having no vote—has civil but not criminal jurisdiction; and the island is a dependency of Guernsey. French is spoken, and the inhabitants are Protestant. The capital is St. Anne, in a fine valley near the centre of the island. Area, 1,962 ac.; length, 4½ m.; extreme breadth, 1½ m.; climate mild and healthy. Pop. (1901) 2,062.

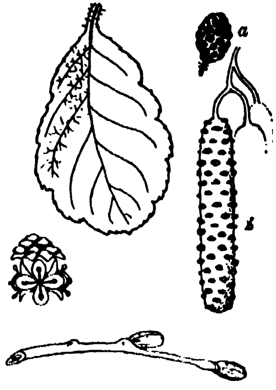
Aldershot, tn., Hampshire, England, 35 m. S.W. of London, on the L. & S.W. and S.E. & Chatham Rys. Pop. (1901) 30,974.



Plan of Aldershot.

Aldershot Camp, the largest permanent military camp in England, situated chiefly to the N. of Aldershot town, between Farnham and Farnborough, on the borders of Hants, Surrey, and Berks. It is 35 m. S.W. of London and 19 m. S. of Windsor, and has three stations—North Camp, Aldershot Camp (Alton Branch Ry.), and Aldershot North Camp (Reading and Reigate line). The camp is divided by the Basingstoke Canal into the Marlborough (N.) and the Stanhope (S.) Lines. The concentration of troops in large garrisons dates from the time of the Crimean war, when the camps at Aldershot, Colchester, Shorncliffe, and the Curragh were formed. The troops were at first housed in wooden huts, but these have been gradually replaced since 1881 by permanent barracks. At Aldershot the barracks, inclusive of the drill grounds that lie between them, cover a space 2¼ m. in length and nearly 1 m. in width. Each arm of the service has its own set of barracks, and the most modern buildings are built of brick, one or two stories high, and named after some successful battle. The permanent buildings can house some 20,000 men, with 4,000 horses. The situation of the camp is open, and the ground, being diversified in feature, is suitable for military manœuvres. The area is, however, too limited for the exercise of large numbers under modern conditions of war, and the problems that can be set in mimic warfare are few in number. The new camp now being formed (1905) on the outskirts of Woolmer Forest will do something towards remedying this defect. In the summer a large number of troops from other stations, as well as militia and volunteers, join the camp for the drill season, and are usually put under canvas. During the S. African campaign in 1899-1902 the numbers amounted at times to about 40,000. Under the army organization of 1901-3 the camp was occupied by the 1st Army Corps, and in the rearrangement of commands made in 1904 it retains its position as the headquarters of an army corps. Aldershot is provided with rifle ranges, gymnasia, technical schools, hospitals, etc. There are railway facilities for the rapid transport of troops; and owing to its vicinity to Windsor and London, royal reviews are of frequent occurrence.

Alder Tree (*Alnus glutinosa*) belongs to the birch family, and is of comparatively small size, though some specimens reach a height of sixty feet. The buds are peculiar among those of British trees in being stalked, for most buds are sessile. The leaves are somewhat like those of hazel, roundish in outline, irregularly toothed, and strongly veined; but the colour is of a deeper green and the surface smoother than in the hazel. Anglers sometimes steep their fishing-gut in an infusion of the leaves, or rub the gut with the leaves, to prevent its glistening in the sunlight. The flowers yield green, the twigs pale brown, and the rough bark dark red dyes, which are used in the Highlands of Scotland. By the banks of British streams, especially in Scotland, the tree forms a dense covering. It loves moisture, and it is often the companion of oaks and birches. The wood, capable of withstanding long immersion in water, is used for piles; and, from its reddish colour and suitability for polishing, it is sometimes called 'Scottish mahogany.' The male inflorescences form catkins, and the female (on the same tree) are like fir cones. These begin to appear in autumn, last through winter, and mature in March or April. The ripened 'cones' are black, and about half an inch long.



Alder Tree: leaf, twig, male (b) and female (a) catkins, and flower.

Lawrence at Bradford, Wiltshire, alone remains of his buildings. Most of his writings, comprising Latin treatises, letters, and Latin and English verses, have not come down to us, but some of his work is preserved in Dr. Giles's *Patres Eccles. Ang.* (Ox. 1844).

Aldiborontiphoscophornio, a courtier in Carey's burlesque, *Chrononhotonthologos* (1734). The name was applied playfully by Sir Walter Scott to James Ballantyne, the printer, on account of his formal style of speech. See Lockhart's *Life*, ch. xviii.

Aldine Editions. See MANUTIUS, ALDUS.

Aldobrandini, a celebrated Tuscan family, settled in Florence about the end of the 12th century. Among its chief members are SILVESTRO ALDOBRANDINI (1499-1558), jurisconsult, banished from Florence for opposing the Medici; IPPOLITO ALDOBRANDINI, son of Silvestro Aldobrandini, became Pope under the title of Clement VIII. (1592-1605); GIOVANNI ALDOBRANDINI, son of Silvestro, became a cardinal (1570); TOMMASO ALDOBRANDINI, another son of Silvestro, author of a Latin translation of Diogenes Laertius; and CINZIO PASSERO ALDOBRANDINI, cardinal, a grandson of Silvestro Aldobrandini.

Aldred (d. 1069), elected (1060) archbishop of York, was the first English bishop (of Worcester) to visit Jerusalem (1058). His archiepiscopate is noteworthy for the Pope's refusal to grant him the pallium; for his reform of the external life of the clergy, and the modelling of his diocese after the splendour of the German Church; and for his loyal yet independent attitude to William the Conqueror, whom he crowned, as he had previously crowned Harold. See Freeman's *Norman Conquest*.

Aldrich, HENRY (1647-1710), dean of Christ Church, Oxford, and author of a small treatise on logic, *Artis Logicæ Compendium* (1st ed. 1691, ed. by Dean Mansel, and repr. 1862), was born at Westminster. His clerical and scholastic labours were varied by his architectural and musical interests—he composed the catch, 'Hark, the bonny Christ Church Bells'—and not least by his love of conviviality. He is said to have designed the Chapel of Trinity College and All Saints' Church, Oxford.

Aldrich, THOMAS BAILEY (1836), American poet and novelist, has contributed much prose and verse to many of the principal magazines, and was editor of *Every Saturday* (1870-4) and of the *Atlantic Monthly* (1881-90). His chief publications are the poems *The Ballad of Babie Bell* (1856), *Pampinea* (1861), *Cloth of Gold* (1874), *Thirty-six Lyrics* (1881), and *Sisters' Tragedy* (1891); and the novels *Story of a Bad Boy* (1869), *Marjory Daw* (1873), *Prudence Palfrey* (1874), *Queen of Sheba* (1877), *Stillwater Tragedy* (1880). See Stedman's *American Poets* (1885).

Aldridge, IRA (1805-67), the 'African Roscius,' a negro, born at Bel Air, near Baltimore, who in 1825 began to prepare for a missionary career at Glasgow, but appeared next year in London as Othello, and subsequently starred the provinces. On one occasion he acted Othello to Edmund Kean's Iago. On the Continent, which he visited in 1852, he had great success as an exponent of Shakespearean rôles.

Aldringen, or ALDRINGER, JOHANN, COUNT (1588-1634), Imperialist general in the Thirty Years' war; was born at Diedenhofen (Thionville), Lorraine. He subdued Würtemberg (1631), and after Tilly's death became commander of the army of the League (1632). See Pufendorf's *Rerum Suecicis*, vi. 157; Brohm's *Johann von Aldringen* (1882).

Aldrovandi, ULYSSES (1522-1605), zoologist, born in Bologna; studied law, philosophy, and medicine there, and later at Padua. In 1549 he was imprisoned at Rome for heresy, but was afterwards released. Thereafter he took a medical degree at Bologna in 1553, and held successively the botany and natural history chairs in that university. He established the Botanic Gardens at Bologna in 1567, and spent many years in forming a natural history museum. The first volume of his great work on natural history appeared in 1599. Six others appeared during his lifetime, seven after his death.

Aldus Manutius. See MANUTIUS.

Ale (Dan. *öl*, A.S. *eale*, Scot. *yill*), a term variously applied to beer. Strictly, ale differs from beer by the large percentage of alcohol (7 or 8 instead of about 2) and by the greater quantity of sugar. (See BREWING.)—HEATHER ALE, a drink formerly brewed from young heather tops and malt in the Scottish Highlands.

Aleander, Hieronymus (1480–1542), cardinal, was born near Venice. He was a strong opponent of Luther at the Diet of Worms (1521), and a persecutor of those who held the reformed faith, notably in the Netherlands; author of a *Lexicon Græco-Latinum* (1512). He died at Rome.

Aleardi, ALEARDO (1812-78), Italian poet, often imprisoned for revolutionary tendencies; professor (1864) of æsthetics in the *Accademia della Belle Arte* at Florence; and later, member of Senate. His *Canti* (complete ed. Florence, 1882) are elegant and patriotically inspired, though somewhat sentimental. Wrote also *Epistolario* (Verona, 1879). See Rosso's *Life* (1900).

Aleatory Contracts (Lat. *aleator*, 'a gamester'), defined by Holland (*Jurisprudence*, p. 234) as those 'depending or not depending upon an uncertain event,' include wagers, bottomry, respondentia, insurance, etc.

Ale-conner, a local officer appointed yearly to assay ale and ale measures; called also *ale-taster, ale-founder*. The liverymen of London, assembled in common hall on Midsummer Day, still appoint four such officers.

Alecto, in Greek mythology one of the three Erinnys or Furies—Alecto, Megæra, and Tisiphone, denoting hatred, jealousy, and revenge. See EUMENIDES.

Alegrete, tn., Rio Grande do Sul, Brazil, about halfway between Cacequi (the terminus of railways from Taquary, near Porto Alegre, and from Pelotas) and Uruguayana. Active trade. Pop. about 1,400.

Aleman, MATEO (c. 1550-1610), Spanish novelist; author of the popular story of roguery, *La Vida del Picaro Guzman de Alfarache* (1599; several English trans.), also of *Ortografia Castellana* (1608); was for twenty years in the service of the king of Spain; died in Mexico. See Ticknor's *Hist. of Spanish Literature*.

Alemanni, or ALAMANS, a fusion rather than a confederation of Teutonic tribes who rose into prominence during the later years of the Roman empire, with which they were almost constantly at war during the 3rd, 4th, and 5th centuries. 'From the source of the Rhine to its conflux with the Main and the Moselle the formidable swarms of the Alemanni commanded either side of the river, by the right of ancient possession or recent victory,' says Gibbon, in describing their situation on the eve of the battle of Tolbiac, 24 m. from Cologne, when they suffered a crushing defeat at the hands of the Franks under Clovis, in 496. Thereafter they were allowed by the Emperor Theodoric to settle in what is now S. Bavaria. They were the ancestors of the modern Swabians. From their name comes the French *Allemand* and *Allemagne*, applied to the whole of Germany. *Almain* was also formerly used in England to denote the Germans of the Rhine districts.

Alembert. See D'ALEMBERT.

Alembic, an apparatus for distillation used by the alchemists; now superseded by retorts and flasks connected to a condenser.

Alemtejo, the largest prov. of Portugal, drained by the Tagus, the Guadiana, and the Sado; detached mountain ranges in the E., well wooded with cork trees, oaks, and chestnuts, towards the W. broad, treeless plains, where sheep are pastured; coast swampy. Cereals are grown, and there are copper and iron mines, and mineral springs, but very little manufacture. Area, 9,423 sq. m. Pop. (1900) 413,531. Chief tn., Evora.

Alençon, cap. of dep. Orne, France, on the Sarthe, 132 m. W. of Paris. Woollen and linen manufactures; the *point d'Alençon* lace industry is decaying. It was held by the English during the Hundred Years' war from 1415-49. Pop. (1901) 17,270. Alençon has been the title of a duchy held by various members of the royal family of France, from Charles II. of Valois, who fell in the battle of Crécy, to the present day.

Aleppo. **(1.)** Vilayet (63,205 sq. m.), N. Syria, Asiatic Turkey, extending from the Mediterranean to the Euphrates. Pop. 995,800. **(2.)** Town (Turk. *Haleb-es-Shabba*; anc. *Berœa*), cap. of above, on the Koeik, 70 m. E. of the Mediterranean, Alexandretta being its port. An important and historic trade centre, inhabited by Turks, Armenians, Greeks, Jews, Maronites, Syrians, four-fifths being Mohammedans. The Italianized name commemorates the trade connection with Venice, active to the close of the 15th century, when the Cape route to India robbed it of its importance. Conquered by Saracens (636 A.D.); sacked by Tamerlane (1402); captured by Turks (1517); devastated by earthquakes (1170 and 1822); ravaged by plague (1827) and cholera (1832). Chief exports: native manufactures (*i.e.* silk stuffs, mixed silk and cotton, and cotton stuffs), silk cocoons, wool, liquorice, morocco leather, butter, wheat and other grain, etc. Pop. 129,000, of whom 23,000 are Christians and 8,000 Jews.

Aleshki, formerly DNIEPROVSK, tn., gov. Taurida, Russia, on the Dnieper. Fisheries, fruit culture, active trade. Pop. (1897) 9,119.

Alesia, or ALEXIA (modern ALISE), fort. tn., ancient Gaul, near the source of the Seine, where Cæsar besieged Vercingetorix (*De Bel. Gal.*, bk. vii. c. 68 *ff.*).

Alesius (Lat. of *Hales* or *Ales*), ALEXANDER (1500-65), Scottish Lutheran divine, canon at St. Andrews, chosen for his skill in confuting Luther's opinions to reclaim Patrick Hamilton; but, himself convinced of what he attempted to confute, had to fly to Germany (1532), where he formed a friendship with Melanchthon. Sent to England, he met Cranmer and Thomas Cromwell (Earl of Essex), and lectured at Cambridge. When Cromwell's fall was imminent, Alesius returned to Germany (1540), and, after holding for three years a professorship at Frankfort-on-the-Oder, spent his closing days at Leipzig. See M'Crie's *Life of Knox*, note 1 (7th ed. 1855); Strype's *Memorials of Cranmer* (1853).

Alessandria. **(1.)** Fort. tn. and episc. see, cap. of prov. of same name, Piedmont, Italy, 57 m. S.E. of Turin; built (1168) by the Lombard League as a bulwark against Frederick Barbarossa; the citadel was built in 1728. Now an important railway centre, and manufactures linen, macaroni, etc. Near it took place the battle of Marengo (1800). Pop. (1901) 72,109. **(2.)** Province, Piedmont, Italy, drained by the Tanaro and other affluents of the Po; chief industries are agriculture and silk. Pop. (1901) 812,022.

Alessi, GALEAZZO (1512-72), Italian architect, enjoyed the friendship of Michael Angelo. He designed several churches and palaces at Genoa, and the churches of San Paolo, San Vittoria, and the Palazzo Marino at Milan. Buildings after his designs may also be seen in Germany and Belgium.

Aletschhorn, second highest peak (13,721 ft.) in the Bernese Oberland; dominates the great glaciers of Aletsch.

Aleurone Grains, small albuminoid granules, with definite chemical and optical properties, found in the endosperm of ripe seeds.

Aleutian Islands, a curved chain of islands numbering about 150, extending w. from the Alaskan peninsula for a distance of 1,000 m. towards the Commander Is. off the coast of Kamchatka. The islands are bare and rocky, and many of their summits are volcanoes; the largest, Unimak, which is also nearest to the mainland, has two active volcanoes. The climate is like that of Iceland (mean temp., July 50°, Jan. 35°). Fishing and sealing are the sole industries. Foxes, bears, dogs, reindeer, caribou, otters, and seals are the chief mammals. The island of Unalaska is the centre of the American whale and seal fisheries; there is a good harbour. The inhabitants, called Aleuts, are Eskimo in origin. They have been converted to the Greek Church, and number (1900) barely 2,000. The greater part of the chain belongs to the U.S. territory of Alaska.

Alewife (*Clupea mattowocca*), a N. American coast, river, and lake fish, 8 to 10 in. long, so called from its rounded, corpulent shape, is somewhat like a shad, but not so good for food. It is taken in great quantities, salted, and exported.

Alexander, eight Popes. ALEXANDER I. (109-119) is believed to have died a martyr.—ALEXANDER II., Anselmo de Baggio (1061-73), was born in Milan; bishop of Lucca; papal legate at Milan (1059); elected pope (1061) through the influence of Hildebrand; opposed and defeated Pope Honorius II., who was elected through the influence of the German emperor; was opposed to the divorce of the Emperor Henry IV.; did much, under the inspiration of Peter Damiani and Hildebrand (later Pope Gregory VII.), to reform the Roman Catholic Church.—ALEXANDER III., Orlando Bandinelli (1159-81), one of the greatest popes of the middle ages, was born in Siena; elected pope in 1159; fought successfully against the Emperor Frederick Barbarossa, who opposed to him successively three anti-popes, and whom he forced to sign the treaty of Venice (1177), for which he was hailed as defender of the liberty of Italy. He was successful also against Henry II., King of England, whom he constrained to do penance for the murder of Thomas à Becket. In 1179 he summoned the Lateran Council, which conferred on the pope alone the right of canonization, and drew up the laws under which the election of the popes is still governed.—ALEXANDER IV., Rinaldo, Comte de Segni (1254-61), formerly bishop of Ostria and Velletri, was of weak character, and in his struggle against Manfred, natural son of Frederick II., was defeated and compelled to fly to Viterbo, where he died.—ALEXANDER V., Pietro Filargi (1409-10), was pope only ten months. Bishop of Milan in 1402, cardinal in 1405, he was elected pope in 1409. He died, it is believed, of poison administered by his chancellor, subsequently his successor, under the title John XXIII.—ALEXANDER VI., Rodrigo Borgia (1492-1503), whose memory is one of the most abused in history; born in 1431 in Jativa, prov. Valencia, Spain. The election of his uncle as Pope Calixtus III. turned his ambition towards the church. At the age of twenty-five he was made a cardinal, and became bishop of Valencia in 1458. The beautiful Vanozza de Cataneis, his mistress, bore him four sons and a daughter, two of whom were the notorious Cæsar and Lucrezia. Elected pope in 1492, he figured conspicuously in the political events of Italy, endeavouring to establish a dynasty for his own family, in the prosecution of which purpose he is accused of having shrunk from no means, not even from assassination and poison. On the other hand, he showed himself an able administrator and politician, a patron of the arts and sciences, and a friend of the people. Cæsar Borgia, who largely inspired Alexander's policy, is Machiavelli's type of the statesman. See Leonetti's *Papa Alexandro VI.* (3 vols. 1880); Clément's *Les Borgia* (1882); Pastor's *Geschichte der Päpste* (3 vols. 1895); Gregorovius's *Lucrezia Borgia* (1875).—ALEXANDER VII., Fabio Chigi (1655-67), was born at Siena in 1599; cardinal and papal nuncio in Germany at the peace of Westphalia; was elected pope in 1655. Alexander was a patron of learning, and himself the author of a volume of poems in Latin. He did much for the improvement of Rome, and constructed the beautiful colonnade in the piazza of St. Peter. He had a dispute with Louis XIV. of France, in consequence of which the papal see lost Avignon (1662).—ALEXANDER VIII., Pietro Ottoboni (1689-91), born in Venice (1610), was bishop of Torcello and Brescia; elected pope in 1689. He assisted Venice in her struggle against the Turks, issued the bull *Inter multiplices* against the four articles of the Gallican Church, and enriched the Vatican library with valuable MSS. from the library of Queen Christina of Sweden.

Alexander, surnamed POLYHISTOR, a native of Cotyaeum, in Lower Phrygia, was brought to Rome as a slave in the time of Sulla; became tutor to the children of Cornelius Lentulus, and was liberated by his master (82 B.C.); subsequently accompanied Crœsus on his travels, and died at Laurentum. He was a voluminous compiler of books on historical and geographical subjects, now only surviving in fragments (Müller, *Frag. Histor. Græc.*, vol. iii.; Eng. trans. I. R. Cory, 1876), one of which contains excerpts from otherwise unknown Jewish writers. His works were largely quoted by Pliny, Eusebius, Clement of Alexandria, and others.

Alexander OF APHRODISIAS, so called from his birthplace in Caria, styled the 'Second Aristotle' as being the greatest expositor of the peripatetic school, was the head of the Lyceum, Athens (*c.* 200 A.D.), and author of numerous commentaries on the philosophy of Aristotle, some of which still exist, as well as of original contributions to philosophy. Of the former, the most important is his commentary on the *Metaphysica*, ed. by Bonitz (Berlin, 1847); of the latter, *De Fato* and *De Animo*.

Alexander OF HALES (d. 1245), English scholastic theologian (*Doctor Irrefragabilis*), having resigned his benefice in Gloucestershire, went to Paris to study, and was there appointed professor in the schools. Having resigned this position, he entered the Franciscan order (1222). He was a strenuous supporter of the papacy, and gave new authority to the teaching of the orders, which now vied with that of the secular professors of the universities. His work, *Summa Universa Theologiæ* (first printed 1475, best ed. 1576) is of no permanent value. See Erdmann's *Geschichte der neuern Philosophie* (Eng. trans.).

Alexander I. (?1078 1124), King of Scotland, fourth son of Malcolm Canmore, succeeded (1107) his brother Edgar to the northern kingdom, while his younger brother David I. ruled the country south of the Clyde and Forth. Alexander promoted important ecclesiastical reforms, introducing a diocesan episcopacy on the Roman model, establishing the see of St. Andrews and defending it against the claims of the English Church, and founding abbeys at Inchcolm and Scone. He died childless, and was succeeded by David.

Alexander II. (1198-1249), King of Scotland, son of William the Lion, succeeded to the throne in 1214. After continuous disputes with regard to the Northumbrian and Cumbrian provinces, he concluded a treaty with Henry III. (1217), and married Joan, sister of the English king. Henry, however, attempted to force Alexander to give homage (1244), but the matter was peacefully settled by the treaty of Newcastle. Alexander protected the church, reformed the laws, and by his wisdom and courage brought prosperity to Scotland.

Alexander III. (1241-86), King of Scotland, succeeded his father Alexander II. when eight years old, and till 1261 was sore beset by regencies of English and Scottish nobles. Alexander is renowned for his splendid architecture, his pure coinage, his wise administration of justice, and for the defeat of Haco of Norway at Largs in 1263, which united the Hebrides to Scotland. Externally, the disputes with England about homage began to take a form ominous of the fast-approaching struggles for independence. On March 12, 1286, he perished by falling over a cliff between Burntisland and Kinghorn. A monument (1887) now marks the spot.

Alexander I., PAULOVITCH (1777-1825), Emperor of Russia, eldest son and successor of Paul Paulovitch, was educated by Laharpe, a Swiss of high character and liberal ideas. The assassination of the Emperor Paul in March 1801 placed Alexander on the throne. The reign of Alexander began well. It synchronizes with the stormy period of Napoleonic conquest, aggrandizement, and decay. Yet, although Russia inevitably found herself arrayed against France, Alexander himself was full of admiration for Napoleon's lofty genius. The chief incidents of the struggle between the two nations were Russia's alliance with Prussia and the treaty of Tilsit (1807), and Napoleon's disastrous invasion of Russia (1812). Under the influence of Mme. de Krüdener, Alexander was instrumental in forming the Holy Alliance. More purely Russian events were the definite annexations of Georgia and Finland (1809), and the tightening of the Russian grip on Poland. This enlightened ruler founded universities and schools; fostered trade; abolished torture, the secret tribunal, and the transference of parents as mere chattels, whether by sale or by gift; and reconciled church and people. Nevertheless, the closing years of his life were marked by reactionary measures. Disappointed and broken in spirit, he took refuge in dissipation, alternating with fits of religious mysticism. He died at Taganrog, on the Sea of Azov.

Alexander II., NICOLAEVITCH (1818-81), Czar of Russia, known as the CZAR LIBERATOR, was the eldest son of Czar Nicholas, whom he succeeded on March 2, 1855. The reign of Alexander II. is marked by two great wars—the Crimean war, which was going on at the time of his accession, and the war with Turkey in 1877. Into this last he was in great part forced by the Panslavist party. Moreover, from 1866 to 1881 his troops were engaged in intermittent and successful warfare with the Turcoman tribes of Central Asia, and the Russian frontier was ever pushed farther and farther to the south-east. The subjugation of the peoples of the Caucasus was likewise completed; and he acted with great severity in suppressing the Polish insurrection of 1863. On the other hand, the emancipation of the serfs in 1861 was due to the initiative of the Czar; and he also took a keen interest in advancing internal reforms in Russia, especially the reorganization of the judiciary and the army. In 1872 the Triple Alliance was concluded between himself and the emperors of Austria and Germany. But the many attempts on his life by the Nihilists drove him to adopt methods of the most severe repression, with no result; and at length, on March 13, 1881, he was fatally injured by the explosion of dynamite bombs thrown at his carriage in the streets of St. Petersburg.

Czar Alexander II., killed by Nihilists, 1881.

Alexander III., ALEXANDROVITCH (1845-94), Czar of Russia, second son of Alexander II., succeeded to the throne on the death of his father on March 13, 1881, his elder brother Nicholas having died in 1865. Plain and blunt in manner ('the Peasant Czar'), and of great personal strength, Alexander III. evinced also a dogged determination to continue the hereditary policy of his house. In matters of foreign policy he consistently followed the idea of Russian expansion, and strengthened the army and navy.

Alexander I., OBRENOVITCH, King of Servia (1876-1903), succeeded his father, ex-King Milan, in 1889, but was under the guardianship of two regents till 1893. In 1900 he married Mme. Draga, *née* Lunyevica, against the wishes of his advisers and the people; this led, in 1903, to the assassination of both king and queen at Belgrade.

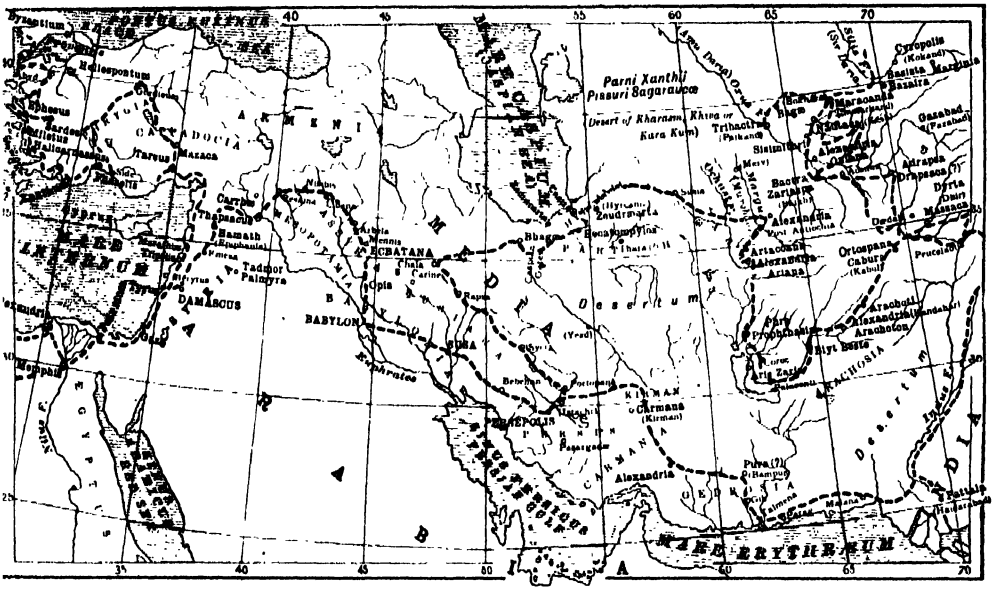
Alexander I. OF BULGARIA (1857-93), titular Prince of Battenberg, second son of Prince Alexander of Hesse and his morganatic wife, Countess Hauke. He was elected first Prince of Bulgaria (1879) under the treaty of San Stefano (1878), and became Prince of E. Roumelia (1885), without the consent of Russia and against the wishes of Servia. In a campaign of a fortnight he repelled the Servian invasion (Nov. 1885), but was abducted from Sofia (Aug. 1886) by Russian intrigue, carried to Reni, handed over to the Russians, and compelled to abdicate. Restored to freedom after a few days by a counter-revolution, he returned to the throne, only to abdicate in a month because of the difficulties thrown in his way by Germany, Russia, and Austria, when he retired to Graz. See J. D. Bourchier, 'Prince Alexander of Battenberg,' in *Fortnightly Review*, Jan. 1894.

Alexander John I. (CUSA), Prince of Roumania (1820-73), born at Husshi; joined the patriotic party in 1848; and in 1859 was elected Hospodar of Moldavia and Wallachia, but was not recognized by the Porte till 1861. Though justly popular, his absolutist tendencies and inability to cope with the financial difficulties of the country united all parties against him. On Feb. 22, 1866, he was forced to abdicate.

Alexander Nevski (1219-63), second son of Grand Duke Jaroslav II., became Prince of Novgorod (1239). The Tartars having raided the south of Russia, the Swedes, Danes, and Livonians invaded the north, but were routed (1240) by Alexander near the Neva, whence the name *Nevski*. He succeeded his father (1247); opposed Pope Innocent IV.'s attempt to reunite the Eastern and Western Churches. Reverenced in life, he was canonized after death. In his honour Peter the Great founded (1710) a monastery near the scene of his famous victory, and created (1722) the Order of Alexander Nevski. The monastery includes a dozen churches, the residence of the metropolitan of St. Petersburg, a theological academy, and the tombs of several distinguished Russians—*e.g.* Suwarov.

Alexander Severus, Roman emperor (208-235), born at Arca, Syria; adopted by his cousin, Heliogabalus; on the murder of Heliogabalus proclaimed emperor by the Prætorians (222); was a wise and studious man and a just prince. He was killed near Mainz by mutinous Prætorians.

Alexander the Great (356-323 B.C.), son of Philip II. of Macedon, was born at Pella. He was educated in the best culture of the day; from about 343 B.C. for several years, possibly until 335, Aristotle was his tutor. It was at the battle of Chæronea, in 338 B.C., that Alexander obtained his first military distinction, the cavalry under his command being the main factor in Philip's victory. In the last year of Philip's life Alexander was estranged from his father, owing to the latter's divorce of Olympias and marriage with Cleopatra, niece of his general Attalus; even Alexander's legitimacy was suspected. When Cleopatra bore a son, an assassin was found probably by Olympias—who murdered Philip. Alexander was the gainer by the crime; and though there is no evidence against him, it cannot be asserted that his innocence is incontestable. It was in 336 B.C. that Alexander ascended the throne, and found himself surrounded by enemies—the Greeks, the Thracians, the Illyrians, and Attalus—who supported the claims of Cleopatra's infant son. With marvellous rapidity he met and conquered his foes in turn; the Greeks, overawed by his energy, gave in without striking a blow, and he was [illegible] patra and her son had been murdered by Olympias's command, and Attalus by that of the king. Next year he crushed the Thracians, advancing as far north as the Danube. In his absence, a report of his death reached Greece. Several states became restless, and Thebes took up arms, blockading the Macedonian garrison in the citadel. But in a fortnight Alexander marched from Thrace to Bœotia, outstripping even the news that he was alive; and as the city would not surrender, he took it and razed it to the ground, sparing only the house of Pindar the poet. Nearly all the inhabitants were enslaved. The other disaffected states, particularly Athens, submitted, and were pardoned (335 B.C.). Alexander then prepared for his conquest of Asia, and in the spring of 334 set out with but 30,000 foot and 5,000 horse. Only the outline of his campaigns can be given. In May he utterly defeated the Persians on the banks of the river Granicus in Mysia. He then advanced along the coast, through Lycia and Pamphylia, to Gordium in Phrygia, where he cut the famous Gordian knot, and thence into Cappadocia, and through the pass called the Cilician Gates, which the Persians did not defend, to Tarsus in Cilicia. There he fell ill of a fever, and while ill received a letter from Parmenio warning him that his doctor was bribed by Darius to poison him. He drank the doctor's medicine, and then gave him the letter; his confidence was rewarded by a speedy recovery. In October he defeated the Persian forces under Darius at Issus in Cilicia. Next year (332) he subdued the cities of Phœnicia—Tyre only after a seven months' siege. The fall of Gaza opened the road to Egypt, which he entered November 332. The country at once submitted, and Alexander was crowned king, for which purpose—as the Pharaohs were held to be sons of the god Ammon—he visited the oracle Ammon in the Libyan desert, and was acknowledged son of the god. The conquest of Syria and Egypt destroyed the sea-power of Darius, and left Alexander free to advance against Persia. He did so in 331, and in September of that year gained the decisive victory of Gaugamela (generally known as Arbela, which place is many miles distant). His foes are said to have numbered a million of men. As a result of the victory, Babylon and Susa submitted. At once he pressed on, forcing the pass known as the Persian Gates, to Persepolis, the old capital of the Persian kingdom, which he took, with, it is said, £30,000,000 of treasure. His next object was to secure the person of Darius, whom he pursued through Media into Parthia. Bessus, satrap of Bactria, seized the king and murdered him; Alexander found him breathing and no more (? May 330 B.C.). He then subdued Hyrcania (Tabaristan). A revolt in Areia called him back; he put it down, founded a city, Alexandria Areia (on the site of which is probably the modern Herat), and conquered Drangiana (E. Afghanistan). There he discovered that Philotas, son of his general Parmenio, was conspiring against him. Philotas was



Sketch Map showing Campaigns of Alexander the Great.

Alexander the Great, born 356 B.C., died 323 B.C. (Bust in the Capitoline Museum, Rome.)

condemned and slain by the Macedonians, and Parmenio was executed by Alexander's orders as an act of precaution. He then advanced southwards through Gedrosia (Seistan and S.W. Baluchistan), and in the spring of 329 reached Kandahar—probably a corruption of Alexandria. Then he crossed the Paropamisus (Hindu-Kush) into Bactria; thence, in pursuit of Bessus, into Sogdiana, the country between the rivers Oxus and Jaxartes. He seized Maracanda (Samarkand), captured Bessus, and founded Alexandria Eschata ('farthest'), where he fixed the frontier of his empire at the pass over the Tian-Shan Mountains. The year 328 was spent in securing the recent conquests. It was at Samarcand that, in a drunken bout, he killed, to his great remorse, his foster-brother Clitus. In the same year he married Roxana, daughter of a Sogdian prince. In 327 he returned to Afghanistan, and prepared to invade India, which he reached through the Khyber Pass. In 326 he crossed the Indus, and advanced to the Hydaspes (Sutlej), where Porus, an Indian king, resisted stoutly, but was finally defeated after the third of Alexander's three great battles. Porus received his kingdom back from Alexander. He then reached the Hyphasis (Beas), which was the limit of his advance; his soldiers absolutely refused to go further, and the king had to yield (326). After nearly losing his life at the siege of Multan, he made his way to the mouth of the Indus. Thence he marched across Baluchistan (Aug. 325 B.C.) to Pura, losing, it is said, more than half his force. Upon getting back to Susa, he married Statira, daughter of Darius, and Parysatis, daughter of Ochus, to set his soldiers and officers an example in the fusion of the races, which was the great object of his policy. In the spring of 324 he went to Ecbatana, and in that year his bosom friend Hephaestion died. At the end of the year he returned to Babylon, where he met embassies from the Bruttians, Lucanians, and Etruscans in Italy, the Carthaginians, Celts, Scythians, Libyans, and Ethiopians—a wonderful testimony to his renown. His next purpose was to conquer Arabia, for which he began to make preparations (323 B.C.). When all was in readiness for the expedition, after a banquet to Nearchus, followed by two nights of carousal, he was attacked by a fever. The report spread among the Macedonians that he was dead, and they forced their way into the palace, and passed his couch in single file; he was able to greet them with a movement of his head and by signs. He died a few days later, in the thirty-second year of his age and the thirteenth of his reign.

In twelve years Alexander made himself master of W. Asia, and left a mark upon it which centuries could not efface. That he spread Greek civilization even beyond the Euphrates was the most enduring monument of his fame; for though the remoter provinces soon relapsed into barbarism, yet when Mesopotamia was lost to the Seleucids by the establishment of the Parthian empire, even the Parthian conquerors retained some tincture of Hellenism, which was destroyed only by the Saracen conquests in the 7th and 8th centuries. It is not the least of Alexander's claims to greatness that, truly Greek as he was, he was able to disregard the distinction of Greek and barbarian, and to attempt to unite all races in a cosmopolitan empire. As soldier and statesman, in brilliancy of strategy, rapidity of movement, grasp of detail, and breadth of organization, Napoleon alone among men can compare with him; and Napoleon's work perished almost entirely before he died. As a man, Alexander displayed a singularly lovable character; he was generous, warm-hearted, chivalrous, brave even to a fault; certainly not naturally cruel, though capable of severity on occasion. For his age and position, his morality was remarkable. He never stooped to intrigue. His marriage with Roxana was one of affection, his others of pure policy. His great fault was excess in drinking, which more than once led him to acts, such as the murder of Clitus, quite inconsistent with his nature; and it was this vice, together with the labours he imposed upon himself, and the many wounds that he received, ever fighting among the first of his men, that caused his premature death. There are no contemporary authorities for the history of Alexander; we have to depend on Arrian (*Anabasis of Alexander*), Quintus Curtius, Plutarch, Justin, and Diodorus, who all make use of earlier writers whose works are lost. See Hogarth's *Philip and Alexander of Macedon* (1897); Droysen's *Geschichte A. des Grossen* (5th ed. 1898); B. I. Wheeler's *Alexander the Great* (1900); M'Crindle's *The Invasion of India by Alexander the Great*. Dr. Budge has edited Syriac (1889) and Ethiopic (1896) *Lives* of Alexander.

It is not surprising that this illustrious figure has given rise to many legends. After the death of Alexander, the Egyptians claimed him to be the son of their last native king, Nectanebus II. A later version, from the same country (c. A.D. 200), extant in Greek MS., was falsely ascribed to Pseudo-Callisthenes. We meet with versions in Latin (3rd century), Armenian (5th century), and Syriac (7th century), the last of which, having originated in a Persian source, makes Alexander a Persian prince. The Ethiopic hero and his counsellor, Aristotle, are both trinitarian Christians; the Hebrew Alexander is a student of the Book of Daniel; he has been identified with 'the two-horned' of the Arabic Koran. The legendary Alexander has been found in Siam and Malay. A Turkish epic has this subject. A portion of a French poem by Alberic de Besançon (12th century) is still extant, and the library of Venice holds the MS. of a later French epic in decasyllables. These were followed by the most popular French version (pub. 1846), from the old romance composed (c. 1180) by Lambert li Court and Alexandre de Bernay (*Li Romans d'Alexandre*). There are German versions (1130) by Lamprecht; by Rudolf von Ems, who took the story from Walter of Châtillon's Latin epic; and by Seifried (1352). A Norman-French metrical poem by Thomas of Kent is translated in the English *King Alisaunder*. Examples in several other languages might be cited. See Nöldeke's *Beiträge zur Geschichte des Alexanderromans* (1890); Spiegel's *Alexandersage bei den Orientalen* (1851); Meyer's *Alexandre le Grand dans la Littérature Française au Moyen Age* (1886).

Alexander, GEORGE (1858), English actor, born at Reading, made his début at Nottingham in 1879 in Mr. Sydney Grundy's *The Snowball*. In 1881 he made his first appearance at the Lyceum in *The Two Roses*, and in 1884 he accompanied Irving on his American tour. In 1890 he made his first venture as a manager, opening the doors of the Avenue with *Dr. Bill*, which ran for seven months. In 1891 he transferred his company to the St. James's, where his career has been one series of successes, beginning with *Sunlight and Shadow*, *The Idler*, and *Lady Windermere's Fan*, which, after a long run, was succeeded by Mr. R. C. Carton's *Liberty Hall*. Then came Mr. Pinero's much-discussed *Second Mrs. Tanqueray*, in which Mrs. Patrick Campbell scored her first great hit, and *Guy Domville*, by Henry James. Among subsequent productions may be mentioned *The Masqueraders*, *The Prisoner of Zenda*, *Rupert of Hentzau*, *The Princess and the Butterfly*, *The Tree of Knowledge*, and *The Ambassador*, by Mrs Craigie (John Oliver Hobbes), *If I were King*, *Old Heidelberg*.

Alexander, JANNÆUS (d. 78 B.C.), succeeded his brother Aristobulus as king of the Jews in 104 B.C. With the help of Cleopatra, he ultimately repelled Ptolemy Lathyrus from Palestine; but throughout his reign he was engaged in constant strife with the surrounding tribes. In the civil conflicts of the Pharisees and the Sadducees, with the latter of whom he sided, Alexander exhibited unusual cruelty. An account of him is given by Josephus.

Alexander, JOHN WHITE (1856), American portrait and figure painter, is a follower of William Page in his love of experiment. He was born in Allegheny, Pa., studied at Paris and Munich, and was influenced by Whistler. He possesses a special sense of feminine grace, chooses daring colour schemes, unusual postures, unconventional backgrounds. He first exhibited at the Champ de Mars in 1893, and was made associate of the *Société Nationale* (1894). His portrait of Walt Whitman is in the Metropolitan Gallery, New York; and he painted *The History of the Book* in the Congressional Library, Washington (1897). His characteristics are well shown in his portrait of Rodin (1900). See the *Studio*, vol. xx., 1900.

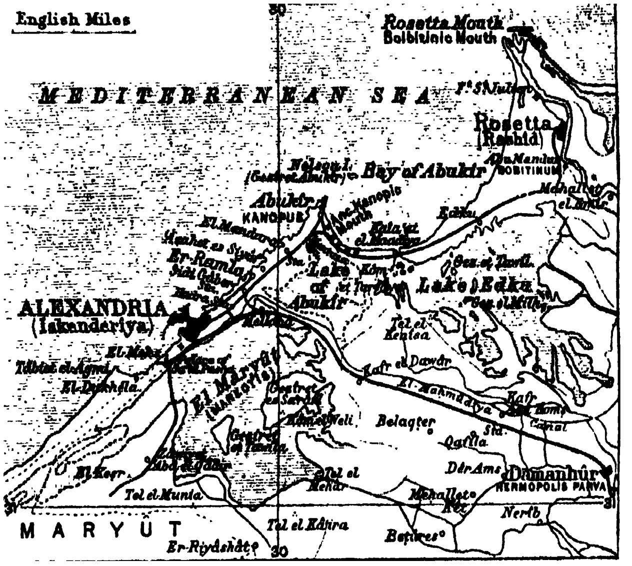
Alexander, WILLIAM (1824), archbishop of Armagh and Primate of all Ireland since 1896; appointed bishop of Derry and Raphoe (1867). Publications: *Witness of the Psalms* (Bampton Lectures, 1874) (1876); *St. Augustine's Holiday, and other Poems* (1887). He wrote the Thanksgiving Hymn (1897), set to music by Sir Arthur Sullivan. In 1896 he published the collected poems and hymns of his wife, Cecil Frances Alexander.

Alexanders (*Smyrnium olusatrum*), a plant of the order Umbelliferæ, formerly used as celery; hence still found near old gardens.

Alexandra, co. or div., Natal, on the coast between Umzimkulu R. and Umkomansi R. Pop. 22,750, mainly natives and Indians.

Alexandra, QUEEN, wife of King Edward VII., born at Copenhagen, Dec. 1, 1844, is the eldest daughter of King Christian IX. of Denmark and his wife, Princess Louise of Hesse-Cassel. To the careful upbringing by her wise and clever mother, as well as to the simplicity which characterized her early home life, may be traced many of the admirable qualities for which the Queen is conspicuous. The marriage of this 'sea-king's daughter from over the seas' to the Prince of Wales was solemnized in St. George's Chapel, Windsor, on March 10, 1863. The first break in the family circle was the death of the eldest son, the Duke of Clarence and Avondale, Jan. 14, 1892. For thirty-seven years, the Queen, as Princess of Wales, took part, along with her husband, in numerous public and state functions. An Eastern tour as far as Egypt and Constantinople was undertaken by the prince and princess in 1868-9, mainly for the sake of her health. Throughout her life, both as Princess of Wales and as Queen, she has displayed deep interest in philanthropic agencies, especially in the London hospitals, and participated actively in the efforts made to succour the wounded soldiers and to support the widows and orphans of those who fell in the South African war.

Alexandra, a British second-class battleship launched in 1875, and named after H.M. Queen Alexandra, then Princess of Wales.



Alexandria and Lake Mareotis.

Alexandra Park, pleasure grounds (480 ac.), 6 m. N. of Charing Cross, London; with a glass palace covering 7½ ac., built 1863, rebuilt 1873.

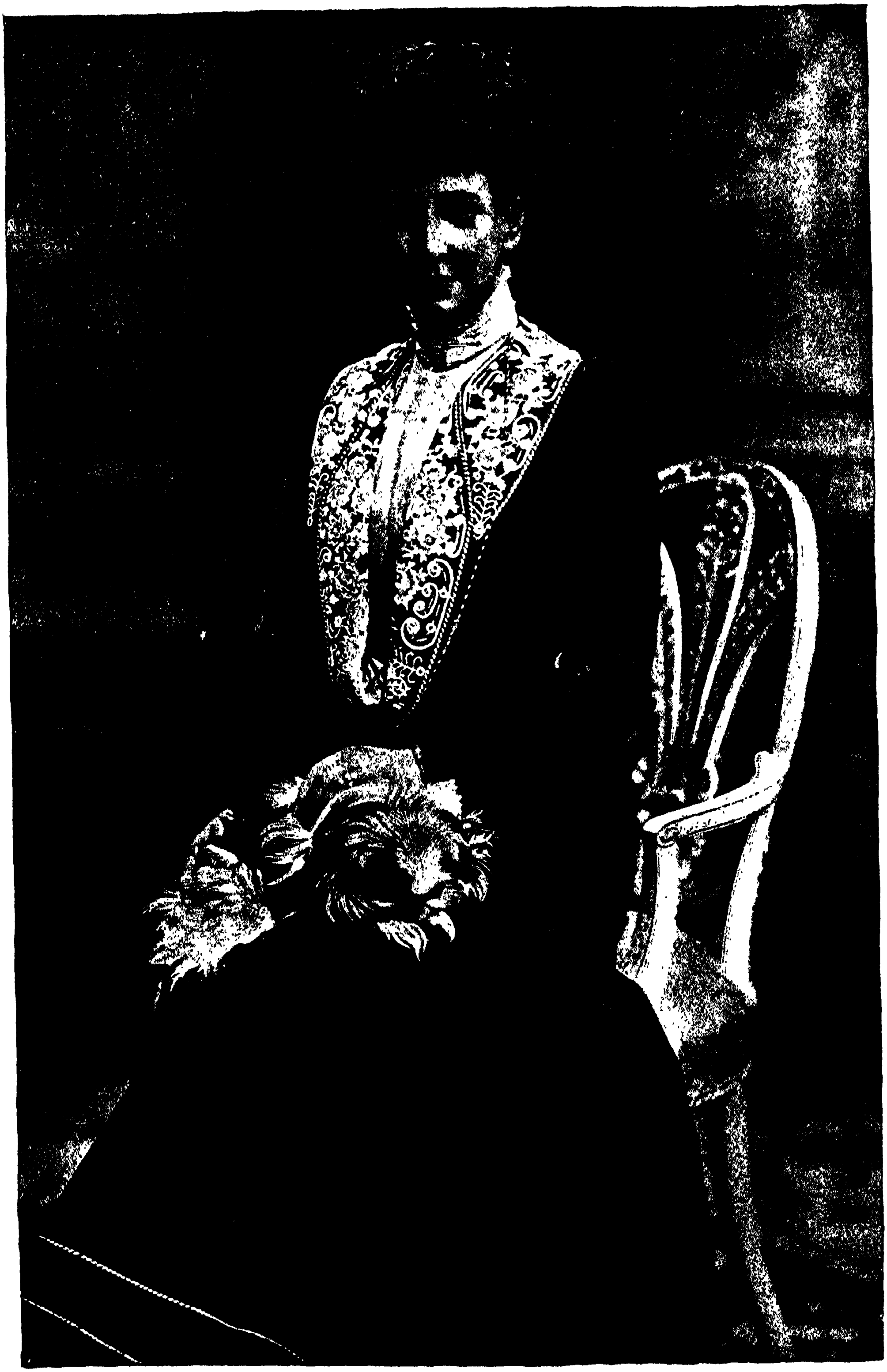
Alexandre, AARON (?1766-1850), celebrated chess-player, native of Hohenfeld, Bavaria; lived some time in Paris; travelled in most European countries and Egypt, and died in London; author of *Encyclopédie des Echecs* (1837); *Problèmes d'Echecs* (1846).

Alexandrescu, GRIGORIE (1812-86), Roumanian author and statesman, who won great popularity by his political satires, and was Minister of Education under Alexander Cuza. Collected works: *Meditatii, Elegi, Epistole, Satire si fabule* (Bucharest, 1863).

Alexandretta, ISKANDERUN, or SCANDEROON, seapt. tn., N. Syria, on gulf of same name, 23 m. N. of Antioch, port of that city and of Aleppo, at N. end of low marshy plain (Europeans reside at Beilan). Safe anchorage, 5 to 6 fathoms, half a mile from shore. Pop. 7,000.

Alexandri, VASILE (1821-90), Roumanian author and statesman; wrote numerous plays for the theatre at Jassy (1844-8); took part in the Roumanian rising of 1848; was Minister of Foreign Affairs (1859-60); founded, with Negruzzi, the review *Convorbiri Literare.* In 1873 his famous drama, *Boierii si Ciocoii,* was written and acted. His martial songs, written during the Russo-Turkish war (1877-8), were received with enthusiasm, and his collection of Roumanian folk-songs is very meritorious. His *Opere* appeared at Bucharest, 1873-6, in 7 vols.; his dramatic pieces in 1875, in 4 vols. In 1874 he won the prize given by the Society of Romance Languages at Montpellier for the best poem with his *Cantecul Gintei Latine,* in which he glorified the Latin race as the queen of humanity.

Alexandria, one of the most famous cities of antiquity, was founded B.C. 332 by command of Alexander the Great. Situated about 14 m. W. of the Canopic mouth of the Nile, on the coast of Egypt, on the narrow strip of land separating Lake Mareotis from the Mediterranean, the new city was admirably placed to become a great emporium. Nearly a mile off lay the little rocky island of Pharos, afterwards the scene of the labours of the translators of the Septuagint. By order of Alexander, a mole, the Heptastadium, 600 ft. broad—now twice



Queen Alexandra.

(*From a recent photograph by Lafayette.*)

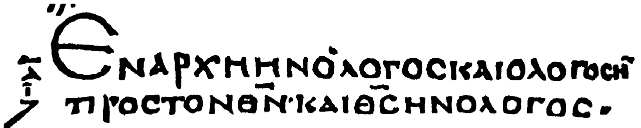
that width—was run out from the mainland to the island, thus converting the open channel inside Pharos into two splendid harbours, the N.E. or Great Harbour, and the S.E. or Eunostos, from which a canal ran into Lake Mareotis. On the N.E. corner of Pharos, Ptolemy II. (Philadelphus) built (B.C. 283) a lighthouse, whence *Pharos* became synonymous with 'lighthouse' (Fr. *phare*). At the E. end of the city, in the quarter called the Brucheion or Basileia, lay the royal buildings, and the Museum, containing the Great Library. Here also stood the two Cleopatra needles (16th century B.C.), one of which is now in London (since 1878), and the other in New York (since 1880); the temple of Poseidon; the palaces of the Ptolemies. To the S. of it were the gymnasium and the hippodrome. In the Egyptian quarter (Rhacotis) stood the Serapeum, or temple of Serapis, containing a second library and the Pillar of Pompey, and at the extreme W. lay the Necropolis. A special feature was the great system of underground tanks, holding more than a year's supply of water.

Under the Ptolemies, Alexandria rose to be a mighty trading centre, with a mixed population of about 750,000, consisting of Greeks, Egyptians, Jews, Romans, and a sprinkling of other nationalities. It was also famous for its glass, paper, and fine textiles—all manufactured there—but was even more famous as one of the chief intellectual centres of antiquity. Even when Egypt became a Roman province, after its conquest by Cæsar (B.C. 48), Alexandria continued to be the greatest seaport of the empire. It survived the cruelties of Caracalla (A.D. 215), the internal struggles between Christian and pagan factions in the 3rd century, and the Jewish persecutions carried on by the patriarch Cyril in the 5th century; but it sustained a severe blow when captured by the fanatical Arabs under Amru (641). The misrule of the Turks (who took the city in 1517), the discovery of America and of the sea route to India and the East, completed the temporary ruin of Alexandria, until towards the end of the 18th century it had only about 6,000 inhabitants. But in 1806 it began to revive under Mehemet Ali; and, with the returning prosperity of Egypt in modern times, it has acquired fresh importance. In 1798 the city was taken by storm by Napoleon, but in 1801 it was wrested from him by the British. In 1882, during the rebellion of Arabi Pasha, the British fleet under Admiral Seymour bombarded and destroyed the harbour forts.

Libraries. — There were two libraries — the 'Great' in the Museum, and the 'Daughter' in the Serapeum. In the former were close upon 700,000 volumes. Under a succession of great librarians it became a famous centre of learning, to which also the observatories, the zoological and botanical gardens, and the collections of the Museum contributed. The Great Library and Museum were destroyed during Cæsar's wars (B.C. 48-47), the 'Daughter' Library and Serapeum by command of Theodosius (A.D. 389). The story of the destruction of the Alexandrian Library by Amru is discredited by the best authorities, although to his caliph Omar is ascribed the saying that if the books in it agreed with the Koran they were useless, if they did not they were pernicious, and in either case should be destroyed. See Ritschl's *Die Alexandrinischen Bibliotheken* (1866); Weniger's *Das Alexandrinische Museum* (1875).

School and Philosophy. — The thousand years over which the influence of the great Alexandrian School extended falls into two periods, the Grecian (B.C. 332-30), and the Neo-Platonist, merging into the Christian (B.C. 30-A.D. 641). The school was strong in erudition and criticism, but lacked originality. Imitative rather than creative, its leaders used the old epic, lyric, dramatic, and elegiac forms for treatises on astronomy, grammar, criticism, mythology, etc., rather than for subjects suitable for poetic treatment. The one exception is found in the *Idylls* of Theocritus. But to Alexandrian scholars the world owes its possession of the texts of most of the ancient authors. In science also we are their debtors: Euclid the geometrician, Eratosthenes and Ptolemy the geographers, and Hipparchus the astronomer, here laid the foundations and extended the borders of their respective sciences. Alexandria was also the seat of Jewish learning, a school of thought which came under the influence of Greek ideas, and of which the most illustrious teacher was Philo. Alexandria, the last fortress of paganism, became in turn the stronghold of orthodox Christianity through its famous exponents, Clement and Origen, the great teachers, and Athanasius, the steadfast patriarch of the city. It was in Alexandria, too, that the Septuagint translation of the Old Testament (from Hebrew into Greek) was made. See Bigg's *Christian Platonists of Alexandria* (Bampton Lectures, 1886).

Codex. — The Alexandrian Codex (Codex A), one of the authoritative Greek texts of the Holy Scriptures, dating probably from about 450, was presented to King Charles I. in 1628, through Sir Thomas Rowe, ambassador at Constantinople, by Cyrillus Lucaris, patriarch of that city, who had taken it thither on his removal from Alexandria. Since 1753 it has been in the British Museum. See *Prolegomena* of Woide (1786) and Baber (1816-28).



Εν αρχη ην ο λογος και ο λογος η̄ | προς τον ϑ[εο]ν· και ϑ[εο]ς ην ο λογος.

John 1 : 1, as given in the Alexandrian Codex and in modern Greek characters : — 'In the beginning was the Word, and the Word was with God, and the Word was God.'

MODERN ALEXANDRIA (Turk. *Iskanderieh*) is the chief port and second town of Egypt, and is the station of the Egyptian fleet. The old harbour, S.W. of the peninsula, is the only harbour for large craft; the new harbour, on the N.E. of it, is protected by a two-mile breakwater. There are three principal quarters — the Frank (European) in the E., the Arab in the W., and the Mohammedan between the two harbours. The chief features of the last named are the palace Ras et-Tin, the barracks, and the arsenal. Alexandria is the seat of a Roman Catholic archbishop. In 1901, 2,882 vessels of over 2½ million tons entered the port, nearly half the tonnage being British. Alexandria is joined to the Rosetta branch of the Nile by canal. Imports about 15 millions in 1903; exports (three-fourths cotton and cotton-seed, the rest being sugar, beans, onions, gum-arabic, cigarettes, etc.) about 18½ millions. Pop. (1902) 310,587.

Alexandria, dist. and vil. in S.E. of Cape Colony. The dist. reaches from the sea to the Zuurberg Mts. Area, 947 sq. m. Pop. 10,005.

Alexandria, city, Virginia, U.S.A., on the Potomac R., 7 m. below Washington. Pop. (1900) 14,528.

Alexandrine Verse is an iambic metre consisting of twelve syllables. The name is derived from the old French romance of *Alexandre le Grand*, composed about 1180 by Lambert li Court and Alexandre de Bernay, in which the measure is first used. It is the standard measure in

French poetry. According to the rules of scansion in French, the cæsura must always fall after the sixth syllable; but this rule has been neglected by most English poets who have employed the metre. English poets use the Alexandrine occasionally for the sake of variety. The Spenserian stanza regularly ends in one, and Dryden and Cowley use it pretty freely among their decasyllables. But the only long English poem in which this metre is exclusively employed is Drayton's *Polyolbion* (1612-22), and the result shows how little it is adapted to the genius of our language. This metre has been employed in Germany by Opitz, Rückert, Freiligrath, Geibel, and others.

Alexandrine Liturgy, called also the LITURGY OF ST. MARK, who is said to have composed it for the use of Egyptian Christians; still extant in substance.

Alexandrine Mosaic, or OPUS ALEXANDRINUM, named after the Emperor Alexander Severus of Rome (A.D. 225-235), a magnificent type of mosaic in which were used precious stones, rare marbles, porphyries, and enamels.

Alexandriya, tn., gov. Kherson, Russia, 200 m. N.N.E. of Kherson city; station on the Kremenchug-Elisabethgrad Ry. Cattle-raising. Pop. (1897) 14,002.

Alexandropol, tn., gov. Erivan, Transcaucasia, Russia. The railway to Tabriz in Persia branches off from the Tiflis-Kars line near Alexandropol, which is 137 m. by rail from Tiflis. Pop. (1897) 32,018.

Alexandrov, tn., gov. Vladimir, Russia, 70 m. W. of Vladimir city. Iron and steel foundries. Pop. (1897) 6,848.

Alexandrovsk. (1.) Town, gov. St. Petersburg, Russia, 5½ m. E. of the capital. Imperial residence; manufacture of porcelain; refineries, tanneries. (2.) Town, gov. Ekaterinoslav, Russia, 52 m. S. of Ekaterinoslav city, on the l. bk. of the Dnieper. Grain trade; three annual fairs. Pop. (1897) 28,434. (3.) The centre of government in Sakhalin and of the Alexandrovsk dist., the N.W. of the island. Flour and saw mills.

Alexandrovsk - Grushevski, tn., prov. Don Cossacks, Russia, 15 m. N.N.E. of Novocherkask. Pop. (1897) 16,250.

Alexei, MICHAILOVITCH (1629-76), Czar of Russia. Succeeding his father, Michael Feodorovitch, in 1645, he extended his dominions after a successful war against Poland (1654-67). He also waged war with Sweden, extended his power to the east of Siberia, and put down (1672) a revolt of the Don Cossacks. His most important works, however, were the codification of the laws, and the opening up of communication with W. Europe.

Alexei, PETROVITCH (1690-1718), eldest son of Peter the Great, was excluded from the succession because of his opposition to his father's reforms. He fled to Vienna, and thence to Naples. Having returned to Russia, he was imprisoned, condemned to death, and then pardoned, but died (or was executed) in prison a few days later. His son became Peter II. See Barrow's (1883) and Schuyler's (1884) *Life of Peter the Great.*

Alexeieff, ERGHENYI IVANOVITCH, Russian naval officer, born 1843 of Armenian father and Russian mother. Commanded the Pacific squadron in 1899; afterwards governor of prov. of Kwantung; adjutant-general (1901); and viceroy of the Far East (1903), but was recalled in October 1904. His strong character and obstinate policy helped to precipitate the war with Japan.

Alexeievka, tn., gov. Voronej, Russia, 75 m. S. of Voronej. Sunflower culture. Pop. (1897) 14,069.

Alexiad, THE, a prolix chronicle of the reign of Alexius Comnenus, Byzantine emperor; written by his daughter, Anna Comnena, and her husband, Nicephorus Bryennius. It extends from 1069 to 1118 A.D., and consists of 15 vols. Sir Walter Scott founded *Count Robert of Paris* on it.

Alexinatz, or ALEKSINAC, tn., Servia, cap. of province of same name, on Morava, 102 m. S.E. of Belgrade; captured by Turks during Russo-Turkish war, 1877-8. Centre of a tobacco-growing district. Pop. (1896) 5,431.

Alexis, WILLIBALD. See HARING, GEORG.

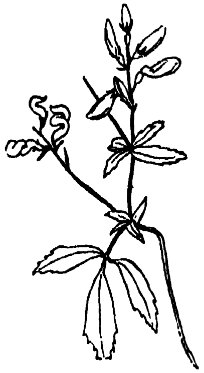
Alexius I., COMNENUS (1048-1118), nephew of the Emperor Isaac Comnenus, and one of the ablest of the Byzantine emperors, supplanted (1081) the Emperor Nicephorus. From the north and east his empire was assailed by the Pechnegs and the Turks, from the west by the Normans; and in 1096 the warriors of the first Crusade encamped before Constantinople. But by wisdom and courage he contrived, during thirty-seven years, to organize his empire—to put in order the finances, and reform the army. His career is fully recorded in the *Alexiad.*

Aleyard, an English measure of capacity and drinking-glass, so called from its elongated shape.

Alfa, or HALFA, the Arabic name, now naturalized in French, for esparto grass, particularly for the varieties *Stipa tenacissima* and *Stipa arenaria.*

Alfadir (*i.e.* 'All-Father'), in ancient Scandinavian mythology a favourite name for Odin.

Alfalfa, the Spanish name for the *Medicago sativa,* or lucerne, a leguminous plant highly valued for pasture and forage. From Europe it has spread through the temperate zone of the New World, being grown in great quantities in S. California and the western states of the U.S.A. generally, into which it was introduced by early Spanish settlers. It produces several crops a year. Also known as Spanish trefoil, French, Brazilian, and Chilean clover, and, in Britain, medic or purple medic.



Alfalfa or Lucerne.

Alfarabi (d. c. 950), Arabian philosopher, born at Farab, beyond the Oxus. In his encyclopædia he recognized six orders of sciences—language, logic, mathematics, natural sciences, civil science, divine science. Lived at Bagdad and Damascus. He popularized among the Arabs the theories of Aristotle, and was the master of Avicenna. For his partially published works, see Munk's *Mélanges,* pp. 341-352 (1859), and Steinschneider's *Mémoires de l'Académie de St. Pétersbourg,* 7th series, vol. xiii. (1869).

Alfieri, VITTORIO, COUNT (1749-1803), Italian poet and dramatist, born at Asti, in Piedmont; succeeded at fourteen to a large inheritance. From his nineteenth year he travelled widely in Europe. His first work was a tragedy on Cleopatra, staged at Turin in 1775. In 1777 Alfieri became deeply attached to Louise von Stolberg, Countess of Albany, wife of Prince Charles Edward, and settled with her first in Alsace, and later in Paris, whence he was driven by the revolution. He returned with Louise to Florence, where the last ten years of his life were spent. Alfieri's own *Memoirs* (Eng. trans. 1810) give an excellent picture of his character. His tragedies, inspired chiefly by political, and especially by republican ideals, are severe and restrained in form. His dislike of French anarchy is recorded in his *Misogallo;* he also wrote many sonnets, and odes on American independence. Charles Lloyd (1815) and Bowring (Bohn) have both translated the tragedies. Landor introduces Alfieri in the

Imaginary Conversations. A new edition of his *Opere*, in 12 vols., was begun at Rome in 1902. See Centofanti's *Vita di Alfieri* (1842); Mazzantini's ed. of the *Letters* (1890); Vernon Lee's *Countess of Albany* (1884); Bertana's *Vittorio Alfieri* (1902).

Alfold, or Pusztas, the great central plain of Hungary, in Miocene and Pliocene times probably covered by a large inland sea, extends from the Danube to the Carpathians; consists alternately of sand ridges and alluvial valleys, and produces cereals, wines, and fruit, but the larger part is grazed by wandering herds of cattle, sheep, buffaloes, and horses. The inhabitants live in large villages situated at considerable distances apart.

Alfonso I. of Portugal (1110–85), 'The Conqueror,' son of Henry of Burgundy, undertook (1128) the control of state affairs, till then directed by his mother, Theresa of Castile; waged successful warfare against the Moors, inflicting a decisive defeat on them at Ourique (1139), when he assumed the title of King of Portugal; and captured Lisbon in 1147.

Alfonso III., 'The Great' (848–910), King of Leon, Galicia, and the Asturias, an intrepid champion of Christendom against the Moors in Spain, succeeded Ordoño I., his father, in 866. In a succession of hard-fought campaigns, he extended his rule over Old Castile and part of Portugal. Popular discontent, represented by his son Garcias in 888, and later by his queen, forced him to abdicate in favour of his three sons; but a Moorish invasion recalled him to power.

Alfonso I. (d. 1134), King of Aragon and Navarre from 1105-34, surnamed 'The Victorious,' succeeded his brother Pedro I. The opposition of his wife, Urraca of Castile, from whom he was separated, frustrated him in his attempt to annex Castile on the death of his father-in-law, Alfonso VI. In his successful warfare against the Moors he seized Saragossa and Tarragona, and inflicted a severe defeat upon them in the mountains of Valencia (1126). The victor in twenty-nine engagements, he was mortally wounded during the siege of Fraga.

Alfonso V. of Aragon and I. of Sicily and Sardinia (1385–1458), 'The Magnanimous,' was the son of Ferdinand the Just, whom he succeeded in 1416. In 1420 Joanna I. of Naples made him her heir, but revoked the gift in 1423; and thereafter, until 1442, he was engaged in a struggle to secure possession of that kingdom. He was an enlightened ruler, and gave asylum to many scholars who fled from Constantinople when it was captured by the Turks.

Alfonso I. of Castile and VI. of Leon (1030–1109), son of Ferdinand of Castile and Leon, ascended the throne of Leon in 1065. He carried on, with varying fortunes, a long and sanguinary warfare with his brother Sancho, King of Castile; and on the assassination of the latter, in 1072, Alfonso obtained his kingdom. He imprisoned his younger brother Garcia until the latter's death. He won New Castile from the Moors, but ultimately sustained a crushing defeat at their hands in 1108.

Statue of Alfred the Great.

Erected at Winchester in 1901, the thousandth anniversary of his death.

Alfonso X., King of Leon and Castile (1226-84), surnamed 'The Wise,' or 'The Astronomer,' succeeded Ferdinand III., his father (1252); was chosen king by some of the German princes (1257); his arms were successful against the Moors (1263); repressed the rebellion promoted by his son Philip (1271), but was driven from the throne by Sancho, his second son (1282). He was a patron of literature; completed the codification of the laws -*Leyes de las Partidas* —and was the author of poetical and scientific works. By his command the first complete history of Spain was written in the Castilian tongue, and the Old Testament was translated into Spanish. The astronomical tables known as *Alfonsine* were prepared under his direction.

Alfonso XII. (1857-85), King of Spain, son of the exiled Queen Isabella, was chosen by the provisional government to succeed Amadeus of Aosta in 1874. He put down the Carlist rebellion of 1876, and restored orderly government.

Alfonso XIII. (b. 1886), King of Spain, posthumous son of Alfonso XII., was proclaimed king on the day of his birth (May 17). His mother, Queen Maria Christina, acted as regent until he reached his majority, at the age of sixteen, in 1902.

Alford, HENRY (1810-71), scholar and poet; laboured as clergyman in Ampton, Wymeswold, London, and (1857) as dean of Canterbury; was evangelical in sympathy; is remembered chiefly for his *Greek Testament* (1849-61). First editor of the *Contemporary Review* (1866-70). Wrote *Poems and Poetical Fragments* (1831); *The School of the Heart* (1835); *Chapters on the Greek Poets* (1841); the Hulsean Lectures, *On the Consistency of the Divine Conduct*, etc. (1841-2); *A Plea for the Queen's English* (1863); also author of several hymns. See *Life* (1873) by his widow.

Alfred, co. at the extreme S. of Natal, bounded by Alexandra on the E., Pondoland on the W., Griqualand E. on the N., and the Indian Ocean on the S. Pop. 21,957, most of whom are natives.

Alfred the Great (849-901), king of the West Saxons in England, was born at Wantage in Berkshire. He was the youngest son of King Ethelwulf, but when his brother Ethelred died in 871 Alfred was declared king by universal consent. The young king fought eight or nine battles with the Danes in the first year of his rule, winning, amongst others, the battle of Ashdown. A period of rest followed; but in 878, Guthrum, king of the Danes in E. Anglia, invaded Wessex, and Alfred retired for a time to Athelney, in Somersetshire, where tradition says that he burned the cakes. Shortly afterwards he gathered levies from three shires, and inflicted a severe defeat upon the Danes at Edington, in Wiltshire. The peace of Wedmore was concluded, under which Guthrum consented to become Christian and to withdraw from Wessex, while the supremacy of Alfred was acknowledged over the whole country south of the Thames and over the greater part of Mercia. From 878 to 893 the land enjoyed comparative peace. It was utilized by the enlightened king in the consolidation of England. He practically founded the British navy; reorganized the national defences; raised public buildings, reclaimed waste lands; and revised all existing laws, combining those which he found good into a single code. He founded schools, encouraged literature in the native tongue, and improved the services of the church. This work was again interrupted by war. A new Danish army appeared under Hastings, who for four years kept Alfred and his forces incessantly occupied. Having once more saved his country, the great king died, Oct. 27, 901, at the age of fifty-two. The thousandth anniversary of his death was fittingly celebrated in 1901 in Winchester, the ancient capital of England.

Alfred's principal writings are as follows:—

(1.) A translation of the *Universal History* of Orosius contains three original insertions by the king: a brief description of North-Central Europe, and the account of two voyages of discovery by the explorers, Othere and Wulfstan. (2.) A translation of Bede's *Ecclesiastical History*, which, on account of Mercian peculiarities in the language, may be due to Alfred's instigation rather than to his own execution. (3.) A translation of the *De Consolatione Philosophiæ* of Boethius. (4.) A close translation of Gregory's *Cura Pastoralis* contains a priceless original preface by the king. (5.) A translation of Gregory's *Dialogues*, not yet edited, and by some assigned away from Alfred. (6.) *Blooms*, a commonplace-book of 'sayings which King Alfred collected.' (7.) Alfred's hand is not directly traceable in the *Saxon Chronicle*, but the finest writing it contains is the contemporary narrative of the Danish wars in his reign, and the *Chronicle* itself is certainly due to his fostering interest and care.

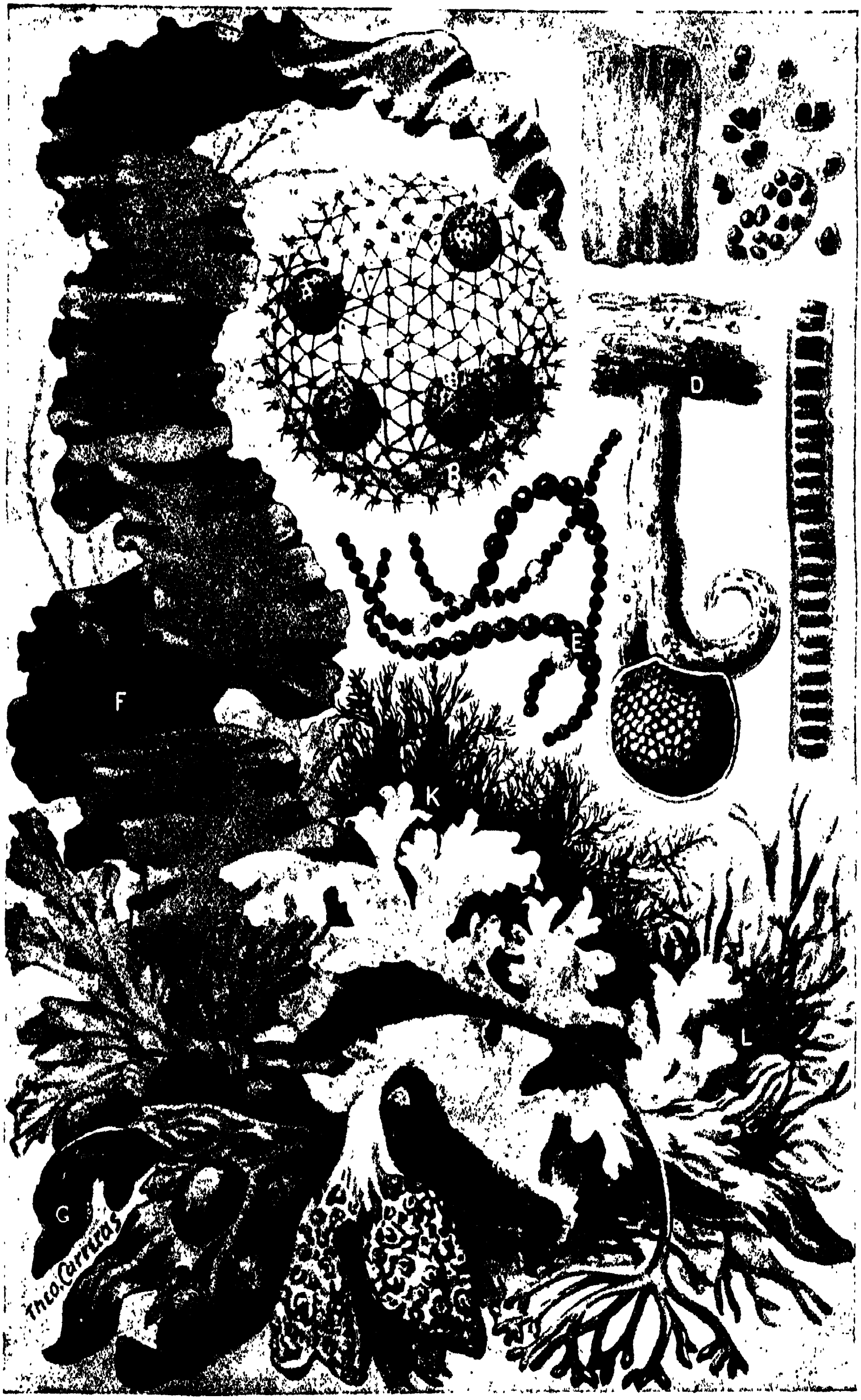
The *Anglo-Saxon Chronicle* is the best authority on Alfred. There are *Lives* by Asser (ed. Wise, 1722), Powell (1634), Spelman (1678), Bicknell (1777), Reinhold Pauli (1851), and Thomas Hughes (1878). See also Alfred's Laws in Thorpe's *Collection* (1840); Turk's *Legal Code of Alfred the Great* (1893); Alfred's *Works* (Ox. 1852-3); *Alfred the Great* (ed. Bowker); Earle and Plummer's *Two Saxon Chronicles;* an Alfredian *Old Eng. Reader*, containing the original preface to and extracts from the *Cura Pastoralis;* the *Orosius;* and the *Chronicle* (Camb. Press).

Alfred Ernest Albert, Duke of Edinburgh and Duke of Saxe-Coburg and Gotha (1844-1900), second son of Queen Victoria, was born at Windsor. In 1858 he entered the navy, and became admiral of the fleet in 1893. In Aug. 1893 he succeeded his uncle, Ernest II., as reigning Duke of Saxe-Coburg and Gotha. He was succeeded by his nephew, the Duke of Albany.

Alfreton, mrkt. tn., Derbyshire, on the Midland Ry., 14 m. N.N.E. of Derby. Pop. (1901) 17,505.

Alfuras, or HARAFURAS, the original inhabitants of Celebes, but found also in Buru, Ceram, Jilolo, the Sula Is., and the N.W. of New Guinea. They are apparently of Malay descent, greatly modified by Papuan blood.

Algæ, a large group of the simplest plants, including seaweeds, and the filamentous and microscopic forms which are found in stagnant pools and on moist surfaces exposed to the air, such as damp soil, stones, and the bark of trees. Though they vary greatly in complexity—from a single nucleated speck of protoplasm at one end of the scale, to the gigantic Macrocystis of southern seas with its fronds of 600 to 800 ft. in length, clothed with ribbon-like leaves of proportionate size, at the other end—algæ never possess true roots, stems, or leaves, however closely these structures may be simulated. They are distinguished from the fungi by their power of building up their organic materials out of elementary inorganic substances. Algæ are also distinguished from lichens, which consist of algæ and fungi living together in an intimate nutritive relation—a high form of symbiosis. They always possess chlorophyll—the substance by means of which new material is assimilated under the influence of light—though its presence may be masked by other pigments. Algæ are usually classified in three orders: CHLOROPHYCEÆ (green); PHÆOPHYCEÆ (brown); and RHODOPHYCEÆ (red); to which some authorities add a fourth, CYANOPHYCEÆ (blue). The green algæ occur in great variety in pools of fresh and salt water. One of the simplest forms is Pleurococcus, abundant on damp surfaces. It is a single round green cell, which multiplies by division into two or four cells, which then separate; in some allied aquatic forms the protoplasm may escape through its cellulose wall, develop a pair of cilia, and swim through the water. In more complex forms, the individuals resulting from fission may not wholly separate, but remain embedded in a common envelope. A very highly developed example of such a colony may be seen in Volvox, a constantly moving sphere of many



ALGÆ.—(A) Pleurococcus vulgaris: details magnified; (B) Volvox globator; (C) Ulothrix parietina; (D) Vaucheria terrestris, showing fructification; (E) Anabæna variabilis: all greatly magnified; (F) Laminaria saccharina; (G) Fucus vesiculosus; (H) Ulva latissima; (J) Rhodymenia laciniata; (K) Cladophora; (L) Polydes rotundus; (M) Griffithsia simplicifilum. A, B, C, D, and E enormously enlarged; F, G, and H much reduced.

Algæ are plants of a simple type, such as seaweeds and microscopic forms found in stagnant pools.

hundreds of ciliated individuals, connected by threads of protoplasm through the envelope, some of which are purely nutritive in function, while others become female reproductive cells, destined to form new colonies, and others again divide into numerous minute and active male elements, which are set free to fertilize the ova. The filamentous green algæ are higher forms, in which continued division results in single rows of cells separated from each other by transverse walls (Confervoideæ), as in Ulothrix, a long dark-green hairlike plant very common on stones in running water, which propagates by means of motile zoospores formed in certain cells, and set free to swim to a new site for a new plant, and also reproduces itself by means of the fusion of two free motile sexual cells (*gametes*). Or the filaments may consist each of a single continuous tube (Siphoneæ), as in Vaucheria, common in moist soil in greenhouses, which has a highly developed form of sexual reproduction, as shown by the large quiescent female cell (*oogonium*) and the minute active male (*antherozoid*). The so-called blue algæ are inconspicuous and degenerate plants, found in fresh waters. A common example is Anabæna, which often makes the water of a pond opaque and dirty green in colour, giving it a foul odour. It is among the brown and the red algæ or seaweeds that we find at once the largest and most differentiated forms, and the highest development of sexual reproduction. The common Laminaria, Fucus, and other seaweeds of British shores, together with examples of simpler algæ already mentioned, are illustrated in the accompanying plate; but for a description of seaweeds, see that article. See also DIATOM.

Algaroba, a Spanish name for the pods of several leguminous plants, principally those of the mesquite tree, found from Colorado westwards to California and southwards through Central America to the Argentine Republic. The pods form excellent food for cattle and horses, and are used commercially in tanning and dyeing.

Algarotti, COUNT FRANCESCO (1712-64), scholar and critic; born at Venice; his works popularized abstruse subjects. His *Neutonianismo per le Donne* (1732; trans. into several languages) was praised by Voltaire. He travelled through Europe, staying some time at Paris, Berlin, Dresden, and St. Petersburg, and was especially honoured by Frederick the Great. His poetry was mediocre, but his *Saggi* (essays) on art, etc. (1769), were influential in Italian literature. His *Opere* (Venice, 1791-4) were accompanied by a Life by Michelessi.

Algarve, the southernmost province of Portugal; mountainous in the N., but with a fertile coast belt on the S. Figs, almonds, olives, oranges, and vines are grown in the lowlands; cereals on the higher ground. Tunny, herring, and sardine fisheries. The Algarves are noted sailors. Cap. Faro. Area, 1,879 sq. m. Pop. (1900) 254,851.

Algebra (Arab. *al jebr*), the science of operations with quantities, where the quantities are usually represented by letters (*a*, *b*, *c* . . ., *m*, *n* . . ., *p*, *q*, *r* . . ., *x*, *y*, *z*, etc.) and the operations by symbols (+, −, ×, ÷, ∝, etc.); these symbols may themselves be numbers. Algebra took its origin in arithmetic, and both studies have the same fundamental laws. But many ideas are original in algebra. Certain quantities (*e.g.* imaginary quantities, such as the square root of a negative number: $\sqrt{-1}$) cannot be entertained by arithmetic. Every quantity, and every step in the working, of an arithmetical problem is capable of intelligible conception; but algebra admits of unthinkable quantities and operations. Vieta (16th century) first used letters for all quantities, and shortly afterwards symbols were used for the operations. For a time the various 'powers' of a number were represented as xx, xxx, etc.; but when Descartes indicated the power by a number (x^2, x^3, etc.), the laws of indices were soon discovered, and it was by subjecting binomials to the latter that Newton discovered the binomial theorem. The whole field of algebra is covered by the investigation of identities (or the methods of presenting an algebraic expression in various ways) and of equations. Algebra, as commonly taught, is only one of many algebras. Hamilton, Grassmann, and others have conceived algebras with different fundamental laws, of which quaternions is an example. For the various algebraic operations, see the respective articles; also Chrystal's *Text-book of Algebra* (1889).

Algeciras, tn., prov. Cadiz, Spain, the port on the bay opposite Gibraltar (5 m.). Industrial town, with busy export trade. The port is open and undefended. Pop. (1900) 13,302.

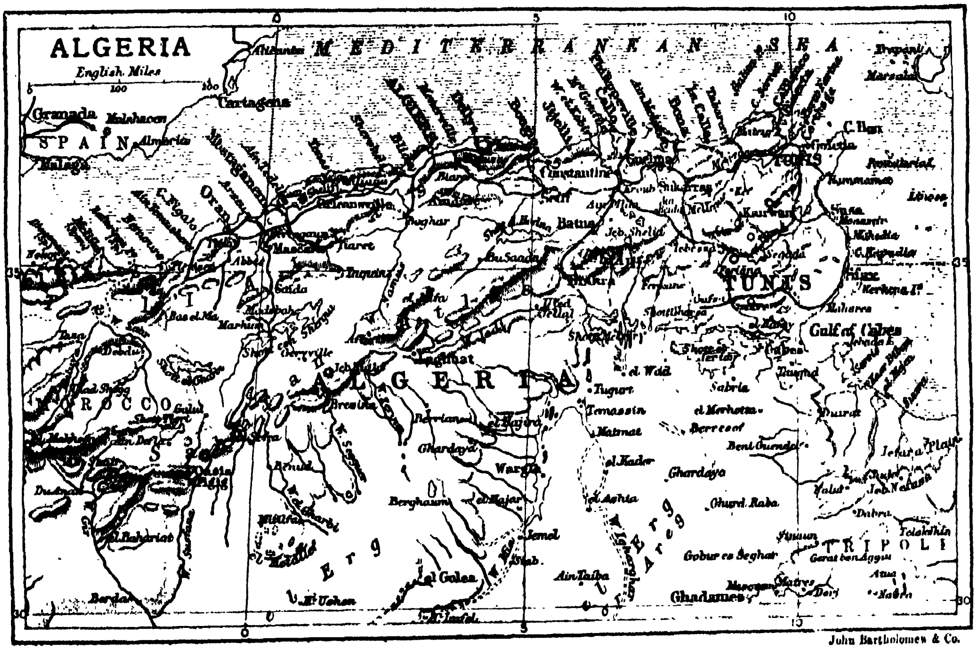
Algeciras Bay, BATTLE OF. In the summer of 1801 a small French division of three ships of the line and a frigate, under Rear-admiral Linois, had to anchor in Algeciras Bay. Sir James Saumarez, afterwards Lord de Saumarez, was blockading Cadiz at the time, and made a gallant attack (July 6), when, with the loss of one ship, the *Hannibal*, he succeeded in forcing the French vessels ashore, and in sinking five Spanish gunboats.

Algemesi, tn., prov. Valencia, Spain, 2½ m. from Alcira, 287 m. from Madrid, on main railway line to Valencia. Produces oranges and rice. Pop. (1900) 8,127.

Algeria, or L'ALGÉRIE, a French colony of N. Africa, which occupies the central portion of the former States of Barbary. It is bounded by the Mediterranean on the N., the Sahara on the S., and is separated from Tunis on the E. and from Morocco on the W. by conventional boundaries. The area is about 184,670,000 sq. m., but it would be almost as large again if its very extensive Sahara hinterland were included. The country is divided by elevation and climatic conditions into three zones, parallel to the coast, but of different breadths:—(1) The Tell, or region of forests and arable land; (2) the Steppe, or region of herbaceous vegetation and of pasture-land; (3) the Sahara, where agriculture is possible only by irrigation in certain limited spots called oases. The coast, running nearly E. and W., has an extent of almost 690 m.; it is, on the whole, high and rocky, and presents little shelter. There are, however, a few large semicircular bays. The orographical structure is determined by two series of mountain chains, which form part of the Atlas range, and may be called the Tell Atlas and the Sahara Atlas. Neither of these forms a continuous ridge; they are cut up into a series of distinct *massifs*, separated by rivers or plains. The height of these *massifs* is seldom more than 4,000 ft., and does not exceed 8,000 ft. in any part. The region between the two series of mountain chains is occupied by high plains, the altitude of which varies from 2,400 ft. to 3,900 ft. The rivers are nothing but torrents (*wads* or *wadies*), very frequently dried up. The waters of some of them are dammed up for irrigation. In the steppes the running waters have generally been unable to find an outlet to the sea; they form the *shotts* of the plains, shallow lakes where snow and rain-water gather in winter.

Algeria belongs to the zone of Mediterranean climate, characterized by the division of the year into two seasons—the rainy or cold season (autumn, winter, spring), and the dry or hot season (summer). The climate fluctuates between the humidity of the Mediterranean and the aridity of the Sahara, the influences of which vary according to latitude, altitude, exposure, etc. The result of this is a great variety of local climates. The temperature is very equable on the coast. (See ALGIERS.) On the other hand, the interior and Sahara are subject to great and sudden changes. The flora and the fauna, like the climate, are

Mediterranean. The trees and shrubs are for the most part evergreens, the olive being the characteristic tree. The forests are composed chiefly of cork-trees, evergreen oaks, Aleppo pines, cedars, and cypresses; the steppes are covered with alfa or esparto grass and salt-loving plants; the date-palm is the characteristic tree of the Sahara.



John Bartholomew & Co.

Algeria has (1901) 4,739,331 inhabitants, of whom 4,072,080 are natives (Berbers or Arabs). The Berbers, who are Mohammedans, but do not practise polygamy, occupy principally the mountain ranges and the southern oases, and are either settled or semi-nomadic; the Arabs inhabit the plains and the steppes, are nomadic or semi-nomadic, and occupy principally the western part of Algeria. The Algerian Jews, to the number of 57,000 (1901), were naturalized by decree in 1870. The European population numbers 584,000, of whom 292,000 are French, 155,000 Spanish, and the rest mostly Italians and Anglo-Maltese.

Algeria is essentially an agricultural country. The principal product is the vine; fertile vineyards cover 376,650 ac., producing annually more than 122,350,000 gallons of wine. The area and the output have trebled since 1884. The olive grows very well, but its culture, together with that of the date, fig, and other fruit trees, is capable of development. Market-gardening flourishes in the neighbourhood of the seaports, and the cultivation of cereals (chiefly wheat and barley) occupies large stretches of country. Tobacco (a growing industry) is extensively cultivated. Sheep-breeding is especially important.

There are copper, zinc, lead, antimony, and mercury mines, and petroleum springs. The only minerals at present of real importance are iron ore at Aïn Mokra and Beni-Saf, and the extensive deposits of phosphate of lime, worked since 1893, chiefly in the Tebessa district. The red marble of the ancients (*giallo antico*) was rediscovered near Kléber in Oran in 1878. There are numerous hot mineral springs, as at Constantine. The native industry (carpets, leather-work, arms) is on the decrease, and that of the Europeans is limited to the preparation of agricultural produce (flour-mills and distilleries).

The total commerce of Algeria is fairly equally divided between imports and exports; it amounts to more than £25,000,000. The greater portion of this commerce is with France (70 to 85 per cent.). Algeria imports from the United Kingdom to the value of £250,000, and exports to the same £550,000. Algeria exports wines, cereals, alfa, tobacco, hides, sheep, wool, iron, and phosphates; it imports cottons, cloth, tools, metals, coal, and colonial produce.

There are some 2,200 m. of main road, and almost 1,880 m. of railway. The railway system (first section opened in 1862) consists of one long line, parallel to the coast, joining the large towns of the Tell, and extending as far as Tunis; lines branch off N. to the seaport towns, and S. towards the Sahara, Biskra being the farthest station S. The principal seaports are Algiers (the cap.), Bougie, Philippeville, Oran, and Bona.

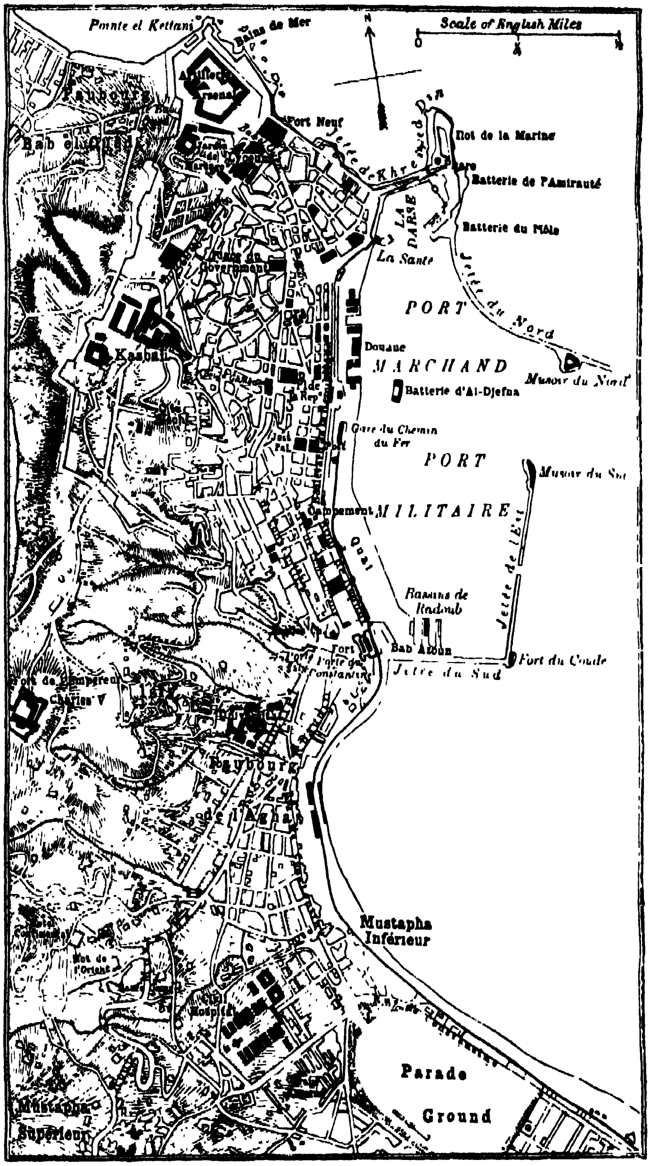
Algeria is divided into three departments—Oran, Algiers, and Constantine. At the head of the country is a civil governor-general. The army forms the 19th corps (about 55,000 men) of the French army.

The oldest evidences of the presence of man which one meets with in Algeria are the cut flints and the various instruments of polished stone. The monuments called megalithic, dolmens, menhirs, tumuli, and cromlechs are fairly numerous. The history of Algeria, the ancient Numidia, is the history of various successive conquests—*viz.* those of the Phœnicians, the Romans, the Vandals, the Byzantines, the Arabs, the Mediterranean peoples of every race, and finally the French—which have been forced in turn upon the old Berber stock, always persisting and resisting. The Turkish government of Algiers, with its corsairs scouring the Mediterranean, and its prisons for Christian galley-slaves, lasted from the 16th century to 1830. France put an end to this by taking possession first of Algiers and then of Algeria. The conquest was long, difficult, and attended by numerous insurrections. For seventeen years the Arabs maintained a vigorous resistance, and after that the Berbers continued the struggle. The important stages in the conquest were the struggle between Marshal Bugeaud and Abd-el-Kader, ending in the submission of the latter in 1847; the conquest of Great Kabylia in 1851 and 1856-7; and the rising of 1871.

See Sir Lambert Playfair's *Bibliog. of Algeria*, from the earliest times to 1895 (1887; with Supplt. 1898); *Exploration scientifique de l'Algérie* (17 vols. 1844-54); *Statistique triennale de l'Algérie* since 1858; *Procès-Verbaux du Conseil supérieur*, preceded by *L'Exposé annuel* of the situation by the governor (annual); Accardo's *Répertoire des Tribus et Douars de l'Algérie* (1900); *Publications de l'Ecole Supérieure des Lettres d'Alger* (Leroux), 34 pamphlets on Algeria published by the governor-general for the Paris Exhibition of 1900. Geographical works -Reclus's *Nouvelle Géographie Universelle* (vol. xi. 1886), the best general description of Algeria; Niox's *Géographie physique* (1885), and *Géographie militaire* (1890); Wahl's *L'Algérie* (new ed. 1899), the best popular book; Leroy Beaulieu's *L'Algérie et la Tunisie* (1897). For history—Mercier's *Hist. de l'Afrique septentrionale* (3 vols. 1888-90), complete, but very confused. For the Roman period—besides the *Corpus Inscriptionum Latinarum* with the Supplements, Gaston Boissier's *L'Afrique Romaine* (1895). For the Arab period the best document is Ibn Khaldoun's *Hist. des Berbères* (trans. from De Slane, 4 vols. 1854). For the Turkish period—De Grammont's *Hist. d'Alger sous la Domination Turque* (1887). For the French period—De Raynaud's *Annales Algériennes* (3 vols. 1887). On the contemporary native population—Hanoteau and Letourneux's *La Kabylie et les Coutumes Kabyles* (3 vols. 1872-86); and Masquéray's *Formation des Cités chez les Sédentaires de l'Algérie* (1886).

Alghero, seapt. and episc. see, on W. coast of Sardinia, 22 m. S.W. of Sassari; founded by the Genoese. Coral fishing; wine, olives, etc., grown. Pop. (1901) 10,741.

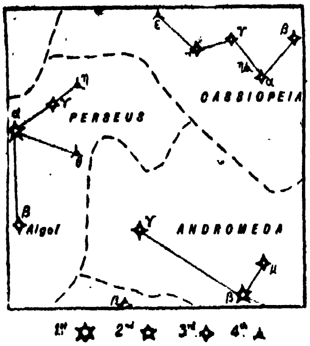
Algiers (Fr. *Alger;* Ar. *Al-jezaïr*, 'the islands'), cap. of Algeria, is situated on the Mediterranean, about 500 m. from Marseilles (26 hrs.). It stands on the seaward slope of high hills, and on the shores of a large semicircular bay. The Arab town is in the form of a triangle, of which the Kasbah (fortress) forms the apex, and of which the base has been rebuilt in an imposing seafront of modern architecture. The modern town in no way differs from European cities. There are two large suburbs—St. Eugène in the N., and Mustapha in the S. Mustapha Supérieur is the residential quarter for Europeans. Algiers is joined to Oran, Constantine, Tunis, and other large towns, by railway, and lies equidistant from the E. and W. boundaries of the country. An extent of about 10 m. along the bay is fringed with an almost unbroken succession of buildings. It possesses a Roman Catholic cathedral, a military academy, observatory, etc. With its exquisite climate, Algiers has become a favourite winter resort for Europeans. Mean temp. 64·3° F.; Jan. 54° F.; Aug. 78° F. Algiers is one of the first provision and coaling stations of the Mediterranean. The trade amounted in 1900 to 1,327,000 tons of cargo; tonnage of shipping entered, 6,937,000. During the Turkish period it was the headquarters of piracy and slave-dealing; was bombarded by Duquesne in 1682, by Lord Exmouth in 1816, and captured by the French, 1830. Pop. (1901) 97,400, of whom 26,700 were natives. See Grammont's *Hist. d'Alger sous la Domination Turque* (1887); Playfair's *Scourge of Christendom* (1884), and his *Handbook of Algeria and Tunis* (1895). The department of Algiers (65,930 sq. m.) had (1901) a pop. of 1,640,985.



Plan of Algiers.

Algin, or ALGINIC ACID, a substance resembling albumin, but not coagulated by heat, is obtained from seaweed, chiefly the genera Fucus and Laminaria, as a precipitate after boiling with sodium carbonate and adding hydrochloric acid. It is used as a dressing for fabrics, and as a thickening for soups and jellies.

Algoa Bay, an open bay or roadstead on the S.E. of Cape Colony. Here was the landing-place of the 1,820 settlers who founded the prosperous town of Port Elizabeth (1820). The bay is exposed to the S.E. gales, but is largely used.



Algol.

Algol, β Persei, was catalogued by Ptolemy as the *lucida* of the Gorgon. It is the model 'eclipse star,' varying in brightness from 2·3 to 3·5 magnitude in a period of 2 days 20 hrs. 49 mins., through the interpositions of a revolving dark satellite. The light-changes of Algol, noticed by Montanari in 1669, were methodically observed and explained by Goodricke in 1783; and his occultation hypothesis, discussed by Pickering in 1880, was spectroscopically verified by Vogel in 1889. An inequality in the timekeeping of the pair, compensated after about 140 years, is attributed by Dr. Chandler to its revolution round an obscure primary in an orbit crossed by light in 152 minutes. The opposite deviations of the eclipses from their calculated times would, on this supposition, be due to periodical alterations in the distance from the earth of the eclipsed body. M. Tisserand, on the other hand, accounted for the disturbance by the spheroidal shape of both the bright star and its companion—the diameter of the first-named being about 1,000,000 m., and the latter 830,000 m.; and their joint mass seems to be just two-thirds that of the sun. Yet Algol must possess far more than the solar luminosity. It gives a helium spectrum, and is now purely white. Al-Sûfi classed it in the 10th century as a red star.

Algoma, dist., W. Ontario, fronting Lakes Huron and Superior. It is very rich in minerals, containing large supplies of copper, silver, and nickel. Area, 91,000,000 ac. Pop. (1901) 56,500. It is traversed by the C.P.R. along its S. margin. The town, a seaport on the N. channel of Lake Huron, is the see of an Anglican bishop. Pop. (1901) 3,633.

Algonkian System, in geology, the lowest of the sedimentary rocks (so named by Walcott in 1889, the term being now generally accepted), lies below the Cambrian rocks and above the Archæan. With the latter it is often classified as the pre-Cambrian formations. They consist of slates, quartzites, gneisses, and other rocks. This stratum is often scarcely separable from that below it, owing to the degree to which metamorphism has proceeded. Near the great lakes of N. America the Algonkian formations have been still further metamorphized through the intrusion of great masses of igneous rocks, and here occur some of the greatest iron and copper deposits of the world.

Algonquins, one of the main divisions of the N. American aborigines, extended from the Rocky Mts. to Newfoundland, and from Hudson Bay to the Carolinas, though a considerable part of this area was occupied by the Iroquois. In 1901 there were 93,319 in Canada and the U.S.A.

Algorism, or ALGORITHM, the Arabic system of numbers; a name derived from 'Al-Kharizmi,' the agnomen of Abu Jafar Mohammed, a mathematician of the 9th century A.D.

Algraphy, a printing process in which aluminium plates are used for the same purpose as the stone in lithography.

Alguazil (Sp. *alguacil*, from Ar. *al*, 'the,' and *wazir*, 'an officer or vizier,' or *wazil*, 'power granted by the king'), an inferior officer of justice in Spain entrusted with the duty of seeing the decision of a judge put into execution. A special class, called *alguaciles mayores*, is in different municipalities either hereditary or elective; while the *alguaciles menores* are ordinary officers attached to a court of justice.

Algum, the trees which were brought from Lebanon for the building and furnishing of Solomon's temple. They are commonly supposed to have been red sandalwood, but this is perhaps only the least unlikely of many and various identifications. See 2 Chron. 2:8; 1 Kings 10:11.

Al-Hakim II., caliph of Cordova (961-976), a patron of art and learning. His library is said to have contained 600,000 volumes, afterwards partitioned among various colleges and the academy of Cordova.

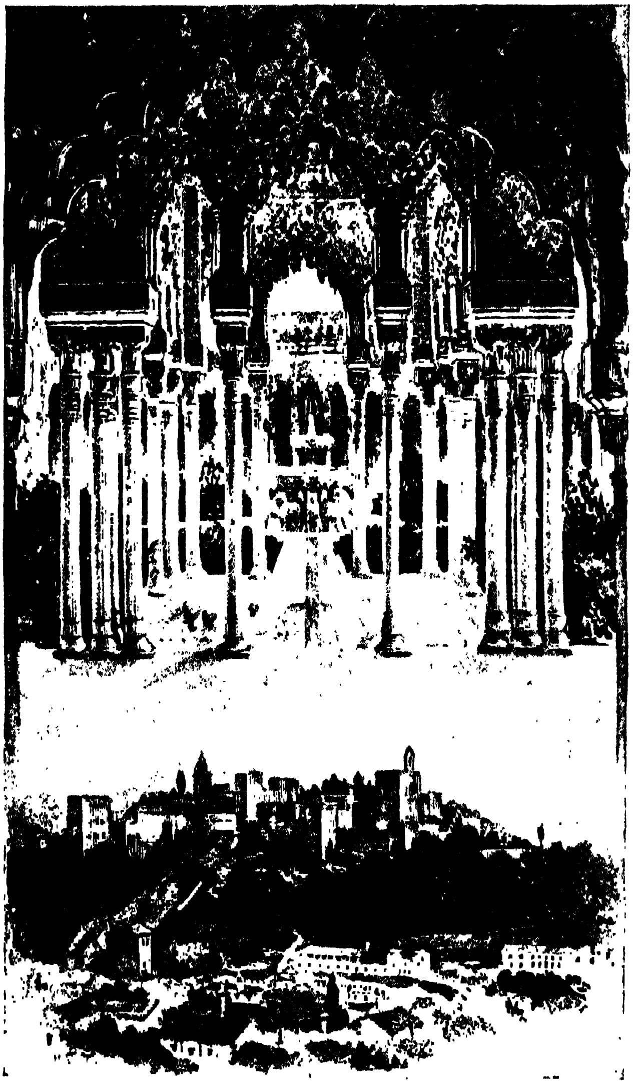
Al-Hakim-ibn-Otto (d. *c.* 780), a false prophet who came to Merv, the capital of Khorassan, in 774. He was surnamed Al-Mokanna, 'The Veiled One,' because he always wore a mask in public. Moore made him the subject of his poem, *Mokanna, or the Veiled Prophet of Khorassan.*

Alhama (Ar. 'bath'). (1.) Town, prov. Murcia, Spain, 19 m. from Murcia. Famous sulphur springs frequented from ancient times. The town stands at foot of a great cliff crowned by a Moorish castle. Pop. (1900) 8,461. (2.) Town, prov. Granada, Spain, 22 m. from Granada. It is romantically situated, is a resort of invalids, and has been famed for its medicinal springs since Roman times. The upper town was damaged by an earthquake in 1884. Pop. (1900) 7,679.

Alhambra (Ar. *Kilaat el-Hamara*, 'Red Castle'), the palace of the Moorish kings of Granada, was erected from 1248 to about 1350. The Emperor Charles V. destroyed part of it, in order to build a newer palace. In 1812 the French under Sebastiani blew up eight of the towers, and an earthquake in 1821 did serious damage. Its restoration was commenced by Queen Isabella in 1862. The Alhambra stands on a lofty terrace, enclosed by a strong wall. The parts of the palace still standing lie round two rectangular courts—the Court of the Myrtles, and the Court of the Lions, in the centre of the latter being the celebrated Fountain of the Lions, a magnificent alabaster basin supported by twelve lions in white marble. The characteristic gloomy Moorish exterior gives place in the interior to gorgeous colouring, to the finest carving in stone, to palmlike marble pillars, and to elaborate scroll-work (arabesque). The other chief buildings are the ruined Alcazaba (*i.e.* the Citadel), the Hall of the Ambassadors, the Hall of the Abencerrages, and the Hall of the Two Sisters. The South Kensington Museum contains a complete series of models of the Alhambra; there is also a model in the Crystal Palace, London. See Washington Irving's *Alhambra* (1832); Jones's *Plans, Elevations, etc., of the Alhambra* (1848); Murphy's *Arabian Antiquities of Spain* (1856); and Borrmann's *Die Alhambra* (1900).

Al-Hazan (965-1039), Arab astronomer and optician, was a native of Bassora, but afterwards settled in Cairo. He wrote a treatise on optics, which was translated into Latin, and published in Basel in 1572, under the title *Opticæ Thesaurus*. His account of the power of lenses is the earliest known, and he is credited with the first suggestion of spectacles. Kepler made considerable use of his writings.

Ali (d. 661), cousin and son-in-law of Mohammed, was the first to believe in the mission of the prophet, whom he served as an intrepid soldier and able vicegerent. He became the fourth caliph, succeeding Othman (656); his appointment was the occasion of the schism between the Shiites and the Sunnites. Ali crushed his opponents. He was succeeded, on his assassination, by his son Hassan.



The Alhambra, or 'Red Castle,' and the Court of the Lion

Alias (Late Lat., 'otherwise'), in common usage that part of an indictment describing a prisoner who goes under one or more feigned names, from the Latin words formerly used in the indictment, *alias dictus.*

Ali Bey (1728-73), a freed Caucasian slave in Egypt who gained a large following among the Mamelukes, and, having destroyed his rivals, assumed the title of sultan and renounced the suzerainty of the Porte. He reduced Syria and the west of Arabia to his rule, but was defeated and wounded in battle near Cairo, and died a few days afterwards.

Ali Pasha, surnamed THE LION (1741-1822), pasha of Janina in Albania, born in Tepeleni, of an old and noble family. For his services in the war against Russia and Austria he was made by the Sultan pasha of Trikala in 1787, and in 1788 he became pasha of Janina. From 1803 he governed Albania, Epirus, Thessaly, and the southern part of Macedonia despotically. In 1820 the Sultan decided to get rid of him, and sent an expedition against him. Ali, besieged in Janina, defended himself like a lion; but, running short of provisions, was forced to capitulate in 1822. In February the same year he was treacherously killed. Lord Byron visited him in 1809, and alludes to him in canto ii. st. 47 of *Childe Harold.*

Alibi. The plea of *alibi* in a criminal prosecution means that the person accused was elsewhere (*alibi*) at the time of the commission of the crime. If proved, it is conclusive; but it is a plea which is easily fabricated.

Alicante. (1.) Province, S.E. Spain, part of ancient kingdom of Valencia. Arid climate, but one of the most fertile districts of Spain; almonds, oranges, olives, and pines are grown. Lead mines are abundant. Pop. (1900) 470,149. (2.) Capital of above prov., busy port on Mediterranean, with a fine harbour. Popular winter resort for invalids. Pop. (1900) 50,142. Exports fruit, wine, esparto, lead, copper, etc.

Alice, tn., Cape Colony, 14 m. W. of Fort Beaufort and 42 m. N.E. of Grahamstown. Near it is the mission station of Lovedale.

Alice Maud Mary, PRINCESS (1843-78), Grand-Duchess of Hesse-Darmstadt (m. 1862), third child of Queen Victoria. She took great interest in art, literature, painting, and sculpture. She was much loved for her thoughtful philanthropy (*e.g.* in the Franco-German war), and for the grace of her home life, shown in her devoted nursing of her father (1861), of her brother the Prince of Wales (1871), and of her own children, in tending whom she contracted her fatal illness (diphtheria). She left four daughters (Victoria; Elizabeth, widow of the Grand Duke Sergius; Irene; and Alexandra Feodorovna, the Czarina), and one son, Ernest Louis, who succeeded his father in 1892. See *Memoir* by Sell (Eng. trans. 1884; new ed. 1897).

Alicuri. See LIPARI ISLANDS.

Alien. In most civilized countries, an alien is one who by birth owes allegiance to a foreign power, and who has not taken the necessary steps to renounce that allegiance. According to the British Acts of 1730 and 1773, every one is a British subject who was born in British territory, or whose father or paternal grandfather was so born; but subsequent events have rendered this to a great extent nugatory. Thus, the grandson of a British immigrant in the United States could not appeal for protection as a British subject unless his father and grandfather had formally retained their British nationality. Formerly, an alien, in English and Scottish law, could not hold land, even of leasehold tenure, although in Scotland special statutes were passed (1558) in favour of Frenchmen and (1607 and 1669) of Englishmen; but now, by the Naturalization Act, 1870, all disqualifications have been removed, except that an alien cannot own a British ship, or hold any public office, including a seat in Parliament, or vote at any election. In England, he can sit on a jury after ten years' domicile in England or Wales (33 & 34 Vict. c. 77, s. 8); but in Ireland he is absolutely disqualified (34 & 35 Vict. c. 65, s. 7), and in Scotland the law is uncertain (*S.L.R.*, 1876, p. 180). A woman who marries a foreigner becomes an alien. An alien may become a naturalized British subject after five years' residence, on application to a Secretary of State. A British subject born of a British father outside the British dominions, or a British subject who is also the subject of another state, may make a declaration of alienage, and thereby cease to be a British subject. A British subject who becomes naturalized in a foreign state *prima facie* becomes an alien, unless he makes a declaration to the contrary. Under the Registration of Aliens Act, 1836, aliens must be registered on arriving in or leaving the United Kingdom. (See DOMICILE.) The British practice of granting pilotage certificates to foreigners has recently incurred the disapproval of more than a hundred members of Parliament, who consider that we are thus training up a body of men who in time of war will add to the strength of an enemy's intelligence department.

Alienation, in law, a transfer of the title to property from one person to another, by conveyance, and not by inheritance.

Alien Immigration. The question of regulating and restricting alien immigration came within the pale of practical politics in the United Kingdom on March 29, 1904, when the Home Secretary introduced the Alien Immigration Bill, based on the recommendations of the Royal Commission, which reported in August 1903. State interference was declared necessary on the following grounds:—That the number of aliens in Great Britain had enormously increased in the last twenty years; that four-fifths of this foreign population resided in four or five centres, Stepney alone containing 54,000 aliens and their families; that overcrowding and strained relations with the native residents had resulted; and that British labour had been largely displaced. An important factor in the situation was the increase of crime amongst aliens in London. The bill proposed to give the Home Secretary power to make regulations for procuring particulars of character, proposed residence, etc., of incoming aliens, for inspecting, excluding, or detaining them, and for forbidding or regulating their residence in particular areas. Strong objection was taken to this bill because the grounds on which it was based were not established by the facts or the report of the commission. That report shows that the percentage of alien population in the United Kingdom is 0·69, the lowest of any important country. Other objections were that it would destroy the traditional right of asylum for foreign victims of religious or political persecution, and that a dangerous system of arbitrary police interference would be established. The bill was read for the first time on March 29, and on June 8 was sent to the Standing Committee on Law. Opposition, however, was so effective that the bill was dropped on July 7. On July 12 a Criminal Aliens Bill was presented, but was not proceeded with. The total number of aliens arriving from the Continent (whether in transit or not) during 1904 was 195,300. The total number of aliens in the United Kingdom has been computed at 286,925 (London 135,377), not including children born of alien parents in this country. Most states reserve the right of refusing to admit certain classes of undesirable aliens, the most rigidly restrictive acts obtaining in the United States and Australia. The United States Act of 1903 raises the head-tax on immigrants from one to two dollars. The former act prohibited the admission of Chinese labourers, persons under agreement to perform labour or service in the United States, idiots, insane, paupers or persons likely to become a public charge, persons suffering from a loathsome or dangerous contagious disease, those convicted of crime (except political), polygamists, and persons who have been assisted by others to come. To these classes the new act adds epileptics, persons who have been insane within the previous five years or have had two attacks of insanity, professional beggars, and anarchists. In Australia there is a poll-tax of £100 on Chinese and coloured immigrants, and by the Immigrant Restriction Act of 1901 persons who cannot write fifty words of a European language and sign the same are inadmissible, as well as workers under contract, unless absolutely required by the Commonwealth. See Report of Royal Commission cited above, *The Destitute Alien* (Social Science Series), *Board of Trade Return* (Mar. 1905).

Alif, the first letter of the Arabic alphabet and of the word Allah, is used by Mohammedans as a symbol of the one God or of the unity of the Godhead, and is set as a monogram at the head of letters and other writings.

Aligarh, or ALIGHUR. (**1.**) District, Meerut div., United Provinces, India, between the Ganges and the Jumna. Pop. (1901) 1,200,822. (**2.**) Town, cap. of above, 47 m. N. of Agra. It adjoins the town of Koil, which has a fort captured by Lord Lake in 1803. Here is a Mohammedan Anglo-Oriental college, affiliated to the University of Allahabad. Pop., including Koil (1901), 70,127.

Alignment, in typography, means the placing of type-letters exactly in line. This is a difficult matter when types of various sizes are introduced in the same line.

Alignments, in archæology, are rows of menhirs or upright stones, usually in parallel lines. There are many in Brittany, notably at Carnac. The best example in the British Islands is at Callernish, in the Hebridean island of Lewis.

Alima, riv., French Congo, Africa, r. bk. trib. of the Congo; rises near source of the Ogowé, and flows N.E., then E., and finally E.S.E. for 400 m. to join the Congo (1° 40′ S.) 220 m. N.E. of Brazzaville. The river is navigable for some 200 m.

Aliment, in Scots law, the maintenance of children and other persons who are entitled to claim on the ground of relationship or marriage. Parents are bound to aliment their children until of sufficient age and ability to support themselves—an obligation which extends to remoter descendants. Children able to do so must aliment their indigent parents or grandparents. A husband must aliment his wife whether living with him or not, and during divorce proceedings, but not after divorce, unless the husband was the defender, when she is entitled to her legal provisions. A wife with separate estate must aliment her children if the husband is unable to do so, but it is not settled whether she is bound to aliment him. The payment of alimony may be enforced by action.

Alimentary Canal, that passage, beginning at the mouth and ending at the anus, through which food passes in the course of eating and digestion. See MOUTH, ŒSOPHAGUS, STOMACH, INTESTINE.

Alimentary Debt, in Scots law, a debt due by decree of court for maintenance—as of a legal relative for which, if it be not paid, successive warrants for the imprisonment of the debtor may be granted at intervals of six months.

Alimentary Fund, a money provision intended solely for the maintenance of the recipient. If the provision be reasonable in amount it is not arrestable, nor can it be claimed by creditors. A debtor, however, cannot alienate from his creditors his own funds as an alimentary provision for himself. In statutes regulating widows' funds, the provisions are usually declared to be alimentary and unalienable.

Alimony, an allowance made by a husband to a wife, or by a wife to a husband, in divorce proceedings. It may be either (*a*) *pendente lite*, and will then amount to one-fifth of the joint income; or (*b*) permanent—*e.g.* after a judicial separation—and will then amount to not more than half, and generally not less than a third, of the joint income. It must be shown that the person against whom the order is made has means. See DESERTION, DIVORCE, and HUSBAND AND WIFE.

Alin, OSKAR (1846-1900), Swedish historian and statesman, was professor of history and political economy at Upsala, and leader of the Protectionist Conservatives in the Swedish Lower House. He wrote important books on the Swedish Council of State in the middle ages (1872, 1877); *Sveriges Historia, 1520-1611* (1877-8); *Minnen ur Sveriges Nyare Historia* (1881-93); *Sveriges och Norges Traktator* (1900); and several books on the union of Norway and Sweden (1889-1900), in which he warmly championed the nationalist Swedish view.

Alipur, a S. suburb of Calcutta, and the residence of the lieutenant-governor. It contains many handsome buildings, a zoological garden, reformatory, and jail. It is a cantonment for native troops.

Aliquot Part. One number which divides another exactly without remainder is said to be an aliquot part of it. Thus, 1½, 2, 3, 4, 6 are aliquot parts of 12, being contained respectively 8, 6, 4, 3, 2 times in it.

Aliscans, or ALESCHANS, a 12th century *chanson de geste* of the Carlovingian cycle, which deals with the battles of Guillaume au Court Nez against the Saracens and their emir Abderame (Abdur-Rahman). The poem, written in ten-syllable lines partly assonanced, partly rhymed, seems derived in title from *Elysii campi*, a burial-ground near Arles. See Paris's *Litt. du Moyen Age* (1888).

Alishan, LEON (b. 1820), Armenian national poet and historian. His numerous works include *Collected Poems* (5 vols. 1857-67); *Popular Songs of the Armenians* (1867); a *Universal Geog.* (1854); a *History of Armenia* (1860); 2 vols. of *Historical Monographs* (1870), etc. He has also translated *Childe Harold*, Schiller, selections from American poetry, etc., and has produced a French version of Sempad's notable *Assizes of Antioch* (1876), besides editing the Armenian literary and scientific journal, the *Polyhistor*, and writing a *Hist. and Geog. of Armenia* (1885), suppressed by the Turkish authorities.

Alison, REV. ARCHIBALD (1757-1839), second son of a lord provost of Edinburgh, where he was born. He held the livings of High Ercall, Roddington, and Kenley (Shropshire). In 1800 he became senior incumbent of St. Paul's Chapel in the Cowgate, Edinburgh. He published *Essays on the Nature and Principles of Taste* (1790), favourably noticed by Jeffrey in the *Edinburgh Review*, 1811; also *Sermons* (1814-15). His wife was a daughter of the celebrated Dr. John Gregory. He died at Colinton, near Edinburgh.

Alison, SIR ARCHIBALD (1792-1867), lawyer and historian, was born at Kenley, Shropshire, and in 1814 was called to the Scottish bar. In 1822 he became advocate-depute, and in 1834 accepted the sheriffdom of Lanarkshire, which he held until his death. His *Principles of the Criminal Law of Scotland* (1832) and *Practice of the Criminal Law* (1833) still possess value. His *History of Europe from the Commencement of the French Revolution to the Restoration of the Bourbons* (14 vols. 1833-42), though popular, cannot rank as a classic, because of the strong Conservative views of its author, and his superficial methods. Alison's other works are: *Polit. and Hist. Essays* (3 vols. 1850), reprinted from *Blackwood's Mag.*; *Principles of Population* (1840), a reply to Malthus; *Life of Marlborough* (1847); *Lives of Lord Castlereagh and Sir Charles Stewart* (3 vols. 1861). See his *Autobiography* (1882).

Alison, GENERAL SIR ARCHIBALD (b. 1826), a son of the preceding, was born in Edinburgh. He served in the Crimean war; the Indian mutiny (as military secretary to Sir Colin Campbell), losing his left arm at the relief of Lucknow; commanded the European Brigade in the Ashanti expedition (1873-4); was in command at Alexandria (1882) during the bombardment, before Wolseley's arrival; led the Highland Brigade at Tel-el-Kebir (1882); and in the same year was made commander-in-chief in Egypt. He published a treatise *On Army Organization* (1869).

Aliwal, vil., 9 m. W. of Ludhiana, Punjab, on the left bank of the Sutlej; famous as the scene of the great battle of the first Sikh war, in which Ranjit Singh was defeated by Sir Harry Smith, June 28, 1846.

Aliwal North, tn. and dist. in the N. of Cape Colony, bounded by the Orange R. on the N., and the Stormberg Mts. on the W. Area, 1,330 sq. m. The town stands on the Orange R., 280 m. N.W. of E. London. Pop. U.D. (1904) 7,655.

Aliwal South. See MOSSEL BAY.

Alizarin is αβ dihydroxy-anthraquinone, $C_{14}H_6(O_2)(OH)_2$, and is the principal colouring matter of the madder root, but is now almost entirely prepared synthetically by the following series of reactions:—Anthracene from coal-tar is first oxidized to anthraquinone, which, after purification, is converted by fuming sulphuric acid into sulphonic acids. The latter are neutralized by sodium carbonate, and then heated under pressure with caustic soda and sodium chlorate, alizarin being precipitated from the product by hydrochloric acid. Alizarin is a red crystalline solid, and owes its dyeing value to its power of forming 'lakes' with metallic hydroxides of various and permanent colours, according to the metal employed. The hydroxides in question, or 'mordants,' are prepared in the fibres of the material to be dyed from appropriate salts, which are of aluminium for red (Turkey red), iron for purple, violet, or black, etc. See DYEING.

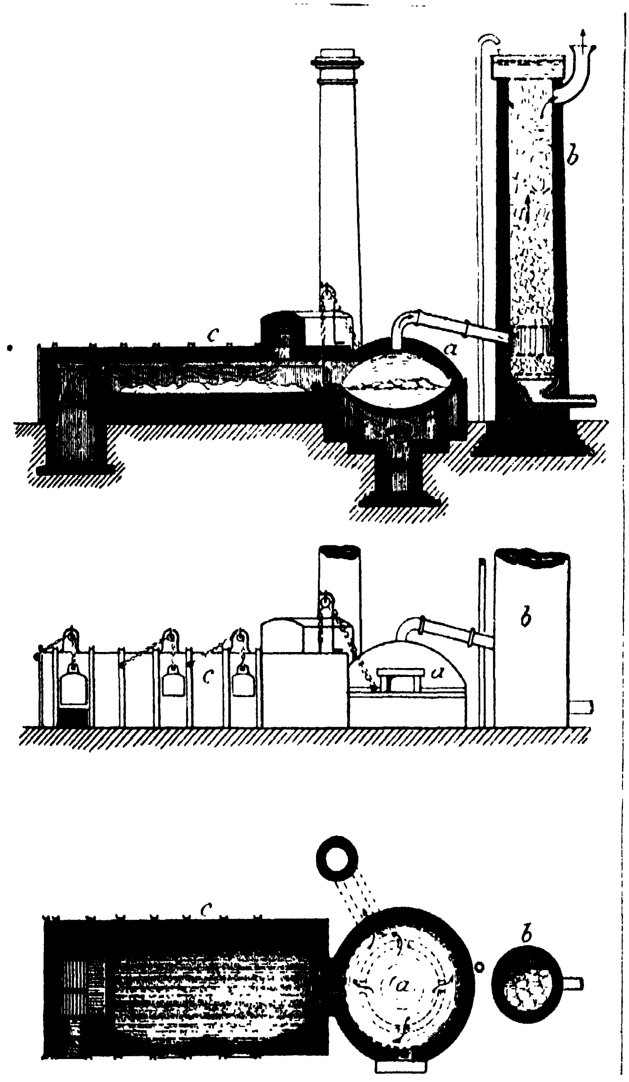
Aljubarrota, vil., prov. Estremadura, Portugal, 63 m. N.N.E. of Lisbon. Here John of Portugal defeated John of Castile (1385), and secured the independence of Portugal. Pop. (1900) 2,044.

Alk, the resin obtained chiefly from the terebinth or turpentine tree, *Pistacia terebinthus*, a native of the Mediterranean littoral, especially Chios. In its liquid state it is called Cyprian, Scian, Chio, or Chian turpentine.

Alkahest, or ALCAHEST, a name used by the alchemists (especially Paracelsus) to denote an imaginary substance which should dissolve every other substance.

Alkali (Ar.), a term originally applied to the ashes of sea plants, but afterwards extended to the ashes of substances which dissolved in water, had a soapy feel, and effervesced with acids. Ammonium carbonate was known as a volatile alkali, as distinguished from sodium and potassium carbonates, the 'fixed alkalis.' When sodium carbonate (soda) was made by Duhamel, in 1736, from common salt, it was named 'mineral alkali,' and the potassium carbonate (potash) 'vegetable alkali.' The term alkali is now chiefly applied to the hydroxides of the 'alkali metals'—*i.e.* sodium, potassium, and the rarer elements lithium, rubidium, and cæsium; but the carbonates of these elements, such as ammonia and the compound ammonias, or amines, are also included. The hydroxides are deliquescent, and very soluble in water; the solutions neutralize acids, forming salts, act corrosively on animal and vegetable substances (*i.e.* are caustic), and change the tint of vegetable colouring matters, or are said to have an alkaline reaction. Exposed to the air they absorb carbonic acid, forming carbonates. Barium, calcium, and strontium are known as the metals of the alkaline earths, and form hydroxides which are sparingly soluble in water; hence the solutions are but faintly alkaline, and much less caustic.

The history of the manufacture of sodium carbonate from common salt is in itself an account of the rise and progress of chemical manufacture in Britain; and this industry includes that of sulphuric and hydrochloric acid, of chlorine and bleaching-powder—all being essentially connected. The increased production and the reduction in price of sulphuric acid led to its general use, and to the rapid growth of other industries, notably the manufacture of alum, and of superphosphate of lime for manure. Cheap alkali made soap and glass cheap; and with the economical production of bleaching-powder, encouraged the cotton and linen industries and the production of paper. The total capital invested in British alkali works is about 12 millions sterling, of which 2¼ millions is that of the Alkali Union, a combination of about forty of the largest producers. In 1900 there were 1,182 works open to inspection under the Alkali Acts. The annual production is 150,000 tons of bleaching-powder, 225,000 tons of caustic soda, 500,000 tons of soda ash, 200,000 tons of bicarbonate of soda, besides carbonate of potash, caustic potash, chlorate of potash, borax, and many other soda salts. The total value of these substances exceeds 7 millions sterling. In 1900, alkali and bleach of the combined value of £1,491,646 were exported. The older, or Leblanc, process of manufacture is divided into three stages:—1. The preparation of salt cake, in which sulphuric acid is heated in iron pots with common salt. Hydrochloric acid is evolved, and collected in 'scrubbers,' or condensing towers, in which a descending stream of water dissolves the ascending gas. The mixture is then heated more strongly in a reverberating furnace, from which the product, salt cake, containing 95 to 98 per cent. of sulphate of soda, is withdrawn. 2. The preparation of black ash, in which chalk or limestone (30 cwt.), slack or powdered coal (20 cwt.), and salt cake (30 cwt.) are mixed and introduced into a large revolving iron cylinder. The cylinder is heated by a furnace, or by a Siemens gas-producer; the mass fuses, and in about two hours is emptied into iron trucks. In theory the reactions taking place are simple; but owing to impurities in the materials, many by-products are obtained, and black ash is a very complex mixture, containing carbonate of soda, soluble in water, and sulphide of calcium, which is insoluble. 3. The lixiviation of the black ash, or solution of the sodium carbonate, which is effected in vats, fresh water being used to wash the nearly exhausted ash, afterwards passing on to fresh ash; in this way all the carbonate of soda is extracted with a minimum quantity of water, and a strong liquor is obtained. The tank liquor is boiled down to obtain carbonate of soda, which is sold in three strengths (1) soda crystals or washing-soda (Na_2CO_3 $10H_2O$), containing 37 per cent. of sodium carbonate, equal to 21·6 per cent. of real alkali (Na_2O); (2) 48 per cent. alkali, crystal carbonate, or refined soda ash, containing about 80 to 85 per cent. of sodium carbonate; (3) alkali or soda ash—99 per cent. of carbonate and 58 per cent. of real alkali

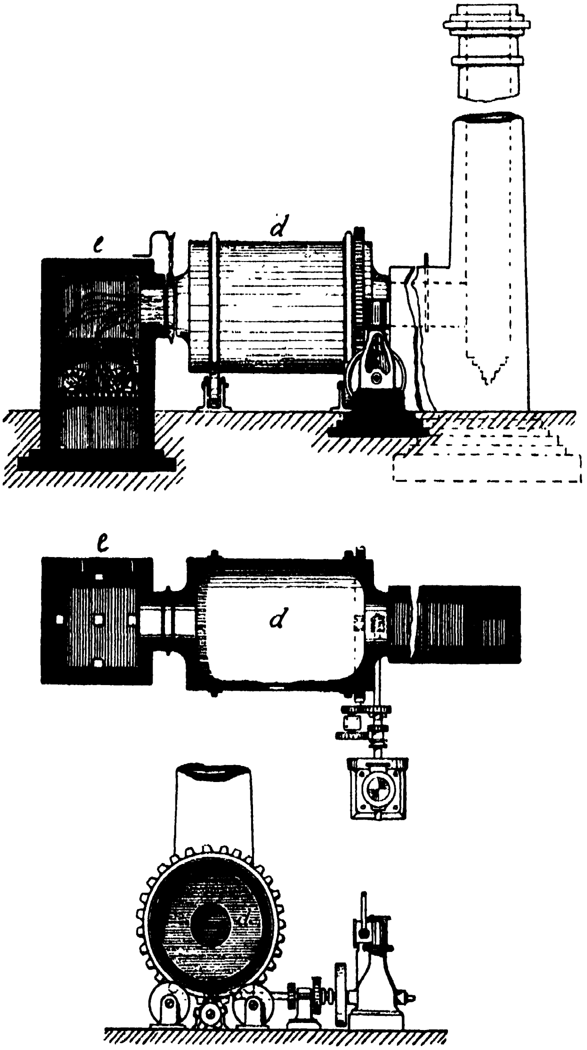


Alkali Manufacture. Leblanc Process.—I.

(*a*) Vessel containing sulphuric acid and common salt; (*b*) Condensing tower;

(Na_2O). The first two are preferred for scouring wool and for domestic use; but the 58 per cent. alkali has now largely superseded them for all other purposes.

Caustic soda ($NaOH$) is prepared from the tank liquor by boiling it with slaked lime. Tank liquor which is to be 'causticized' is freed from sulphide by blowing air through it, and then diluting it to a sp. gr. 1·10. After boiling with the lime, the liquor is filtered from the chalk sludge and evaporated. Finally, the hot caustic liquor is ladled into iron drums, in which it solidifies, and is distributed to the consumer. Caustic soda is sold as 60 per cent., 70 per cent., and 77 per cent. of real soda (Na_2O), respectively equivalent to 80, 90, and 99·5 per cent. of caustic soda ($NaOH$).



Alkali Manufacture. Leblanc Process.—II.
(*d*) Revolving cylinder containing chalk or limestone, slack or powdered coal, and salt cake; (*e*) Furnace.

The Leblanc process has been largely superseded by the Solvay or ammonia-soda process, and by electrolytic processes. In the former, sodium bicarbonate is obtained by passing carbon dioxide into a saturated solution of ammonia and common salt in water, and is then converted into sodium carbonate by heating; and in the latter, common salt is electrolyzed, usually in solution, with the production of chlorine and sodium hydroxide directly.

The Alkali Works Regulation Acts, 1881 and 1892, require the registration of alkali and other chemical works according to the regulations of the Local Government Board; forbid, under heavy penalties, the emission of noxious gases, and the deposit or discharge of alkali waste; and provide for the appointment of inspectors, the prosecution of offenders, and for inquiries into complaints by sanitary authorities.

The United Alkali Company, Ltd., controls the production of alkali in the United Kingdom.

For further details, see Lunge's *Sulphuric Acid and Alkali Manufacture* (1902); Thorpe's *Dict. of Applied Chemistry;* Lomas's *Manual of the Alkali Trade;* and Blount's *Electro-Chemistry* (1901).

In medicine, alkalis in solution are used externally as rubefacients, and as caustics in their undiluted form. Dilute solutions of potash and soda relieve itching in skin diseases; caustic potash destroys warts and corns; ammonia relieves the pain of stings by bees, ants, and mosquitoes, by neutralizing the formic acid. Internally, ammonia is inhaled to relieve headache, as a restorative in shock, and, taken in solution, aids expectoration in bronchitis. Alkalis, taken before meals, stimulate the secretion of gastric juice; taken after meals, they act as antacids. They are given to increase the alkalinity of the blood and to diminish the acidity of urine, with the object of preventing or removing acid deposits in the joints and urinary system. The symptoms of poisoning by alkalis are generally like those of acids, but the vomit is alkaline, and there is no characteristic stain on the clothes. Ammonia (hartshorn) acts locally like potash or soda, but may suffocate by its pungent vapours. The treatment in cases of poisoning by alkalis is to give diluted vinegar, lemon juice in water, or any other highly diluted acid drink, in small, frequent doses; and later, when the alkali is neutralized, milk, olive oil, and demulcent drinks. In the case of ammonia, special attention must be paid to relieving the respiratory symptoms, as by placing the patient in a tent the air of which is rendered moist by steam. The stomach-tube must not be used.

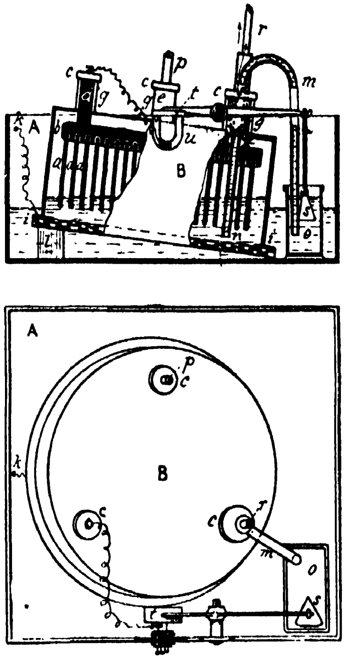
Alkali Lands, the name given to regions (as in parts of Wyoming, Nebraska, Montana, Utah, and New Mexico) marked by the presence of alkali either under the ground or crusted on the surface. An alkali soil requires only a small rainfall, and irrigation is harmful. Many valuable estates, and especially an 'alkali flat' of a hundred square miles near Salt Lake City, have been practically abandoned owing to the increase of alkali due to heavy rainfall or unwise irrigation. The U.S. Department of Agriculture has attacked the problem; the alkali soils are being mapped, the source of the alkali determined, the cause of the accumulation of alkali salts shown, and the rational treatment of the lands (principally by gypsum and drainage) is advocated.

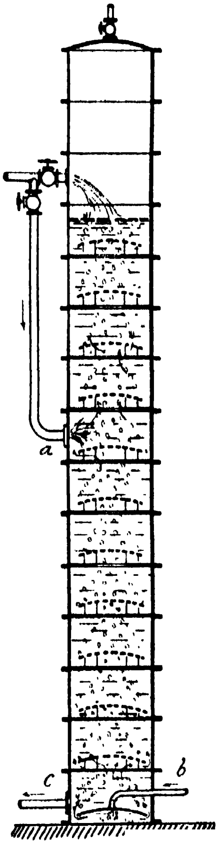
Alkalimetry, the quantitative estimation of the amount of alkali, is usually carried out by adding an acid solution of known strength to a given weight of the substance, until the colour of litmus, or some other indicator, shows the solution to be neutral; when, from the measured amount of acid that has been required, the amount of alkali can be calculated. See Sutton's *Volumetric Analysis* (1896).

Alkaloids, nitrogenous organic compounds having alkaline or basic properties. They occur in both animal and vegetable substances, and some have been prepared artificially. Most alkaloids are white, odourless crystalline solids composed of carbon, hydrogen, nitrogen, and oxygen; but a few are liquids, and contain no oxygen. They all combine with acids to form well-defined salts, but have few other properties in common, though many have an acrid, bitter taste, and most are powerful poisons. In cases of poisoning there is no common antidote. The stomach must be cleaned out by emetics or by the stomach-pump; and, since alkaloids are precipitated by tannic acid, copious draughts of strong tea are sometimes used. Some of the alkaloids are antagonistic in their action—*e.g.* strychnine and physostigmine, atropine and morphine—and thus one may become an antidote for another. Several are valuable medicines. There are several characteristic general tests for the alkaloids, which are readily recognized when pure; but their detection in and separation from organic materials is difficult, especially as ptomaines, the poisonous compounds in putrid flesh and fish, possess all the general characters of alkaloids.

The best known vegetable alkaloids are *aconitine*, occurring in aconite; *atropine*, in the belladonna or deadly nightshade; *cocaine*, in coca leaves; *coniine*, in hemlock; *daturine*, in stramonium thorn apple; *ergotinine*, in ergot; *eserine*, or *physostigmine*, in the Calabar bean; *morphine*, *codeine*, *narcotine*, and many others, in opium; *nicotine*, in tobacco; *pilocarpine*, in jaborandi; *piperine*, in pepper; *quinine*, *cinchonine*, and *cinchonidine*, in cinchona bark; *strychnine* and *brucine*, in nux vomica and St. Ignatius bean; and *veratrine*, in cevadilla. See Thorpe's *Dict. of Chemistry*, article 'Vegeto-Alkaloids;' and Wynter Blyth's *Poisons*.

Alkan, Charles Valentin Morhange (1813-88), pianist and composer, born in Paris, where he studied under Zimmermann. His compositions include *Marche funèbre*, *Marche triomphale*, *Etudes caprices*, 25 *Préludes*.





Alkali Manufacture.

Electrolytic Process (Le Sueur's, modified by Ric[illegible]n).

A is a tank with a saturated solution of common salt; B is an inner vessel containing the anodes *a*, *a*, *a* of retort-carbon fixed in the lead plate *b*, and suspended by the projecting flanges *c*, *c*, *c* on the leaden tubes *d*, *e*, *f*. By means of exchangeable supports *g*, *g*, *g*, when the anodes wear down they may be lowered in the bell by inserting shorter supports. The cathode *h* consists of layers of wire gauze set in a ring *i*, *i*, and connected with the negative conductor *k*; one side rests on the bottom of the tank, and the other is supported on a block *l*. On the ring *i* a diaphragm of asbestos and pa[illegible]ent-paper is placed, and the bell B is then lowered upon it and filled by means of the sipho[illegible] to a level somewhat above that of the liquid in A. The glass limb *n* of the siphon extends a little below the anode; th[illegible]ter limb *m* (of lead) dips into the vessel *o*, which is filled with brine to the level of the liquid [illegible] the bell.

Caustic soda is formed in the large tank and chlorine in the top of the bell, whence it i[illegible] conveyed away through the pipe *p*. The siphon *m*, *n* has a prolongation *r* connected with the gas pipe, to carry off any chlorine which may collect in the siphon.

If the liquid in the bell B should fall too low, the siphon *m*, *n* begins to act. The consequent lowering of the level of the liquid in *o* permits th[illegible]eight *s* [illegible] fall, and releases the anchor *t* from the horse-shoe magnet *u* (one limb of which [illegible]nall quantity of mercury, into which a pin on the anchor dips), and thus interrupts the current.

Ammonia-Soda Process (the Solvay Tower).

The tower is built up of from 15 to 25 cast-iron cylinders, each 6 ft. 8 in. in diameter, and 3 ft. 3 in. high. The bottom of each cylinder has a central opening 1 ft. 4 in. in diameter, over which is placed a concave perforated plate supported on light stays. Brine saturated with ammonia is forced [illegible]; lime-kiln gas enters at *b*, and as it ascends through the various [illegible] of the to[illegible]ght into contact with all parts of the descending stream of brine. The liquid, now full of crystals of s[illegible]diu[illegible] b[illegible]onate, [illegible] dr[illegible]wn off at [illegible]

Alkanet, or Alkanna (*Anchusa tinctoria*), a plant of S. Europe, belonging to the forget-me-not family. Its blood-red roots yield a harmless red dye, used for colouring woods, perfumery, and wines.

Al-Khwarasmi, or Al-Khowarezmi, Arab mathematician, born in Khorassan, who lived at the beginning of the 9th century. He was librarian to the Caliph Al-Mamun at Bagdad. After composing two astronomical tables called *Sind-Hind*, based on the Indian system *Sindhanta*, he wrote an algebra (founded on that of Brahmagupta) which was the source of all subsequent mediæval works on the subject. He was also author of the first book of arithmetic showing the Indian system of notation.

Al-Kindi, ABU YUSUF, mathematician and philosopher, born at Basra in the 9th century. The Arabs, who call him *the* philosopher, look upon him as the founder of their philosophy. He wrote on almost all the sciences known in his day, and is especially distinguished as a writer on logic and on mathematics, and as a commentator on Aristotle. See Flügel's *Al-Kindi genannt der Philosoph der Araber* (1857).

Alkmaar, tn., prov. N. Holland, Netherlands, 20 m. N.W. of Amsterdam, on the N. Holland Canal (16½ ft. deep). Salt is made, and there are cheese markets. In 1573 the town withstood a siege by the Spaniards. Pop. 18,275.

Alkyl, the general name given to hydrocarbon radicals, such as CH_3 (methyl), C_6H_5 (phenyl), etc., that play much the same part in organic chemistry that the metallic elements do in inorganic. Thus, CH_3OH is methyl hydroxide, corresponding to NaOH (sodium hydroxide), etc.

Allada, tn. in kingdom of Dahomey, W. Africa, 25 m. N. of Whydah. Pop. 10,000.

Allah (from Ar. *al*, 'the;' and *ilah*, 'worthy to be adored;' *cf.* Heb. *Eloah*), the word used by the heathen Arabs to denote their chief god, and which Mohammed adopted as the name of the one true God. The word forms the substance of the battle-cry of Mohammedans—'Lā Ilāha Illallāh!' (There is no God save Allah).

Allahabad ('the city of God'), city and cap. of United Provinces, Allahabad dist., India, on the l. bk. of the Jumna, is a municipal town. The fort stands at the angle of the Jumna and the Ganges. The chief features are Government House, with its parklike grounds, the Library and Museum, and the Muir Central College. A magnificent railway bridge spans the Jumna, and there are two bridges of boats across the Ganges. The city is visited every December and January by a quarter of a million of pilgrims, who come to bathe in the Ganges. The fort and city were founded by Akbar in 1575. In 1857 it was the scene of a massacre of British officers by mutinous sepoys. A celebrated pillar which bears an edict of the great Buddhist emperor Asoka (*c.* 240 B.C.) stands within the fort. Pop. (1901) 175,748. Pop. of district (1901) 1,487,904.

Allamanda, a genus of plants of the Apocynaceæ. Several species introduced from S. America are cultivated as hothouse climbers. The flowers are in general large and bright yellow.

Allan, DAVID (1744-96), painter, known as the 'Scottish Hogarth,' born at Alloa; settled in Edinburgh (1780); anticipated Wilkie in Scottish character-painting, as in *Scotch Wedding*, *Highland Dame*, and *Repentance Stool*. He illustrated Ramsay's *Gentle Shepherd*.

Allan, SIR HUGH (1810-82), founder of the Allan line of steamships; born at Saltcoats, Ayrshire; died at Edinburgh. In early life he settled in Canada, where his firm reached an eminent position. He was one of the projectors of the C.P.R., and was knighted in 1871.

Allan, ROBERT W. (1852), Scottish painter of seascapes, a pioneer of the modern 'Glasgow school,' studied in Paris (1875-80), and was strongly influenced by Bastien-Lepage. He settled in London (1881), and made his mark with *The Funeral of Carlyle*. See the *Studio*, vol. xxiii. p. 223.

Allan, SIR WILLIAM (1782-1850), Scottish historical painter. After nine years of travel in Russia and Turkey, he settled in Edinburgh (1814), was elected R.A. (1835), P.R.S.A. (1838), succeeded Wilkie as 'Limner to the Queen' for Scotland (1841), and was knighted in 1842. Among his works are *Peter the Great Teaching his Subjects Shipbuilding* (painted for the Czar), *The Stirrup Cup* (in the National Gallery, Edinburgh), and *John Knox Admonishing Mary Queen of Scots* (engraved by Burnet).

Allan, SIR WILLIAM (1837-1903), Liberal M.P. for Gateshead (1893-1903), was born in Dundee, where he served an apprenticeship to an engineer, afterwards engaging himself as a sea-going engineer, in which capacity he sailed in a blockade runner during the American civil war, when he was captured and imprisoned. For fifteen years he was manager of N.E. Marine Engineer Company on the Tyne, which he left to carry on business at Scotia Engine Works, Sunderland. In Parliament he was best known as a determined opponent of the use of tubular boilers in the navy. He was knighted in 1902. He wrote several volumes of poems, including *Lays of Leisure* (1883), *Sunset Songs* (1897), *Songs of Love and War* (1900), and also a *Guide to the Marine Engine* (1880).

Allan Line, British steamship company (the Allan Line and State Line of Steamers Company, Limited), was originally called the Montreal Ocean Steamship Company. It dates from 1852. Since 1859 there has been a weekly service with the chief Canadian ports, as well as with New York, Boston, Philadelphia, and several ports in S. America. The company owns a fleet of thirty-five steamers, aggregating 155,154 tons, in addition to the two new turbine steamers, the *Victorian* and the *Virginian*.

Allantoin, a crystalline solid substance, $C_4H_6N_4O_3$, discovered by Vauquelin, in 1790, in the fœtal fluids of many animals.

Allantois, an important fœtal membrane by means of which the embryos of reptiles and birds breathe, while in most mammals it is converted into the placenta, the organ by which the developing young both feed and breathe. At a very early stage in the embryo of reptile, bird, and mammal, the allantois appears as a bud from the posterior part of the food-canal, and, rapidly increasing in size, grows out of the embryo into a space provided for it by the amnion. It becomes richly supplied with blood-vessels, and in birds and reptiles comes to lie close beneath the egg-shell, through whose pores the respiratory interchange occurs. The early stages of development are the same in mammals; but in all except monotremes and marsupials, the allantois and its blood-vessels later form a connection with the maternal blood-vessels of the uterine wall, thus constituting the placenta. At birth or hatching, when the lungs come into play, the extra-embryonic portion of the allantois becomes functionless, and is cast off; but the internal portion may persist as the urinary bladder. This last fact is a link in the chain of proof which shows that the allantois has been developed from the urinary bladder of amphibians.

Allardyce, ALEXANDER (1846-96), author, born in Aberdeenshire; was sub-editor of the *Friend of India* (1868-75), afterwards editing the *Ceylon Times*. From 1877 to 1896 he was reader to the Blackwoods, contributing political and literary articles and short stories to *Maga*. Novels—*City of Sunshine* (1877), *Balmoral* (1893), *Earlscourt* (1894). He wrote also *Memoir of Viscount Keith* (1882), and edited (from the Ochtertyre MSS.) *Scotland and Scotsmen in the 18th Cent.*, and *Letters from and to Charles Kirkpatrick Sharpe*.

Alleghany Mountains. See APPALACHIAN MOUNTAINS.

Allegheny. (1.) City, Allegheny co., Pennsylvania, U.S.A., on r. bk. of Allegheny R., at its junction with the Monongahela to form the Ohio. (Pittsburg is on the opposite side of the river.) It is the seat of the Western University of Pennsylvania, founded in 1819, and has an observatory. Pop. (1900) 129,896, of which the foreign-born numbered 30,216, or 23·3 per cent. of the whole. (2.) River of the E. United States, one of the head streams of the Ohio. It rises in W. New York, and flows 300 m. in a general S.W. course to its junction with the Monongahela R. at Pittsburg, above which it is navigable for small steamers for 150 m.

Allegiance is the duty of every subject to obey the lawful authority of his sovereign. It is either natural or acquired. The former arises at the birth of a subject; the latter is due from an alien who has become a naturalized subject. There is also local allegiance—*e.g.* the obedience which a British subject in a foreign country is bound to render to the laws of that country so long as he is there; and, conversely, that which a foreigner for the time being resident in Britain must render to her laws. See OATH.

Allegory (Gr. *allos*, 'other;' *agoreuo*, 'I speak'), a form of composition in which one series of events or qualities is treated as typical of another series of events or qualities expressed or understood. The difference between allegory and fable is a very clear and definite one. The fable exists for the sake of its moral; it is an exemplification of some truth of practical life; and the more unexpected the quarters from which this exemplification is brought, the greater its merit as a fable. Allegory, on the other hand, need not convey any moral. It is a typical representation of life, and is valued in proportion as its details correspond with the details of actual existence; while its chief interest consists in the orderly development of the analogies between the type and the thing typified. As a rule, allegory is used in order to impart some human interest to metaphysical and abstract subjects. Hence religious or moral teaching has been its usual theme in all ages, but this connection is not a necessary one. Nor is its use confined to literature, for such pictures as Holman Hunt's *Light of the World* are as much allegories as Bunyan's *Holy War.* The allegorical reference may, moreover, be double as well as single, though only at the risk of its effectiveness. Thus, in Spenser's *Faërie Queene*, Arthur stands for the virtue Magnificence in general, with a particular reference at times to Leicester, and at other times to Sidney; while Britomart signifies both Chastity and Queen Elizabeth. The parables of Christ are sometimes allegories of the best type, as that of the prodigal son; but others, such as the picture of the Pharisee and the publican who went up to the temple to pray, are merely vivid transcripts of contemporary or universal life and character. A good example of the allegorical method is contained in St. Paul's reference to the armour of faith (Eph. 6: 13-17).

The origins of allegory in European literature are to be sought in the writings of Plato, who used it in its simpler forms in order to provide his pupils with a convenient means of passage from the world of appearance to the world of ideas or of reality. From him the method descends through Philo Judæus (B.C. 20-54 A.D.), who applied it to the interpretation of the Hebrew Scriptures; to Origen (A.D. 185-254), who popularized it in connection with Christian theology; while its employment by Pope Gregory the Great in his commentary on Job stamped it with the approval of authority. A further stage is indicated by Martianus Capella's *Marriage of Mercury with Philology* (439 A.D.), where it is employed to illustrate the mediæval scheme of education. But its real flourishing dates from the composition of the *Romaunt of the Rose.* This celebrated work consists of two parts, the first of which, written by William de Lorris (*c.* 1240), is an elaborate exposition of the chivalric idea of love; while the second, by Jean de Meung (1260-1320), is an ironical travesty of the whole system. This work, which was translated and imitated by Chaucer, influenced through him the whole course of English poetry for two centuries, supplying not only its main motives, but the very details of its poetical machinery. For these two hundred years our poets do little but repeat the story of the dream, the garden, the siege of the castle of love, and the temple with the names of faithful lovers inscribed on it. It is only possible here to indicate the names of Lydgate, Henryson, James I. of Scotland, Gavin Douglas, William Dunbar, and Stephen Hawes. (See articles under these names.) Meanwhile, however, Langland, in his *Vision of Piers Plowman* (1362), had adapted allegory to the purpose of moral and social satire. The form now passed under the hands of Spenser, who, in his *Faërie Queene* (1590), applied it to the description of Aristotle's twelve virtues. A new school branches off from Spenser, the most prominent productions of which were Giles Fletcher's *Christ's Victory and Triumph* (1610), and Phineas Fletcher's *Purple Island* (1633), the latter being an elaborate description of the human body. Meantime allegory had run its course in the drama. Allegorical figures had always appeared in the miracle plays, and the separation of the allegorical from the historical elements in these resulted in the morality plays of the early Elizabethan era, which discuss problems of human life by means of such highly generalized figures as Juventus, Mundus, Freewill, etc. The morality in turn, when its brief course was run, handed over its allegorical machinery to the masque, with such changes as the transition from moral teaching to court compliment rendered indispensable. Since the decay of the Spenserian school we have had no regular English school of allegory; but the numerous independent works of this species which have appeared embrace some of the finest compositions of the class in the world, and well exemplify its range of application. We have the allegory of religious experience in Bunyan's *Pilgrim's Progress* (1678) and his *Holy War* (1682); the allegory of political satire in Dryden's *Absalom and Achitophel* (1681), and of religious debate in his *Hind and Panther* (1687); and the allegory of scholastic and ecclesiastical satire respectively in Swift's *Battle of the Books* and *The Tale of a Tub* (1704). Of later examples we have had Addison's *Vision of Mirza* (*Spectator*, No. 159), and Thomson's *Castle of Indolence* (1748); while, in our own day, Tennyson's *Idylls of the King* is meant to contain beneath its appearance of a heroic poem a representation of the eternal war between flesh and spirit in human life. See Courthope's *History of English Poetry*, vol. i. (1895); Saintsbury's *Flourishing of Romance and Rise of Allegory* (1897).

Allegretto, an indication of *tempo* in music, is a diminutive of *allegro*, and signifies a slower movement than *allegro*, but not so slow as *andante*.

Allegri, ANTONIO. See CORREGGIO.

Allegri, GREGORIO (1590-1652), composer, born in Rome, is remembered solely for a famous *Miserere* for nine voices which is still sung during Holy Week in the Sistine Chapel. It was this piece that Mozart, when a boy of fourteen, wrote down from memory after hearing it only once.

Allegro, a musical term signifying a quick, lively rate of movement, nearly intermediate between *andante* and *presto*, is frequently modified by the addition of other words, such as *allegro vivace*, *allegro molto*, *allegro con brio*, etc. Also used for the name of a piece of music, such as Chopin's *Allegro de Concert*, Op. 46, or for the first movement of a symphony.

Alleine, JOSEPH (1634-68), nonconformist divine, especially noteworthy for his *An Alarm to the Unconverted* (1672, reprinted as *A Sure Guide to Heaven*); born at Devizes, but laboured chiefly at the Church of St. Mary Magdalene, Taunton, from which he and the rector (George Newton) were ejected in 1662. Released two years later, he continued his ministrations amidst much persecution.

Alleine, Richard (1611-81), Puritan clergyman, and author of many books on practical religion; born at Ditcheat, Somerset; was for twenty years rector of Batcombe, and after being ejected in 1662, faithfully preached as occasion offered. His chief work is *Vindiciæ Pietatis* (1663).

Alleine, William (1614-77), younger brother of the above, was for many years cruelly persecuted by the Cavaliers, and was ejected in 1662 when vicar of Blandford, but continued his work in Bristol, and in Yeovil, Somerset, where he died. Among Alleine's works are two books on the millennium, which reflect his modesty, piety, and learning. See Hutchins's *Researches at Blandford and Yeovil and Ditcheat.*

Alleluia. See Hallelujah.

Allemande, one of the movements of a musical composition termed a suite. It is usually in common time, and consists of two parts—frequently of equal length, but the second may be longer—each of which is repeated. Also a German national dance, of Swabian origin, in triple time, as well as of another form of dance in double time; but neither of the latter bears any relation to the allemande of a suite.

Allen, Bog of, large tract of red bog in the centre of Ireland, stretching east of the Shannon, and from the Slievebloom Mts., on the border of Queen's Co., northward to the parallel of Mullingar. In its more restricted application the name refers to the peat lands of King's Co. and Kildare. The peat, 20 or 30 ft. deep, varies in character from the moss of the surface to the lignite of the deepest strata. Stumps of oak ('corkers') and pine trunks are found in the lower layers, their roots being in the underlying clay. See Kinahan's *Manual of Geol. of Ireland,* ch. xvi. p. 1 (1878).

Allen, Lough, a pear-shaped lake between the counties of Roscommon and Leitrim, Ireland, in the course of the Shannon, chiefly in Roscommon. Length, about 5 m.; greatest breadth, about 3 m.

Allen, Charles Grant Blairfindie, best known as 'Grant Allen' (1848-99), novelist and scientist, was born at Alwington, near Kingston, Canada. He was for a short time professor of mental and moral philosophy in a negro college in Jamaica; but the college proving a failure, he returned to London, where he devoted himself to literature. His early publications, chiefly scientific works, had little or no sale, and he was compelled to turn to fiction, publishing over thirty novels in fifteen years—light and easy in style, and displaying a keen insight into life and character. In magazine articles Grant Allen displayed a happy knack of conveying scientific instruction in a popular and lively manner. *The Woman Who Did* (1895), a 'problem' novel, was eagerly read by the public, but condemned, and soon sank into oblivion. Among his other works are *The British Barbarians* (1896), a satire on the existing social system; *Postprandial Philosophy* (1894); *Evolution of the Idea of God* (1897); *The Lower Slopes* (1894). His *Life* was written by E. Clodd (1900).

Allen, Ethan (1738-89), born at Litchfield, in Connecticut, U.S.A.; present at the capture of Fort Ticonderoga in 1775; accompanied Montgomery to Canada, where he was taken prisoner, and not released till 1778. He wrote *Reason the only Oracle of Man* (1784). See *Life* by De Puy (1853).

Allen, James Lane (1849), novelist, born in Kentucky, U.S.A., was professor of Latin and higher English at a Virginian college, but devoted himself entirely to literature after 1886. His stories, which are distinguished by exquisite perception, and deal chiefly with scenes and characters of Kentucky, include *The Kentucky Cardinal* (1894), *Aftermath* (1895), *A Summer in Arcady* (1896), *The Choir Invisible* (1897), *The Mettle of the Pasture* (1903), and numerous short stories.

Allen, Joel Asaph (1838), naturalist, born at Springfield, Mass., U.S.A.; accompanied Agassiz to Brazil (1865); assistant in ornithology at Cambridge (U.S.A.) Museum of Comparative Zoology (1870), and curator in New York Museum (1885); author of *The American Bisons* (1875), and works on American Rodentia and Pinnipedia.

Allen, John (1771-1843), author; made himself indispensable to Lord Holland by aiding him with historical material for his speeches. His chief writings are on C. J. Fox, and on constitutional history; the best known is an *Inquiry into the Rise and Growth of the Royal Prerogative in England* (1830). Contributed political and historical articles to the *Edinburgh Review.* See Princess Marie Liechtenstein's 'Holland House,' *Gent. Mag.*, xx. (1843).

Allen, Karl Ferdinand (1811-71), Danish historian; after three years of European travel for purposes of historical research, returned to Copenhagen to become in 1851 *privat-docent,* and in 1862 professor of history and archæology of N. Europe at the university. His democratic opinions gained wide influence through his *Haandbog i Fædrelandet's Historie*—'Manual of Danish History' (1840). His *History of the Three Northern Kingdoms, 1497-1536,* is of great value.

Allen, Ralph (1694-1764), English philanthropist, known as 'the man of Bath;' made a fortune by devising and farming a postal system from town to town in England and Wales (1720). Up to 1764 his profits from this source averaged £12,000 a year. He was the friend of Pope and of Fielding. The latter used him as the prototype of Squire Allworthy in *Tom Jones,* and dedicated *Amelia* to him. He was one of the most benevolent men of his time.

Allen, Thomas (1542-1632), mathematician, philosopher, and antiquary; born at Uttoxeter; was a great collector of MSS. on astronomy, astrology, etc., some of which are preserved in the Ashmolean collections in the Bodleian Library. The vulgar of his time regarded him as a magician.

Allen, William (1532-94), cardinal, had to flee from England owing to his zeal for the Roman Church. He founded (1568) the R.C. Theological English College in Douay, at which he became a professor (1570), and by which a regular mission was maintained in England. He supported Philip II. of Spain in his pretensions to the English throne, and was made a cardinal in consequence (1587). See *Records of the Eng. Catholics,* vols. i. and ii.

Allende. See San Miguel de Allende.

Allenstein, tn., prov. of E. Prussia, 81 m. by rail s. of Königsberg, with sawmills, breweries, etc. Pop. (1885) 11,555; (1900) 24,295.

Allentown, city, Pennsylvania, U.S.A., the county seat of Lehigh co.; situated on Lehigh R., about 60 m. from Philadelphia. It is a large manufacturing place, with furniture factories, iron foundries, blast furnaces, silk and woollen mills, shoe factories, etc. Here are Muhlenberg College (1867) and Allentown College for Women. Up to 1838 it was known as Northampton. Pop. (1900) 35,416.

Alleppi, Aulapolai, or Allapalli, chief seapt. in the Travancore State, Madras, India, 33 m. s. of Cochin. A natural mud-bank affords safe anchorage in the roughest weather (anchorage 3½-4½ fathoms). Its exports are coffee, cardamoms, ginger, pepper, cocoa-nuts, and coir (cocoa fibre). Pop. over 25,000.

Allerion, a heraldic term denoting a bird—an eagle or a martlet (martin or martinet)—without beak or claws, with wings expanded.

Allestree, Richard (1619-81), English royalist divine, who took up arms in the civil war. After the restoration he was made chaplain to the king and professor of divinity at Oxford (1663), and in 1665 provost of Eton. He wrote *Privileges of the University of Oxford* (1647), and some *Sermons.*

Alleyn, EDWARD (1566-1626), actor, and founder (1619) of Dulwich College, was born in London. As an actor, as an owner and builder of theatres, and as bear-master to the king, he acquired great wealth, by means of which he raised himself to a distinguished social position. See Collier's *Memoirs of Edw. Alleyn* (1841), and *Alleyn Papers* (1843) corrected by Warner's catalogue of MSS. and muniments at Dulwich College (1881).

All Fools' Day, the 1st of April, when it is customary to play tricks on one's friends, such as sending them on fruitless or impossible errands. In Scotland the victim is called a *gowk* (cuckoo), in France *un poisson d'Avril* (an April fish). The custom is of unknown antiquity.

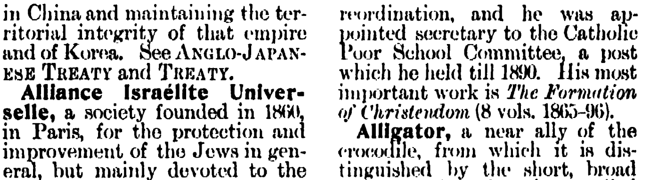
Allgemeine Zeitung. This newspaper, which is one of the most widely reputed in Germany, is published daily in Stuttgart, Sunday included. It was founded in 1778, by the publisher Johann Friedrich Cotta. In 1803 the issue of the paper was forbidden by the Herzog of Würtemberg, and Cotta transferred the publishing office to Ulm, and in 1810 from Ulm, which had become part of the state of Würtemberg, to Augsburg. It was in the latter city that the *Allgemeine Zeitung* first attained the influential position which it still commands. In later years the headquarters of the journal were changed again—to Munich in 1882, and back to Stuttgart in 1889, when the whole publishing business of the house of Cotta passed into the hands of the Kröne Brothers. Huber, the first editor, died in 1804, and was succeeded by Karl Stegmann (1804-37), Gustave Kolb (1837-63), A. Altenhöfer (1863-70), Otto Braun (1870-89), and Hugo Jacobi, the present editor. The *Allgemeine Zeitung* began as an organ of independent Liberal opinion; but though it still has pronounced opinions on political and religious questions, its tendencies are no longer distinctively Liberal. A prominent and much-valued feature of the paper is the scientific supplement published twice a week, to which the most distinguished German authors and men of science have contributed.

All-hallows-tide. See ALL SAINTS' DAY.

Allia, a trib. of the Tiber. The Gauls routed the Roman army on its banks in 390 B.C., before their capture of the city. The *dies Alliensis* ('day of the Allia') was always an unlucky day in the Roman calendar.

Alliaceous Plants (Lat. *allium*, 'garlic') have the characteristic smell and taste of the onion or garlic—*e.g.* onion, garlic, leek, shallot, chives.

Alliance (INTERNATIONAL), a name given to a union between nations of independent rank for the purpose of offence or defence, and usually contracted by specific treaty or agreement. The objects of the combined action are usually stated definitely, and the word 'alliance' is not applied to an indefinite mutual understanding which does not bind the contracting powers to active interference on behalf of each other. The chief alliances mentioned in history are: (1) the Triple Alliance (1668) of Britain, Sweden, and the Netherlands against France; (2) the Quadruple Alliance (1718) of Britain, Holland, France, and Austria against Spain; (3) the Holy Alliance (1815) of Russia, Austria, and Prussia against possible revolutions; (4) the Alliance (1854) of Britain, France, Sardinia, and Turkey against Russia. Among existing political combinations there are the Triple Alliance of Germany, Austria, and Italy, and the Dual Alliance of France and Russia, nominally for the purpose of ensuring the peace of Europe; while the most recent alliance is that between Britain and Japan (1902) for securing combined action in China and maintaining the territorial integrity of that empire and of Korea. See ANGLO-JAPANESE TREATY and TREATY.



Chinese Alligator.

Alliance Israélite Universelle, a society founded in 1860, in Paris, for the protection and improvement of the Jews in general, but mainly devoted to the interests of those in the east of Europe, N. Africa, and Asia Minor. The society is managed by a central committee resident in Paris, who convene a meeting at uncertain intervals and present a report. There are a large number of schools in Europe under the management of the alliance, whose income in 1899 was 984,370 francs, and expenditure 1,182,256 francs. An Anglo-Jewish association in connection with the alliance was founded in 1870.

Alliaria, in botany, a genus of Cruciferæ. The variety most widely known is *Alliaria officinalis*, or, according to some botanists, *Sisymbrium Alliaria*. A white-flowered biennial, it grows about two and a half feet high. It is popularly known as 'Sauce-alone' and 'Jack-by-the-hedge.'

Allibone, SAMUEL AUSTIN (1816-89), American bibliographer, and compiler of the well-known *Dict. of English Literature and British and American Authors* (3 vols. 1854-70-71). A supplement (2 vols. 1891) was issued by Dr. John Kirke. His other works include *Poetical Quotations* (1873) and *Prose Quotations* (1876).

Allier. (1.) Department (2,822 sq. m.) of Central France; its cap., Moulins, is 163 m. S.S.W. of Paris (194 by rail); it contains some of the most fertile districts of France. All cereals, fruits, and roots of the temperate zone grow well; there are rich meadows, large forests, and good fishing. Coal is mined at Commentry, Doyet, and other places; iron, manganese, antimony, and copper in other parts. The celebrated mineral waters of Vichy come from this department. Pop. (1901) 422,024. (2.) River, rising among the mountains of Lozère, flows N. and joins the Loire. Length, 233 m.

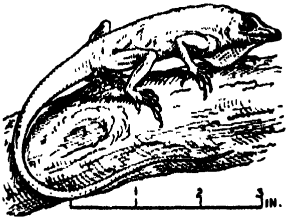
Allies, THOMAS WILLIAM (1813-1903), ecclesiastic and author, took orders in the English Church, but in 1850 became a convert to Rome. His marriage excluded him from reordination, and he was appointed secretary to the Catholic Poor School Committee, a post which he held till 1890. His most important work is *The Formation of Christendom* (8 vols. 1865-96).

Alligator, a near ally of the crocodile, from which it is distinguished by the short, broad head; the fact that the so-called canine (fourth tooth) of the lower jaw bites into a pit in the upper instead of into a groove; that the union of the two halves of the lower jaw is short; that the hind limbs have no fringing membrane, and the toes are incompletely webbed. The alligators are confined to America, except for one Chinese species.

Alligator Fish, the *Podothecus acipenserinus*, is about a foot in length, with a compressed tapering body; found in Strait of Fuca, Puget Sound, and other inlets along the N.E. Pacific coast.

Alligator Lizard. This term includes a number of species of the genus Sceloporus. The reptiles, especially the males, are brightly coloured below, chiefly on the throat. The back is usually dull in colour, with a few markings.

The head lacks spines, and the scales are flat. They are found in abundance in S. and Central America.



Alligator Lizard.

Alligator Pear, or AVOCADO PEAR, a juicy, edible fruit about the size of a large pear, obtained from a small tree of the laurel family. It is a native of the W. Indies.

Alligator River Blacks, aboriginal Australian race living around Van Diemen's Gulf, N. Australia. The designs on their baskets of woven grass indicate some idea of picture-writing. See descriptions by R. Etheridge, jun., in *Macleay Mem. Volume* (Linn. Soc., N.S. Wales), 1893, and *Internat. Archiv für Ethnogr.* (1899).

Alligator Wood, the timber of the W. Indian tree *Guarea grandifolia*.

Allin, REAR-ADMIRAL SIR THOMAS (1612-85), was born at Lowestoft. An ardent royalist, he was in command of a ship in Prince Rupert's squadron (1649-50). In 1665 Allin successfully engaged a large Dutch convoy from Smyrna off Cadiz; and in the following year served in the first battle off the North Foreland, and in the 'St. James's Fight.' In 1669 he reduced the Barbary States to subjection. Allin became Controller of the Navy in 1670, and was commander-in-chief in the Channel for a short time in 1678.

Allingham, HELEN PATERSON (1848), water-colour painter of English pastoral scenery and rural life, was on the staff of the *Graphic*. In 1874 she married the Irish poet William Allingham; was elected to the Royal Society of Painters in Water-Colours (1875). Her drawings were much admired by Ruskin. See Ruskin's *Art Notes for 1875*.

Allingham, WILLIAM (1824-89), Irish poet, was first a bank clerk, and then an officer of the Customs. In 1850 he published his first volume of verse; and he had early and close associations with most of the pre-Raphaelite brotherhood, with Browning, Clough, Carlyle, and many others. In 1870 he retired from the civil service to become sub-editor of *Fraser* under Froude, whom he succeeded as editor in 1874. His longest poem was *Laurence Bloomfield, or Rich and Poor in Ireland* (1864); but his lyric talent is best seen in some of his *Day and Night Songs* (1855). His works were collected in 6 vols. in 1890. See *Letters of D. G. Rossetti to William Allingham* (1854-70), ed. by Birkbeck Hill (1897).

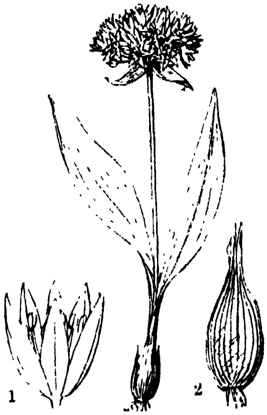
Alliteration is the recurrence of the same letter at the beginning of several words in a composition. As a method of procuring emphasis it has been much favoured among Teutonic and Finno-Ugrian peoples, and constantly recurs in English popular phrases like 'kith and kin,' 'bed and board,' etc. In all old Teutonic poetry alliteration is the prevailing metrical distinction, as in ancient Gaelic poetry it is combined with assonance. The normal Anglo-Saxon verse, which may be taken as a type of purely alliterative measures, consists of two hemistichs, each containing two accents. The first hemistich generally contains two alliterating words, and the second one, *e.g.*—

'Fyrst forth gewat;
Flota waes on ythum.'

'Time went by; the ship was on the waves' (Beowulf, 210). In the case of vowels, alliteration was made by the recurrence of *different* letters. Outside Anglo-Saxon times, the only work of first-rate importance in which this measure is employed in English is the *Piers Plowman* of Langland, and his use of it is, from a metrical point of view, very licentious. In popular estimation, however, both in romances, such as *Gawain and the Green Knight*, where it is combined with an elaborate stanzaic arrangement, and in popular character-sketches, such as Dunbar's *Twa Marriit Wemen and the Wedo*, it survived even into Elizabethan times. Most of the Elizabethan critics, and many of its greatest writers, such as Sidney and Shakespeare (in *Love's Labour's Lost*), ridicule its indiscriminate employment. 'E.K.,' the first editor of Spenser's *Shepherd's Calendar*, speaks with contempt of the 'ragged rake-helly rout that hunt the letter;' but his own master makes frequent use of the device. *Cf.*—

'In woods, in waves, in wars she wonts
to dwell,
And will be found with peril and with
pain.'

(*Faërie Queene*, bk. ii. canto iii. line 41). And perhaps no more perfect example of its use can be produced than Shakespeare's 'Full fathom five thy father lies.' The use of alliteration is not confined to poetry, however. In Anglo-Saxon prose, the homilies of Ælfric contain long passages where alliteration is consistently employed. It was also one of the distinctive features of the euphuism which Lyly made fashionable at the court of Elizabeth, but it has never been extensively employed in English prose. (See Guest's *Eng. Rhythms*, ed. Skeat, 1882; and reprint of the Percy *Folio*, 1868, vol. iii.) Alliteration in rhyme and folk sayings is also a strong characteristic of Finno-Ugrian speech. (See p. 169 of Hunfalvy's *Ethnographie von Ungarn*, Schwicker's German trans., 1877.) In modern German literature it has been used with good effect by Goethe, Heine, W. Jordan, and Richard Wagner. See Jordan's *Der Epische Vers der Germanen und sein Stabreim* (1868).



Allium.
1, Floret; 2, bulb.

Allium, the onion genus of the order Liliaceæ. The plants are herbs with bulbous stems and grasslike leaves. The flowers are arranged in dense heads or umbels; and bulbils, which may fall off and develop new plants, often replace many of the flowers. The cultivated species (chives, garlic, leek, onion, shallot, etc.) possess a sulphurous volatile oil, giving the acrid taste and garlic smell of the genus.

Allman, GEORGE JAMES (1812-98), zoologist; regius professor of botany in Dublin University (1844-55); regius professor of natural history and keeper of Natural History Museum, Edinburgh (1855-70); president of the British Association (1879); was a brilliant student of the lower forms of animal life. Wrote *A Monograph of the Freshwater Polyzoa* (1856), *A Monograph of the Gymnoblastic Hydroids* (1871-2).

Allmers, HERMANN (1821-1902), poet and author, born at Rechtenfleth, near Bremen; published the *Marschenbuch* (1858; 4th ed. 1902), an entertaining description of Frisian peasant life, in the style of Riehl; also *Dichtungen* (1860; 4th ed. 1900) and *Römische Schlendertage* (1869; 10th ed. 1902). His works were published in 6 vols. (1891-5). See *Life* by Bräutigam (1891).

Alloa, seapt. tn. on the N. bk. of the Forth, in co. Clackmannan, Scotland, 6½ m. S.E. of Stirling. It has a harbour; depth of water on bar, 22 to 24 ft. Shipbuilding is carried on. Alloa has breweries, distilleries, worsted factories, pottery works, and manufactures glass and iron. It also exports coal. Pop. (1901) 11,421.

Allobroges, a tribe of ancient Gaul, who dwelt between the Rhodanus (Rhone) and the Isara (Isère), as far north as the Lacus Lemannus (L. Geneva). Their chief town was Vienna (Vienne). They were conquered in 121 B.C., but not finally pacified until Julius Cæsar settled the country. In 63 B.C. Catiline intrigued with their embassy, and was betrayed by them to Cicero.

Allocution, the formal address or exhortation by a Roman general to his soldiers; hence the public addresses of the Pope to his clergy or to the church generally. The Pope's allocutions are affixed to the door of the Vatican.

Allodial. In England, land which is held of no overlord is called allodial. There has been no such property there from the 12th century, since when all land is held of the king. In Scotland the term is applied to (1) movables; (2) crown and church property; (3) certain 'udal' property in the Orkneys and Shetlands; (4) land purchased under the Lands Clauses Consolidation (Scotland) Act, 1845, s. 80. Among the ancient Scandinavians in Norway and Sweden, though not in Denmark, *odal* (*i.e.* allodial) land was quite common. Such land could not be alienated from the family. If sold, the family had the right to redeem it for sixty years after the date of the sale. There were six ways of converting land into odal property; they are defined in s. 270 of the Gulathing Law, where the whole subject is treated of at length.

Allogamy, cross-fertilization in plants. See FLOWER; SEX.

Allopathy, the mode of curing diseases by using medicines which produce in the system a condition contrary to that of the disease. The term was first used by Hahnemann, the founder of homœopathy, to indicate the methods of orthodox medicine.

Allori, CHRISTOFANO (1577-1621), Florentine painter; studied under his father, Alessandro Allori (1535-1607), and under Santo di Tito. His chief work, *Judith with the Head of Holofernes*, in which the beautiful Judith is the portrait of his mistress, and the head of Holofernes that of himself, is in the Pitti Gallery in Florence. He painted admirable portraits of distinguished contemporaries: a *Portrait of a Florentine Lady* is in the National Gallery, London.

Allotments. The word allotment means either the process of allotting or the share which is allotted, and is used in both these senses in connection with shares in joint-stock companies and several other matters. But the more general application of the word is to the system of dividing a field into small lots, to be cultivated by labourers or cottagers in their spare time and on their own account. The latter system was favourably reported on by a committee of the House of Commons, and in 1819 and 1831 acts were passed to promote it. In the Inclosure Act, 1845, which dealt with the enclosure of commons, special provisions were inserted for the making of allotments for the use of the labouring poor. Between 1709 and 1869 thousands of acres of commons and waste grounds were enclosed in Britain, depriving the rural labourer of the immemorial privilege of grazing his cow, pig, geese, etc., free of charge. The consciousness of this, added to the depopulation of rural districts during the last quarter of the 19th century, has led to recognition of the need of giving the labourers some direct interest in the land; and one result has been the present series of Allotments Acts, beginning with the Allotments Extension Act of 1882, and continued in the Allotments Act of 1887, and others. Under these enactments, taken in conjunction with recent Local Government Acts, local authorities have powers to acquire land for allotments. The system has been extended to Scotland by the Allotments (Scotland) Act, 1892, and by certain sections of the Local Government (Scotland) Act, 1894. The Allotments Rating Exemptions Act, 1891, has also done much to promote it. The size of allotments is usually about a quarter of an acre, but varies considerably in different localities. Spade cultivation is, of course, generally adopted, and allotments are among the most highly cultivated lands in their various districts. See the Earl of Onslow's *Landlords and Allotments* (1886); J. L. Green's *Allotments and Small Holdings* (1896); and Earl Carrington's account of his Lincolnshire experiments in *XIXth Century* (March 1899).

Allotropy, the faculty possessed by certain chemical elements of existing in forms that possess entirely different properties while still being composed of the same kind of atoms. Phosphorus, sulphur, carbon, silicon, and oxygen exhibit this property in a striking degree. Two kinds of phosphorus are well known—one a colourless waxlike solid, exceedingly poisonous and spontaneously inflammable; the other a red powder, neither poisonous nor spontaneously inflammable. Each can be converted into the other without adding to or taking from it; they are both composed only of phosphorus, and when burned, equal weights of them yield the same weight of phosphorus pentoxide. Lamp-black, graphite, and diamonds consist solely of carbon; yet no substances could appear more different. Allotropy is believed to be due to a difference in the arrangement of the atoms in the molecule; this is known to be the case in the intimately related oxygen and ozone, of which the former molecule contains two atoms (O_2), the latter three (O_3). There is also a different energy content, as different forms give out a different amount of heat when burned. Similar phenomena in compound substances are known as polymerism and isomerism.

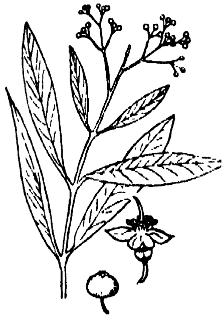
Alloway, vil. on N. bk. of 'Bonnie Doon,' 2½ m. S. of Ayr, Ayrshire, Scotland; contains the cottage, now converted into a museum, in which Robert Burns was born. The 'haunted kirk,' now in ruins, where Tam o' Shanter saw the dance of the witches, stands a quarter of a mile from the poet's birthplace. The 'Auld Brig' and a new one cross the Doon, and there is a monument to Burns.

Alloys are mixtures of metals, though in some cases, such as that of steel, a metal may be mixed with a non-metal like carbon, or with a compound of carbon. Some alloys, especially of the precious metals, occur in nature; but they are usually prepared artificially, by fusing the components together in order to impart special properties, such as to increase hardness, fusibility, or toughness, to alter colour, or to give a definite electrical resistance. Carbon and manganese harden iron; tin and bismuth lower the melting-point of lead; arsenic toughens copper, and aluminium increases its tenacity. Sometimes a second metal makes the first cast sounder; thus, aluminium is added to steel, and phosphorus to copper. Alloys are either (1) mechanical mixtures which may be considered to be solidified solutions of one or more components in each other; (2) definite chemical compounds; or (3) mixtures of these two classes. Some metals unite with evolution of heat, others with absorption: aluminium-copper, platinum-tin, and bismuth-lead belong to the former class; lead-tin to the latter. The sp. gr. of an alloy generally differs from the mean sp. gr. of its constituents; increased density indicates contraction and probable chemical interaction. Some important alloys are as follows:—Iron and manganese unite in all proportions; steel with 14 per cent. manganese is very hard, tenacious, and ductile; ferro-manganese is cast-iron with 30 to 85 per cent. manganese. Up to 7 per cent. nickel increases the tenacity of steel; from 8 to 15 per cent. the alloys are brittle; from 20 per cent. upwards alloys are tough, malleable, and almost non-corrodible. Steel with 2 per cent. chromium is hard, and resists penetration to a high degree; ferro-chrome may contain 80 per cent. chromium and 11 per cent. carbon. From 1 to 2 per cent. aluminium hardens steel; in pig-iron it causes separation of graphite; in steel it helps to produce good castings; ferro-aluminium generally has 10 per cent. of the latter. Copper and zinc unite in all proportions, forming alloys (brass) from red to yellow and white: with over 65 per cent. copper they are very malleable, ductile, and tough, but cannot be rolled hot; with 55 to 64 per cent. they are close-grained, can be rolled hot, are harder, and generally have higher tenacity but less ductility than the former; with less than 55 per cent. they are crystalline and brittle. From 2 to 4 per cent. iron, with the second of these classes of brass, gives a very hard and tenacious metal. Gun metal (90 per cent. copper, 10 per cent. tin) is a typical bronze, but the tin is often partly replaced by zinc; bell metal is 80 copper and 20 tin; aluminium-bronze is 90 to 95 copper and 10 to 5 aluminium; manganese-bronze is brass with 2 to 3 per cent. manganese. German-silver is about 60 copper, 5 to 30 nickel, and the rest zinc. Cupro-nickel for bullets is 80 copper and 20 nickel. Bearing-metal is 70 to 85 copper, 5 to 20 tin, and the rest zinc; white bearing-metal is 76 lead, 18 antimony, 6 tin. Britannia metal is 90 tin, 8 antimony, and 2 copper. Pewter is 80 tin and 20 lead. Soft solder is 50 tin, 50 lead; best solder, 66 tin, 34 lead; plumbers' solder, 34 tin, 66 lead. Type metal is 70 lead, 18 antimony, 10 tin. Fusible alloys are composed of bismuth, lead, tin, cadmium, in the following proportions: Newton's, 50, 31, 19, 0; Rose's, 50, 28, 22, 0; Wood's, 50, 24, 14, 12; Sipowitz's, 50, 27, 13, 10. British coinage: gold is 91·66 gold, 8·33 copper; silver is 92·5 silver, 7·5 copper; bronze is 95 copper, 4 tin, 1 zinc. In jewellery, gold is represented in carats: 24 carat is pure, 22 carat contains 22 parts gold and 2 of other metals. See Hiorns's *Mixed Metals*; Roberts-Austen's *Introduction to Metallurgy*; *Cantor Lectures* (Roy. Soc. of Arts); and Mathiessen's *Alloys* (Trans. Chem. Soc. 1867).

Allport, Sir James Joseph (1811-92), manager of the Midland Ry. from 1853, united several small local lines to form that system, which extends from London to Carlisle. He was the first to run third-class carriages on all trains (1872) and to abolish the second class. See Acworth's *Railways of Eng.* (1900).

All Saints' Day (Nov. 1), called also All-Hallows-tide and Hallowmas, dedicated to all the saints collectively, became a festival of the Roman Church early in the 7th century, and was definitely instituted in 835. See Halloween.

All Souls' Day (Nov. 2), a festival of the Roman Church, on which prayers are offered for the faithful dead; instituted in 998, in the monastery of Clugny, from which the observance quickly spread over the whole Catholic world.



Allspice or Jamaica Pepper, with Flower and Fruit.

Allspice Tree (*Eugenia pimenta*), or Jamaica pepper, of the order Myrtaceæ, or myrtle family, is a native of the W. Indies. It grows thirty feet high, and has evergreen leaves and sweet-scented flowers. The dried fruit, of the size of a small pea, is pimento or allspice, so named because of its supposed comprehensive flavour, resembling that of other spices, as cinnamon, nutmeg, cloves. Odour and taste are aromatic and hot.

Allston, Washington (1779-1843), painter and poet, called 'the American Titian' because of his love of strong colours. A native of S. Carolina, he studied in London, Paris, and Rome. Elected A.R.A. in 1818. Among his chief works are *Dead Man Touching Elisha's Bones*, now in Philadelphia; *Spalatro's Vision of the Bloody Hand*, in the Taylor-Johnston collection, New York; *Portrait of Coleridge*, in the National Portrait Gallery, London. His *Lectures on Art*, edited by Dana, appeared in 1850. He also published a vol. of *Sonnets*, *The Sylphs of the Seasons* (1813), and a novel, *Monaldi* (1842). See Flagg's *Life* (1892).

All the Talents, Ministry of (1806-7), formed, on the death of William Pitt, by Lord Grenville.

All the Year Round, a weekly periodical edited by Charles Dickens; previously called *Household Words* (1850-7).

Alluvion, new land formed by the action of flowing water. Both in England and in Scotland, small accretions, slowly made, belong to the owner of the adjacent land. In England, large additions, rapidly produced, belong to the crown; in Scotland, to the person from whose property the earth was displaced.

Alluvium, a geological term used to indicate formations which are taking place now. It may be (1) restricted to all stream deposits, such as accumulations of sand, mud, shingle, gravel, boulders, etc., in river beds and at the foot of mountain slopes, deposits left by inundation of flood-plains, lacustrine deposits, river bars, lagoon barriers, and river deltas; or (2) extended to include all kinds of quite recent deposits, such as (in addition to the above) dune formations along the seashore, turf, coral reefs, disintegration clays, laterite (decomposed igneous and schistose rocks), volcanic products (lava, ash, etc.), and the screes formed by landslips and mountain slides.

Allyl, $CH_2CH\,CH_2$, is an unsaturated organic radical, from which are derived an alcohol and other compounds. Allyl alcohol is prepared by heating glycerin and oxalic acid, and is a pungent-smelling liquid. Mustard oil is allyl isothiocyanate.

Alma, riv. of Russia, rises in the Chatyr-dagh, flows w., and falls into the Black Sea near Cape Lukul, 17 m. n. of Sebastopol harbour. This river was forced by the Anglo-French army on Sept. 20, 1854. See Crimean War.

Almack's. A Scotsman named M'Caul opened a gaming club in Pall Mall (*c.* 1763), known as Almack's Club (from a transposition of MacCaul). It was famed for high play, and included among its members the Duke of Portland and C. J. Fox; also, later, Gibbon and W. Pitt. The London club now known as 'Brook's' was started by Almack before 1763. In 1765 M'Caul opened large Assembly Rooms in King Street, St. James's, London, where fashionable subscription balls were held during more than seventy years. He died wealthy in 1781, bequeathing the rooms to his niece, after whom they were called 'Willis's.' They were closed in 1890, but are now reopened as a restaurant. See *Notes and Queries*, series iii., vols. 9, 10, 12; and Timbs's *Clubs and Club Life in London* (1873).

Almada, tn., dist. Lisbon, Portugal, on the l. bk. of the Tagus, opposite Lisbon. Pop. (1900) 7,913.

Almaden, tn., prov. Ciudad Real, Spain, 48 m. from Ciudad Real, on Ciudad Real and Badajoz Ry. Rich quicksilver mines. Pop. (1900) 7,375.

Almagest, the Arab title of the principal work of Ptolemy, the Alexandrian astronomer. This monumental treatise, composed between 140 and 150 A.D., is divided into thirteen books. The first two contain introductory matter, and lay down as postulates the sphericity of the earth, and its immobility at the centre of the revolving stellar sphere. The third treats of the length of the year, and of solar theory. The fourth deals with the theory of the moon, and announces the discovery of an inequality in its motion. (See EVECTION.) The fifth book explains the construction and use of the astrolabe, and the method of determining lunar parallax. The sixth discusses solar and lunar eclipses. The seventh and eighth include an exposition of precession, and a catalogue of 1,028 stars. The concluding five books are occupied with the theories of the several planets, and give the improvements in epicyclical machinery by which the Ptolemaic system was laboriously perfected. The *Almagest* is the great codex of Greek astronomy. It embodies nearly all that was worth preserving, and maintained its authority during fourteen centuries. The standard edition is a critically revised Greek text, with a French translation by the Abbé Halma (1813-16).

Almagra, the Arabic name of an ochreous earth of a fine deep-red colour, used in India for staining the skin, in Spain for colouring tobacco, and generally, under the name of Indian red, as a paint, and as a powder for polishing silver.

Almagro, tn., prov. Ciudad Real, Spain, station on line from Manzanares to Ciudad Real (14 m.). Lace industry. Pop. (1900) 7,974.

Almagro, DIEGO D' (?1464-1538), Spanish conquistador, associated with Pizarro and Hernando de Luque in the conquest of Peru. He reached that country in 1533, attacked Chile in 1536, and, on his return in the following year, relieved Cuzco, which was besieged by the Peruvians. Pizarro refused to recognize his claim to this town and to Lima, defeated him at Las Salmas, April 26, 1538, and had him executed. See Prescott's *Conquest of Peru.*

Almain (Fr. *Allemagne*), an old name for Germany. See ALEMANNI.

Al-Mamun, or MAMOUN, called also ABDALLAH (786-833), one of the Abbaside dynasty of caliphs, son of Haroun-al-Raschid, attained the throne of Bagdad after a war with his elder brother, Al-Amin, in 813. He continued the illustrious traditions of his father Haroun; patronized learning; procured Arabic translations of numerous Greek works on philosophy, astronomy, medicine, etc.; and encouraged practical science, especially astronomy, causing a degree of the meridian to be measured on the plain of Shinar. He died in Cilicia during a campaign against the Greek emperor Theophilus.

Almanac (Ar. *al-manah*, 'the sundial'), a year-book of dates and tables, giving a calendar of days and months, ecclesiastical fasts and feasts, the age of the moon, the tides, and the exact time of the sun's rising and setting. Under astronomical information, the eclipses of the sun and moon are always given, with notes of the position of the planets throughout the year. Many almanacs include lists of names and tables of statistics to suit their various classes of readers. The first important book of this character to be printed was one written in Latin, and issued by Regiomontanus in 1475 *et seq.* The widely-known *Almanach de Gotha*, printed both in German and French, is a marvellous compression in over 1,000 pages of statistical information on the polities, boundaries, extent, population, income and expenditure, army, navy, etc., of every state, besides enumerating the sovereigns and their relatives, and giving obituaries of distinguished persons, tabular returns, etc. The most authoritative almanac in Britain is the *Nautical Almanac*, with a very different scope from that printed in Gotha. Its information is indispensable in navigation and astronomy, and the accuracy of its tables (issued four years regularly in advance) renders it a principal book of reference all over the world. It contains full details of astronomical phenomena, especially the elements used in finding a ship's longitude, the exact time at which the principal stars cross the meridian of Greenwich, etc. Much of it, in fact, is necessary for the compilation of other important almanacs at home and abroad. The *Nautical Almanac* is published by the Admiralty; the first edition (in 1767) was edited by Dr. Maskelyne, the astronomer royal. In France the corresponding astronomical almanac is the *Connaissance des Temps* (begun 1679), now published by the Bureau des Longitudes; in Germany, the *Berliner Astronomisches Jahrbuch;* and in United States of America, the *American Ephemeris and Nautical Almanac*, first published in 1853. Perhaps the most popular almanac now in England is Whitaker's, a solid mass of statistical knowledge, edited up to date. In Scotland the *Edinburgh Almanac* of the 18th century developed in 1837 into the famous 'Oliver and Boyd's,' indispensable to any writer dealing with the statistics of N. Britain. For facts connected with Ireland the analogous book of reference is Thom's *Irish Almanac*, somewhat larger than the *Edinburgh Almanac*. (See *Companion to the British Almanac*, 1829, 1839, 1840, and 1846.) Prophetic almanacs of the type of Old Moore's, Poor Robin's, Zadkiel's, were published under the patronage (from the reign of James I.) of the Universities of Oxford and Cambridge, the Archbishop of Canterbury, and the Stationers' Company. Swift had a stinging hit at Partridge, the almanac-maker of the Stationers' Company, in his *Predictions of Isaac Bickerstaffe* (1708).

Almansa, city, prov. Albacete, Spain, 40 m. from Albacete; produces grain, saffron, and sheep. Famous for the great battle (Apr. 25, 1707) which practically decided the war of the Spanish Succession in favour of Philip V., Duke of Anjou. Pop. (1900) 11,180.

Al-Mansur ('The Victorious'), name assumed by ABU-JAFAR (c. 707 775), second caliph (754) of the dynasty of the Abbasides, and founder of Bagdad (764); a cruel and treacherous prince, and persecutor of Christians. He crushed his subjects under a heavy load of taxation, but was a patron of learning. He failed to retain Spain and Africa under his rule.

Alma-Tadema, SIR LAWRENCE (1836), historical and archæological painter, born in Friesland; studied under Wappers in Antwerp, and in Brussels under Baron Leys. He settled in London (1870), and became a naturalized British subject in 1873. Elected A.R.A. (1876), R.A. (1879), and to the Royal Society of Painters in Water-Colours (1875). As a painter of genre highly and carefully finished in oils and water-colours, he is unrivalled. His great merit is to have utilized his archæological knowledge in the reconstruction of the antique world through the medium of an intense feeling for modern realism. Among his chief works are *Sappho* (1886), *The Vintage* (1870), *The Sculpture Gallery* (1875), *The Silent Greeting* (Tate Gallery), *The Picture Gallery* (1875), *The Roses of Heliogabalus* (1888), *The Apodyterium* (1886), *The Four Seasons* (1877; engraved by Aug. Blanchard), *Hadrian in Britain* (1884), *Spring* (1895), *Gold Fish* (1900). He has frequently exhibited in the Paris Salon, and many of his works have been engraved. See Ruskin's *Art of England* (1884); Zimmern's *L. Alma-Tadema* (1886); and C. Monkhouse's *Brit. Contemporary Artists* (1899).

A Reading from Homer. By Sir Lawrence Alma-Tadema.
(Selected by the Artist for reproduction in this Work.)
(Copyright of the Berlin Photographic Co.)

Almeida, fortress, prov. Beira, Portugal, between the riv. Coa and the Spanish frontier. It was taken by the Spaniards in 1762, and by the French in 1810. When Massena retreated into Spain in the following year, the French blew up the fortifications; but these were at once rebuilt by the British. Pop. (1900) 2,312.

Almeida, Emanuel (1580-1646), Portuguese Jesuit, lived at the Abyssinian court (1622-34), and left valuable accounts in his *Historia general de Ethiopia a alta* (ed. by Balthazar, 1660).

Almeida, Francesco d' (d. 1510), son of the second Count of Abrantes, was a famous soldier and founder of empire. For his services against the Moors he was made (1505) viceroy of the Portuguese possessions in the E. Indies. He fortified existing Portuguese factories, or established new ones, at Cannanore, Cochin, and Quilon, and in Ceylon and Mauritius. The most important events of his administration were the conclusion of a commercial treaty with Malacca, and the discovery of Madagascar and the Maldive Is. by his son. When Albuquerque arrived from Portugal with orders to supersede him, Almeida refused at first to give way; but in 1509 he sailed for Europe, and was slain in an engagement in Saldanha Bay, S. Africa.

Almeida, Nicolão Tolentino d' (1711-1811), Portuguese poet, whose satires—written in the pure national form of *quintilhas* are remarkable for their ingenuity and elegance. See his *Obras Poeticas* (1802).

Almeida-Garret, João Baptista da Silva Leitão d' (1799-1854), Portuguese poet, dramatist, and politician, born in Oporto; took an active part in the liberal movement of 1820. He is the author of some of the best dramas of modern Portuguese literature—*e.g. Auto de Gil Vicente* (1838); *Dona Filippa de Vilhena* (1840); *Alfageme de Santarem* (1841); *Frei Luiz de Sousa* (1844); *Camoens* (1825), a poem in which he sings the praises of the famous poet of his fatherland; the epic *Dona Branca* (1826); the poems *Bernal-Francez* (1829) and *Lirica de João Minimo* (1829); *Romanceiro* (3 vols. 1851-3), a collection of Portuguese folk-tales; *Folhas Cahidas* (1852), a volume of lyrics, and his finest production. His collected works were published in 25 vols. (1854-77).

Almeirim, tn., Santarem, Portugal, 42 m. N.E. of Lisbon; formerly the summer residence of the kings of Portugal. Pop. (1900) 6,085.

Almelo, tn., prov. Overyssel, Netherlands, 21 m. by rail N.E. of Deventer, with manufacture of linen. Pop. (1900) 10,018.

Almendralejo, tn., prov. Badajoz, Spain, 31 m. from Badajoz. Grain, oil, and wine; vast pastures upon its downs. Pop. (1900) 12,587.

Almeria. (**1.**) Province of S.E. Spain, on slopes of Alpujarras range to the Mediterranean. Intersected by rivers Almeria and Almanzora. Produces fruit, wine, olives, etc. Arid and sub-tropical climate. Area, 3,300 sq. m. Pop. (1900) 359,013. (**2.**) Capital of above prov.; port on Mediterranean. The western mole (2,000 yds.) makes a safe port for vessels of all sizes; eight fathoms at entrance. Large export of fruit, lead, etc. Under the Moors it was a flourishing town with a pop. of 150,000. Pop. (1900) 47,326.

Almissa (Slav. *Olmis*), tn., Austria, on the Dalmatian coast, 13 m. S.E. of Spalato; formerly a haunt of pirates. Vineyards and wine industry. Pop. (1900) 15,108.

Almodovar del Campo, tn., prov. Ciudad Real, Spain, 22½ m. from Ciudad Real; important mining district. Pop. (1900) 12,525.

Almogia, tn., prov. Malaga, Spain, 10 m. N. of Malaga. Wine, figs, almonds, and raisins, mats, etc. Pop. (1900) 6,511.

Almohades, a dynasty of Berber princes who expelled the Almoravides, and reigned over a large part of N.W. Africa and the southern half of Spain during the 12th and 13th centuries. Founded as a Moslem sect by Mohammed-ibn-Abdallah, the Almohades conquered Morocco under Abd-ul-Mumen, and extended their power to Spain after a victory over the Castilians at Alarcos (1195). After the defeat of Yakub Almansur by the kings of Aragon, Castile, and Navarre, at the battle of Navas de Tolosa (1212), the Almohades lost Spain; but continued in Morocco until 1269, when the revolt of the nomad tribes put an end to their rule. See Slane's French trans. of Ibn-Khaldun's *Histoire des Berbères* (1854), and Dozy's *Histoire des Almohades* (1881).

Almon, John (1737-1805), the friend of John Wilkes; a London bookseller and journalist, born in Liverpool. Establishing himself in Piccadilly as a book and pamphlet seller, and publisher to the opposition *Coterie Club*, he edited and issued numerous miscellaneous publications, among which were the *Parliamentary Register* in 1774, and the *General Advertiser* in 1784. In 1770 he was fined for selling a paper containing a reprint of Junius's *Letter to the King*. His acquaintance with Wilkes began in 1761, and lasted till the latter's death in 1797. His works include *The Remembrancer* (1775-83); *Biographical, Literary, and Political Anecdotes* (1797); *The Correspondence of the late John Wilkes* (5 vols. 1805); and an edition of *Junius*.

Almonds, Oil of. The oil of sweet almonds is very similar in composition to olive oil, and is prepared by crushing and pressing the almonds. The essential oil of almonds, or oil of bitter almonds, is benzaldehyde, C_6H_5CHO. The bitter almond contains a nitrogenous substance called amygdalin, which, by the action of a ferment (emulsin) in the almond, and in the presence of water, breaks up into oil of bitter almonds, prussic acid, and glucose. If the mixture is now distilled, the oil and prussic acid distil over, and form the crude essential oil of almonds which is used as a flavouring agent. It is poisonous from the presence of prussic acid, though the purified oil is not poisonous. A large proportion of the oil of bitter almonds now used in commerce is prepared artificially from toluene, obtained from coal-tar, which is chlorinated, and the product heated with lime and water under pressure.

Almond Tree (*Prunus amygdalus*) belongs to the order Rosaceæ. It is a native of Persia and Syria, and is found wild throughout Europe. When grown out of doors in Britain it rarely bears fruit, except in the south of England. Almonds are grown commercially in California. The fruit is dry, fibrous, and velvety when ripe. The kernel within the stone is the seed the almond of commerce. There are two varieties, the sweet and the bitter: the former is the larger; the latter, when crushed, has the characteristic odour of bitter almonds.

Almoner, an official charged with the dispensing of gifts and alms. Of monastic origin, the office afterwards extended to the households of sovereigns, feudal lords, etc., and to public institutions such as hospitals. In the royal household of Britain there are a hereditary grand almoner, a lord high almoner, and a sub-almoner.

Almora, chief tn., Kumaun dist., India, on a ridge in the Almora Hills, 5,494 ft. above sea-level. For centuries it was the stronghold of native rulers. During the Gurkha war of 1815 it came into the possession of the British. The Ramsay College is at Almora; and at Lohaghat, in the neighbourhood, a sanatorium has been established. Pop. (1901) 8,596; pop. of dist. Almora (1901) 465,893.

Almoravides, a Berber dynasty which reigned over N. Africa and S. Spain during the 11th and 12th centuries. Originating in a sect founded by Abdallah-ibn-Yasin, the Almoravides, led by Abu-Bekr, conquered the kingdoms of Fez and Morocco (1054). Under Yusuf-ibn-Tashfyn, they crossed to Algeciras (1086), and defeated Alfonso VI. at Zalaca; and when Yusuf died (1106), after a reign of forty years, his son Ali succeeded to a kingdom stretching from the Sahara to the Ebro. But the ceaseless attacks by Christian armies, and the growing power of the rival Almohades, broke the dynasty of the Almoravides, which came to an end with Ali's son, Tashfyn. See Slane's French trans. of Ibn-Khaldun's *Histoire des Berbères* (1854), and Dozy's *Histoire des Musulmans d'Espagne* (1861).

Almqvist, KARL JONAS LUDVIG (1793-1866), Swedish author, after a short official career withdrew into the forests of Vermland, where he lived for two years like a backwoodsman; became rector of a large 'gymnasium' (1829); fled to N. America (1851-63) on suspicion of attempted murder; on his return (1865) lived at Bremen as Professor Westermann. He wrote very much that is worthless, but his collection of romantic poems, *Törnrosens Bok*, is one of the finest things in Swedish literature. He wrote several novels, some dealing with peasant life (*Skällnora Qvarn*), some novels with a purpose (*Tre Fruar i Smaland*), the poetic novels *Kapellet* and *Palatset*, and the fine *Det gar an*, a bold attack on marriage. See *Valda Skrifter* (1874-8).

Almshouse (in Scotland, 'hospital'), a house for the charitable support of persons suffering from old age or poverty, built and supported by private endowment; the inmates are therefore not paupers. The abuses which marked the management of endowed almshouses were put an end to by the appointment of the Charity Commissioners (1853).

Almucantar consists of a small telescope carried by a float swimming in a tank of mercury, and revolving round an imaginary perpendicular axis, so as to describe a small horizontal circle passing through the pole of the heavens. The transits of stars cutting this circle in different azimuths give the means of determining instrumental and clock corrections, the right ascensions and declinations of the stars, as well as the latitude of the place of observation. The method is compromised by fewer risks of error than that of meridian determinations, to which it serves as an alternative. Two instruments of the kind were erected in 1900 one at Durham University, England, the other at Case College, Cleveland, Ohio. In both a plane mirror is employed as an auxiliary to a horizontal telescope six inches in aperture. This name was also given to an instrument invented and perfected between 1879 and 1884 by Dr. S. C. Chandler. See *Annals of Harvard College Observatory*, vol. xvii.

Alnus. See ALDER TREE.

Alnwick, par. and mrkt. tn. in Northumberland, England, 17 m. N. of Morpeth. It took a prominent part in the Scottish wars, and was frequently besieged by the Scots between 1083 and 1448. On the S. bk. of the river stands the castle of Alnwick, the residence of the Dukes of Northumberland; about a mile to the W. is Alnwick Abbey, supposed to have been founded in 1147 by Eustace Fitz-John. There are numerous collieries in the vicinity. Pop. of par. (1901) 7,385; of tn. (1901) 6,716.

A.L.O.E. See TUCKER, CHARLOTTE MARIA.

African Aloe, showing Inflorescence and Section of Flower.

Aloe, a genus of Liliaceæ. The plants are natives of warm countries, especially of the karroo in Cape Colony. The species are very variable, with thick fleshy leaves, many of which have spiny margins; often grown in conservatories in Britain. The drug, bitter aloes, is the inspissated juice of the leaves, and is a powerful aperient with an intensely bitter taste, owing its principal properties to the active principle aloin ($C_{16}H_{10}O_7$). In the mouth and stomach aloes, in medicinal doses, stimulate the secretions and act as bitter tonics. Their cathartic action is on the colon and rectum, and they also stimulate the flow of bile. Care is necessary to avoid the production of hæmorrhoids by excessive doses, through congestion of the pelvic vessels. Externally, the tincture has been recommended for painting over ulcers after cleansing with antiseptic lotion. For American aloe, see AGAVE.

Aloes Wood, or EAGLE WOOD, called also LIGN (*lignum*) ALOES, is the heart-wood of species of Aquilaria—trees related to the laurel, found in tropical Asia. It was formerly medicinal, but is no longer officinal. When burnt, it diffuses a sweet aromatic odour, and is used to perfume clothing and apartments.

Aloidæ, ALŒIDÆ, or ALOADÆ, in Greek mythology, Ephialtes and Otus, the gigantic sons of Iphimedia and Poseidon. They made war on the gods, and attempted to pile Mount Ossa upon Olympus and Pelion upon Ossa.

Aloin. See ALOE.

Along, ALLONG, or HALONG, a bay of the Gulf of Tonkin, to the N.E. of the Red R. delta; is sheltered from all seaward winds by the island of Kak-Ba on the S., and a series of calcareous islets on the E. In the roadstead the largest ships may anchor.

Alopecia. See BALDNESS.

Alora, tn., prov. Malaga, Spain, 18 m. N.W. of Malaga; stn. on ry. to Cordova. Picturesque situation on riv. Guadalhorce, and interesting mediæval ruins. Great fruit centre, and especially famed for 'Manzanilla' olives. Its mineral springs are highly valued. Pop. (1900) 10,325.

Alost (Flem. *Aalst*), fort. tn., prov. of E. Flanders, Belgium, 16 m. by rail S.E. of Ghent. Linen, silk, and cloth are woven, and there is a trade in hops. Pop. (1900) 29,205.

Aloysia. See VERBENA.

Aloysius, ST. See GONZAGA, LUIGI.

Alpaca, the *Auchenia paco*, is a member of the camel family, known only in a semi-domesticated state, but believed to have been derived from the wild guanaco (*A. huanacus*). It is smaller than the llama, and, like it, was domesticated in S. America prior to the Spanish conquest, and was described by the early Spanish writers as a sheep. It is not used as a beast of burden, but is prized for its long, fine fleece, which is largely imported into Europe. The colour is usually black, but there is considerable variation. It lives in flocks on the higher slopes of the Andes, and is essentially a mountain animal. The material manufactured from its wool is used for clothing, and to a large extent for covering umbrellas. It is cool, light, and durable, with a dull shine. Much, however, of the so-called alpaca is a mixture of silk and wool, woven to resemble the alpaca wool.

The Alpaca.

Alp Arslan, 'Valiant Lion' (1029-72), second sultan of the Seljuk dynasty of Persia, whose name, Mohammed-ibn-Daoud, was assumed on his conversion to Islam, became ruler of Khorassan (1059), and of Persia (1063), his kingdom extending from the Tigris to the Oxus. He captured Cæsarea in Cappadocia (1067-8), and conquered Georgia and Armenia. In his attempts against the Byzantine empire he was thrice defeated by the Emperor Romanus Diogenes, but obtained a decisive victory in 1071, and captured the emperor. Alp Arslan then marched upon Turkestan, but was killed by a prisoner whom he had condemned to death.

Alpena, city, Michigan, U.S.A., co. seat of Alpena co.; is on the E. coast of Lake Huron, on the Detroit and Mackinaw Ry. Pop. (1900) 11,802.

Alpenhorn, or ALPHORN, a long bugle-horn made of wood used by Swiss peasants, who thus communicate with each other from an astonishing distance.

Alpenstock, a stout staff, iron-tipped, used by mountain climbers. The names of the peaks ascended are often branded on its shaft.

Alpes Maritimes, the most S.E. dep. (area, 1,482 sq. m.) of France, on the Mediterranean; known as the French Riviera. It surrounds the independent state of Monaco. The dep. is roughly triangular in shape, its most northerly and at the same time its highest point is the Cime de Tinibras. One of the most mountainous districts of France, its climate varies according to locality, the genial winter of the coast contrasting greatly with the severity of the highlands a few miles inland. The mistral (N.N.W. wind), which prevails in the winter months, brings intense cold, except to sheltered places, such as the popular health resorts. Large herds of sheep are pastured in the Alps in summer; olives, vines, and fruits are cultivated on the littoral; in the Plaine de Grasse large quantities of flowers are grown for the manufacture of perfumes. Capital, Nice. Other towns are Cannes, Antibes, and [illegible] The dep. wa [illegible] 1860, when the l. bk. of the Var was ceded to France. Pop. (1901) 293,213.

Alph, 'the sacred river' of Coleridge's *Kubla Khan*, is an imaginary stream, although placed by the poet in a real locality, the 'Xamdu' mentioned in *Purchas his Pilgrimage* (1626, p. 418) as the site of the summer palace erected by Kubla, Khan of Tartary, in the 13th century.

Alpha and Omega, the first and the last characters of the Greek alphabet, a name applied to the Deity, who is the 'beginning and the ending' (Rev. 1:8).

Alphabet. *Introductory.*—Alphabetic writing is almost universally employed by modern peoples, and no other system of writing has had so extensive a history. This does not imply that alphabets are easily invented, or have originated independently many times over. The prevalence of the system is explained by the ease with which it is transmitted and differentiated into new forms. Most alphabets are members of the same family, and modern discovery and research are steadily reducing the number of apparently disconnected alphabets. It is premature to maintain categorically that certain undeciphered alphabets, and others, are not offshoots of this family. (Ogham writing employs symbols which appear to be independent of the Greek or Latin models, by which it was influenced. The Persian cuneiform 'alphabet' is half a syllabary.) In any case, the invention of an alphabet is a rare achievement. It is the simplicity and adaptability of alphabetic writing which has secured its triumph over the [illegible] of ideographic and syllabic writing. The vast majority of alphabets are descended from one, which is the earliest known, and was in existence about 1000 B.C.

Many causes unite to transform alphabets which have a common origin. Their differences may be classified as differences (1) in the number of the letters; (2) in the forms of the letters; (3) in their values or pronunciation.

1. The letters of a borrowed alphabet are rarely added to at the time of transmission. The numerical limitation imposed by the old alphabet is remarkable. The distinctive sounds of the borrowing language are sometimes provided for by letters whose sounds it does not possess; or a single letter may be taken to represent two closely-related sounds. When new letters do appear, sooner or later, they are generally differentiations of others previously in use. The distinction is often made simply by a diacritical point (*e.g.* C G, I J, δ ð, ב בּ).

2. Changes in form are the result of a continuous process of variation. Fashion necessarily plays a part, and additions are sometimes made for the sake of ornament. Changes of writing material exert a powerful influence at certain periods. The inscribed surface and the instrument used may be changed. When a pen is employed, modifications are caused by the effort to attain speed and convenience. Letters are written as much as possible in one stroke (e from E, 7 from T, 9 from θ). They are also united to one another by ligatures. Considerations of convenience often lead to alteration in the point at which a letter is commenced, with the result that it may be speedily transformed. Changes in the proportion of a letter, influenced by fashion or convenience, soon alter its appearance (ω from Ω). The desire to keep letters distinct and legible is a check on development, but when letters approach one another it may actually lead to further change. It is to be observed that liability to variation increases when an alphabet is transmitted to another people, and so is freed from the conservative influences of the past.

3. Change in phonetic values on a great scale takes place when an alphabet is applied to a new language. It is only in a small proportion of cases that the new sounds exactly coincide with the old. Quite new values may be given to the signs which are not required for their original purpose. Other signs may keep their old value, and receive a new one as well. But values also change within the range of national usage; letters are differently pronounced at different dates. This arises (1) through the introduction of new sounds which require representation; (2) through neglect to change the spelling of a word which has changed its sound. In both cases the sign of the old sound comes naturally to represent the new sound.

The Origin of the Alphabet. The earliest alphabetic writing known is Semitic. The oldest monument on which it occurs, to which a date can be assigned, is the stone of Mesha. The language is Moabite, and the date the commencement of the 9th century B.C. A Phœnician inscription on the fragments of a bowl dedicated to Baal of Lebanon belongs perhaps to the same century. There are similar Aramaic inscriptions of the 8th century (from Zenjirli). In the earliest stage of its history the alphabet is therefore common to the Semitic-speaking inhabitants of Syria. It is written from right to left, expresses consonants only, and consists of twenty-two letters.

A mixed system of alphabetic writing existed in Egypt many hundreds of years earlier. (See HIEROGLYPHICS.) Attempts have been made to show that the Semitic alphabet was derived from this. The Egyptian letters are so numerous that accidental resemblances are to be expected. The danger of arbitrary selection has been best avoided, perhaps, by E. de Rougé. He determined the letters that are employed to transliterate each Semitic consonant, selected those most in use, and then compared their hieratic forms in Papyrus Prisse with the early Semitic characters. The resemblances are striking. But the papyrus is dated 1,500 years before the stone of Mesha. Even an interval of a thousand years between the alphabets is more than sufficient to forbid a definite conclusion. Besides, there is a close resemblance between certain Semitic letters which express related sounds (*e.g.* tṭ, ṣś, hḥ). It is natural to assume that the forms have been differentiated from one another. But this implies that in these cases De Rougé's resemblances are accidental, and doubt is cast on the other parallels also. The attempts made to show that the cuneiform writing of Babylonia is the true parent of the Semitic alphabet may be regarded as even less successful.

It has been argued, from the resemblance of some of the Semitic signs to the objects denoted by their names, that the letters were once pictures used as ideograms. The intrinsic probability of Egyptian or Babylonian influence forbids the postulate of an unknown ideographic system, which, besides, would surely have left a trace of itself. But the alphabetic signs may have originated in conventional pictures. It is not to be supposed that they were arbitrary inventions. The value of each consonant is the first letter of its name (b = bêth, etc.). The sign may have been devised from the name, although intended to represent its initial consonant only. This hypothesis leaves room for the influence of the older systems. It is unlikely that the inventor followed no precedent, and it is extremely improbable that an alphabet invented in Syria in the second millennium B.C. should be uninfluenced by the writing of Egypt or Babylonia. Both the conception of alphabetic writing and the acrophonic principle of the construction of the letters may have been borrowed from Egypt; both were known there. It is premature to say what influence was exerted by the recently-discovered signs which from an early date were used in Asia Minor, Crete, Egypt, and other countries bordering on the Mediterranean. They resemble alphabetic signs, but their phonetic character is still unknown. (See Flinders Petrie's *Royal Tombs of the First Dynasty* (1900), p. 31, *f.*)

It remains to be said that the great achievement of the inventor of the Semitic alphabet was not, in any case, the creation of new alphabetic signs. It lay in the adoption of a purely alphabetic system, which, moreover, denoted each sound by one sign only. For this achievement, simple as it now seems to us, he is to be ranked among the greatest of the benefactors of mankind.

The absence of vowels from this early alphabet has not been satisfactorily explained. It has been conjectured that the letters at first had a syllabic value (= consonant + vowel). The supposition is used in support of the hypothesis of Egyptian origin, and is suggested by it. Does not the fact rather imply that dialects were to be represented which agreed consonantally, but varied in their vowel systems, so that the inventor left the vowels to be supplied according to local practice?

The nationality of the inventor of the alphabet is unknown. It is accidental that the earliest monument on which it is employed is Moabite. The clue given by the significance of the traditional names of the letters is too slight; the Aramaic form of these names in Greek is not decisive evidence.

Cuneiform writing was currently used by the Semites of Syria at the date of the Tell Amarna letters (*c.* 1400 B.C.). This may be evidence that the alphabet was not yet invented, or was still of recent origin. The Aramaic or Hebrew order of the letters is the oldest. There is some appearance of phonetic grouping, but this may be accidental. The meaning of the names seems to affect the arrangement. Some of the letters may be regarded as additions to the first alphabet, since they appear to be differentiations of letters with related sounds. It is noteworthy that the names of these new letters are the most difficult to interpret.

The Semitic Alphabets.—The distinctive forms of the early alphabet were preserved by the Phœnicians. It was the Carthaginian alphabet also. The Hebrews used it before the exile (Siloam inscription), and the Maccabean princes revived it on their coins. The Samaritan alphabet is its most direct descendant.

The Aramean alphabet is of fundamental importance, because of its numerous descendants. It gradually assumes a distinctive character; by the 5th century B.C. the transformation is complete (inscription of Teima). The omission to close the tops or sides of the letters is a marked feature (Latin O is the archaic form of ע, and Δ of ד). The endeavour to reduce the number of separate strokes is noticeable (ט from Θ).

After the exile the Jews adopted the Aramean alphabet. A distinctive Hebrew variety exists from the Christian era onwards. It is marked by a tendency to bend final strokes round to the left (ל is the same letter as L). This was a step towards cursive writing, which at last comes into use, although never in Bible MSS. In printed Bibles the letters imitate ornamental German MSS. of the middle ages. The Syriac is another descendant of the Aramean alphabet. Mutated consonants were indicated by dots, and combinations of points were used to represent vowels. The Hebrew vowels date from the 6th or 7th century A.D., and the innovation may have followed a Syriac model.

From a Nabatean variety of the Aramean alphabet comes the Arabic. It and the Latin alphabet are now the most widely used. It has profoundly altered the characters of the parent alphabet, and so confounded five that diacritical marks are required to distinguish them. There are now twenty-eight consonants. The numerical order of the alphabet is the old one; the six new consonants are at the end. The grammatical order is a rearrangement according to the present resemblance of the signs. Subsidiary and inadequate vowel representation is now available.

The Himyaritic alphabet of Arabia seems to be a development of the early Semitic alphabet. But the connecting links have not yet been supplied. The Ethiopian syllabary is an offshoot from it. It has been suggested that the Indian alphabets, which are a large family in themselves, may also be derived from this.

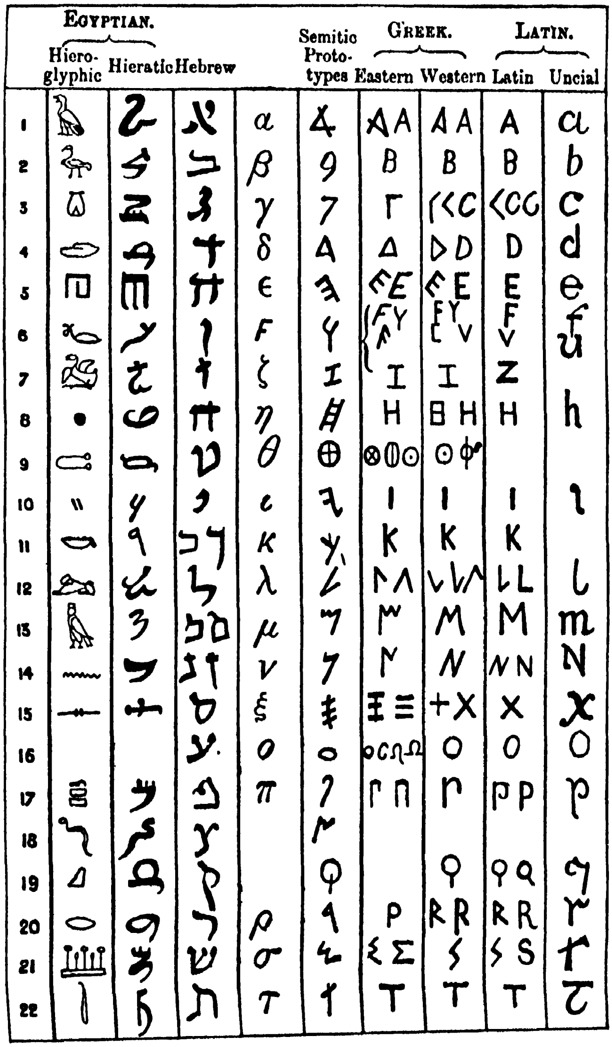
The Genealogy of the English Alphabet.—The Semitic alphabet was transmitted by the Phœnicians to the Greeks (earliest inscriptions, undated, from the island of Thera; Abu-Simbel inscriptions about 600 B.C.). The most remarkable change was the introduction of vowel representation. Four consonantal signs were employed to denote the vowels *a*, *e*, *i*, *o*; Y was added to express *Ϝ*. It appears to be a differentiation of waw *Ϝ*, later called digamma, which was required as a consonant. One of the *t* signs was employed for *th*. Some of the local alphabets preferred san, No. 18, and some sigma, No. 21, as the sign for *s*. A third sibilant, No. 15, was dormant until revived to represent ξ. At this stage the Greek alphabet consisted nominally of twenty-three consonants, as follows: A B Γ Δ E Ϝ Z H Θ I K Λ M N Ξ O Π Ϻ Ϙ P Σ T Y.

Greek colonists took an early form of the alphabet to Italy. But already there were three additional letters at the end, X, Φ, Ψ, with the values ξ, φ, χ. Of these twenty-six, the Latin alphabet adopted twenty-one. Θ, Φ, Ψ were not required; Ξ was rejected; sigma was preferred to san. The first Latin alphabet was therefore as follows: A B C D E F Z H I K L M N O P Q R S T V X. Before this alphabet passed to Britain the principal changes were: (1.) Z proved unnecessary, was dropped, and then restored for employment in Greek words. Along with Greek Y it was placed at the end of the alphabet. The older Y in the form V had now a different value (*u* as in full). (2.) C, which is Γ rounded, added to the value *g* that of *k*, and practically supplanted *k*. Finally, a variant G took the old value, and C stood for *k* only. The new letter G was set in the alphabet after F. This was the original position of Z, which it still occupies in the Greek and Hebrew alphabets.

This alphabet was transmitted to Britain. The forms in English use may still be called those of the Latin alphabet. (See WRITING.) The number of the letters also has increased only by three: *w* has arisen from *vv*; *u* and *v*, originally variants, have acquired a distinctive use, and *j* is a modern form of consonantal *i*. Three other letters were employed for a time, until rejected by Norman-French influence (ð and two runic letters þ, ƿ). But, phonetically, the Latin alphabet has been transformed by English usage. The values of the vowels in particular have been entirely changed. (See SPELLING, and the articles on the letters.)

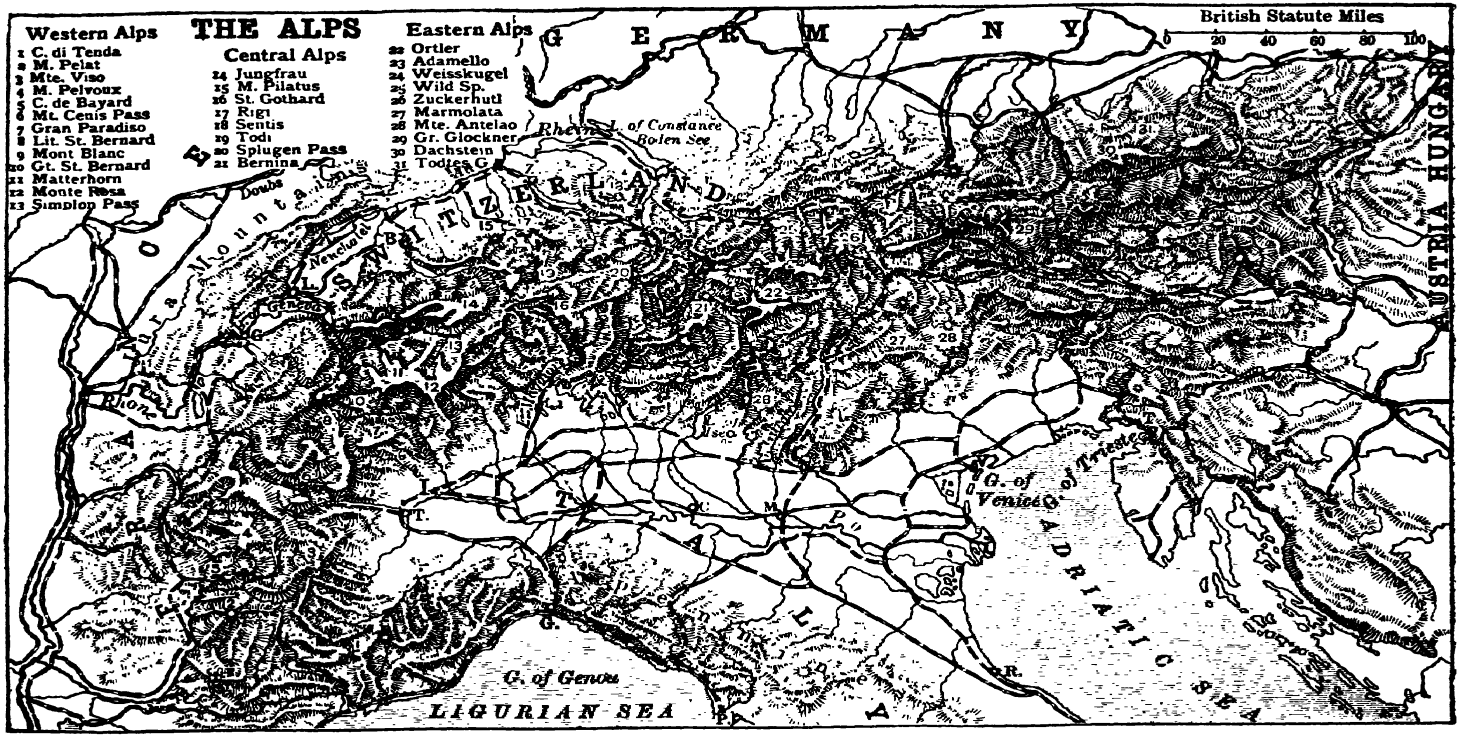
The Standard Greek Alphabet.—The principal features in the national development of this alphabet are: (1.) The gradual disuse of Ϝ and Ϙ, because the language did not require them, and of san, which was supplanted by Σ. Ϝ and Ϙ were revived as numerals, 6 and 90. San had lost its alphabetic position, but was set at the end to represent 900 (sampi ϡ). (2.) The addition of certain new consonantal signs. *Ph* (ϕ) was the earliest in general use. *Ks*, *kh*, and *ps* were not uniformly represented. In one group of alphabets, $\xi = ks$, $\chi = kh$, $\psi = ps$. In another, χ was *ks*, and ψ represented *kh*; ξ was retained in the alphabetic list, but unemployed. The Ionian alphabet represents the former group, the Italian alphabets the latter. (3.) The addition of two new vowel signs. H assumed the value η, *h* being left for a period unrepresented; Ω was derived from O. As the last addition to the alphabet, Ω was placed at the end. There were now twenty-four letters.

An alphabet embodying these changes was complete soon after 600 B.C. The Abu-Simbel inscriptions, about this date, show Ϙ lingering; H = η, but twice used for *h*; Ω not yet in use. In 403 B.C. the Ionian alphabet was officially adopted at Athens. Since about 500 B.C. the direction of the writing had been from left to right.

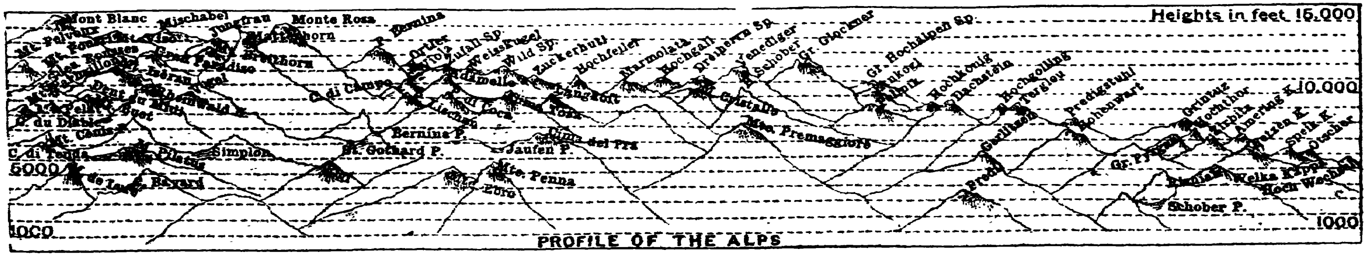

EGYPTIAN.
Hiero-glyphic
Hieratic
Hebrew
Semitic Proto-types
GREEK.
Eastern
Western
LATIN.
Latin
Uncial
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

Literature.—The material for a study of the earliest alphabet, and of Semitic alphabets generally, is given in the *Corpus Inscriptionum Semiticarum*. Selected inscriptions and a full bibliography are given by Lidzbarski in *Handbuch der Nordsemitischen Epigraphik* (1898). In favour of the Egyptian origin of the alphabet, Rougé's *L'Origine Egyptienne de l'Alphabet Phénicien* (1874); of a Babylonian origin, a section (pp. 221-231) of Delitzsch's *Entstehung des ältesten Schriftsystems* (1897). Thompson's *Greek and Latin Palæography* (2nd ed. 1894) is excellent; *cf.* Kenyon's *Palæography of Greek Papyri* (1899). Kirchhoff's *Studien zur Geschichte des Griechischen Alphabets* (4th ed. 1887) is an introduction to the early Greek inscriptions. General introductions, with bibliography on other alphabets: Taylor's *The Alphabet* (2 vols. 1883); Berger's *Histoire de l'Ecriture dans l'Antiquité* (2nd ed. 1892). Lenormant's *La Propagation de l'Alphabet Phénicien* (1872-3; reprint, 1875) remains incomplete. For phonetic changes in the English alphabet, see Sweet's *History of English Sounds* (1888).

Alpheus, in Greek mythology, the god of the Alpheus, the chief river of the Peloponnesus, which flows past Olympia to the Ionian Sea. The legend of his love for the nymph Arethusa is that the god surprised Arethusa bathing in the river, and pursued her; but Artemis transformed her into an underground spring, which reappeared as a fountain on the island of Ortygia, close to Syracuse, Sicily. Alpheus, taking a similar form, followed her, and came to the surface of the sea as a fresh-water spring near the fountain of Arethusa. (Ovid, *Met.* v. 572.) The legend is the foundation of Shelley's poem *Arethusa*.



THE ALPS



PROFILE OF THE ALPS

Alphonsine Tables, improved astronomical tables drawn up by fifty celebrated astronomers at Toledo in 1252, under the patronage of Alfonso x. of Castile, and first printed in 1483.

Alphonso. See ALFONSO.

Alpine Club, a society formed in London in 1857-8 for the purpose of bringing together those interested in mountaineering. Its membership now extends to about 500, and its interests are no longer exclusively centred in the Alps, but extend to wherever there are new peaks to conquer. By the issue of the *Alpine Journal*, (founded in 1863), by holding an equipment exhibition (1899), and by the issue of maps, etc., the club has done much to popularize the sport all over the world. The headquarters, 23 Savile Row, London, contain an excellent reference library. Other Alpine clubs are the Austrian (1862), Swiss (1863), Italian (1863), French (1874), and German (1869), the first and the last of which were amalgamated in 1874. There are also a few similar clubs in the United States of America.

Alpine Glow, the tingeing of the summits of certain Alpine peaks with rosy colour just before sunrise and just after sunset.

Alpine Plants, which are also, in general, arctic plants, form the flora of regions which, by reason of altitude or latitude, approach the limits of perpetual snow. They are, for the most part, tiny plants with brilliant flowers, and they tend to grow closely, forming carpets of green; thus the many kinds of saxifrages are typical alpine plants. Edelweiss, gentians, azaleas, rhododendrons, primulas, and many minute ferns, belong to the vegetation of mountains, but are successfully grown in European rock gardens. In the secular climatic changes of the earth's surface these forms have been driven from the once frozen valleys of the temperate zone to the mountain slopes of the Alps and Andes, and to the northern plains of Siberia and Canada. See Dawson's *Geol. Hist. of Plants* (Internat. Scient. Series, 1888); Willis's *Flowering Plants and Ferns* (1897); Robinson's *Eng. Flower Garden*, ch. x.

Alpini, PROSPERO (1553-1617), Italian botanist, studied medicine at Padua, went in 1580 to Cairo to practise as a physician, served (1584) in the same capacity with the fleet of Andrea Doria; and ultimately became professor of botany at Padua. He is remembered chiefly for his work *De Plantis Ægypti* (1592), which included the first accurate description of the coffee plant. He also published *De Medicina Ægyptiorum* (1591), *De Medicina Methodica* (1611), and other works.

Alpist, the seed of canary grass (*Phalaris canariensis*), used for feeding cage birds. The name is derived from the native name of the plant in the Canary Islands.

Alps, the great mountain range that extends, in the form of a crescent, from Genoa to Trieste. In the Alps themselves the term denotes the high mountain pastures, used only in summer. On the N. the foothills reach to just S. of Munich, Salzburg, Linz, and Vienna. The chain is usually described as divided into three sections: (1) the W. Alps (Col di Tenda to the Simplon), including the Maritime Alps, Cottian Alps, Dauphiné Alps, Graian Alps, chain of Mont Blanc, and Pennine Alps; (2) the Central Alps (Simplon to Reschen Scheideck and Stelvio), with the Bernese Alps, N. Swiss Alps, Lepontine and Adula Alps, Todi group, Rhaetian Alps; (3) the E. Alps (Reschen Scheideck and Stelvio to the Semmering), including Ortler, Adamello, and Brenta groups, Limestone Alps of Bavaria, N. Tyrol and Salzburg, Central Tyrolese Alps, S. Tyrolese Alps or Dolomites, and S.E. Alps or the Carnic, Karawanken, and Julian Alps.

Politically, the Alps are situated in five countries France, Italy, Switzerland, Austria, and Bavaria. Railways have been pierced under several passes - the Semmering, Col de Fréjus (not Mont Cenis, as often stated), St. Gothard, and Arlberg; and tunnels are in progress (1905) under the Albula, Simplon, Col di Tenda, and Col de Jaman. Railways pass over the Brenner Pass, Col de la Croix Haute, Brünig, Laret, and Little Scheideck. Light railways run to the summits of the Rigi, Uetliberg, Pilatus, Monte Generoso, Monte Salvatore, Brienzer Rothhorn, Rochers de Naye, Grand Revard, Salève, Stanserhorn, Gornergrat, and Gurten; while many others are projected, including the Jungfrau. The highest carriage roads pass over the Stelvio from Austria to Italy, Col du Galibier, Umbrail from Switzerland to Italy, Great St. Bernard, and Furka.

There are many glaciers (1,155, covering 1,200 to 1,500 sq. m. according to Heim), and some of the greatest European rivers rise from these glaciers - the Rhone, Rhine, Po, Adige, and Piave flowing to the Mediterranean, North Sea, Black Sea, and Adriatic. There are many lakes, of which the largest are Geneva, Constance, Garda, Maggiore, and Chiemsee. The geological history of the Alps is one of successive periods of upheaval, due to pressures from N.W. and S.E., which have folded, broken up, and in some cases even overturned the strata of the earth's crust. In the centre of the range the rocks are chiefly Archaean - gneiss, granite, mica schist, etc.; while the outer belts contain principally fossiliferous sedimentary strata. Minerals are abundant in the Austrian part of the range, where coal, iron, lead, gold, silver, copper, and mercury are worked.

The principal Alpine railways are:- (1.) Geneva to Chamounix. (2.) Geneva to Brigue for the Simplon, *via* St. Maurice (with branch from Visp to Zermatt and Gornergrat). (3.) Bern to Interlaken, *via* Thun; Interlaken by Lauterbrunnen and Mürren for the Jungfrau, with branch for Grindelwald. (4.) Lucerne to Brienz, *via* Meyringen. (5.) Lucerne to Alpnach and Mt. Pilatus. (6.) Lucerne to Zürich, *via* Rothreuz and Zug. (7.) Zug, *via* Arth (for the Rigi), to Vitznau. (8.) Lucerne by Arth-Goldau and the St. Gothard Tunnel to Bellinzona and Lugano. (9.) Zürich, *via* Rapperschwil, to Weesen and Glarus for Linththal. (10.) Zürich, *via* Weesen and Lanquart (*a*) to Davos-Platz, (*b*) Coire and Thusis and the Albula Pass.

The chief mountain-climbing centres are Grindelwald (for Eiger and Wetterhorn), Chamounix (for Mt. Blanc), Zermatt (for the Matterhorn), Courmayeur, Macugnaga, and Pontresina (for Piz Languard, etc.).

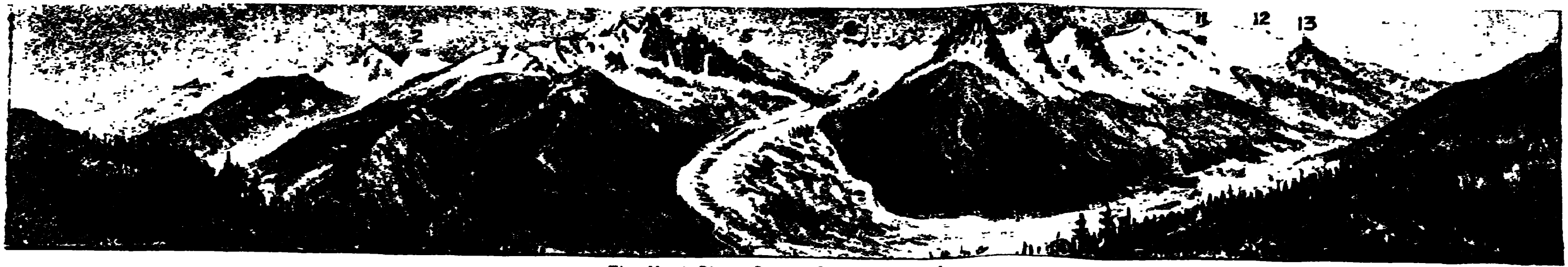
Among the most frequented health resorts are Davos-Platz (E. Switzerland), St. Moritz, Samaden and Sils Maria (in the Upper Engadine), Pontresina, Tarasp, Bergün, St. Beatenberg, Heiden, Urseren, Engelberg, Seelisberg, Mürren, Grindelwald, Interlaken, Gersau, Lugano, Vevey, Lausanne, Bex, Bormio, Faulen, Rotzlach, Yverdon, etc. (For the chief places here mentioned, see articles under their names.)

The animals of the Alps include the steinbok (ibex), chamois, bear, wolf, lynx, wild cat, marmot; the eagle, lammergeier (vulture), and several hawks: salmon and trout are abundant in the lakes; butterflies and other insects abound.

The population is racially very mixed, and some have postulated an ancient Alpine race which has modified the people of Teutonic, Slavonic, and Latin origin who have pressed in upon the highlands from the plains.

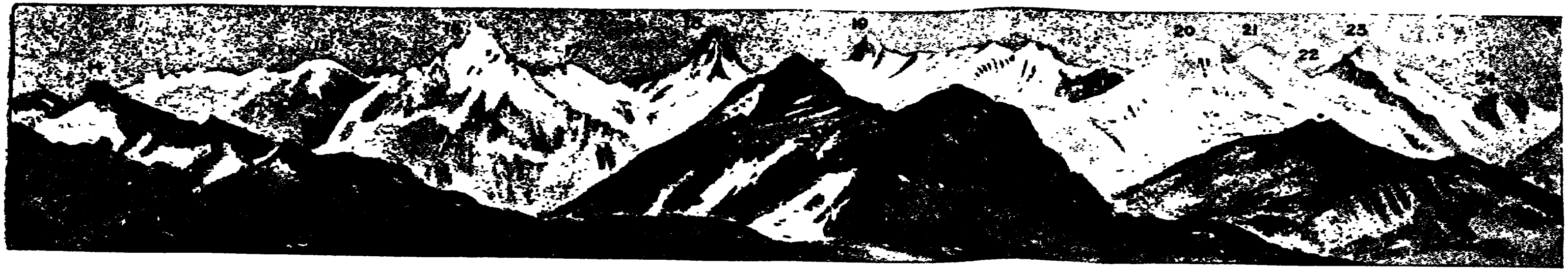
The Alps have played a great part in the history of the world. Hannibal, Cæsar, Attila, Napoleon, and many other great generals, knew them well. The word 'ultramontane' indicates their significance in ecclesiastical controversy; and the unique international position of the Swiss confederation is only one example of their influence in the politics of Europe.

For general bibliography, see Rev. W. A. T. Coolidge's new edition of Ball's *Hints and Notes for Travellers in the Alps*, and Wäber's



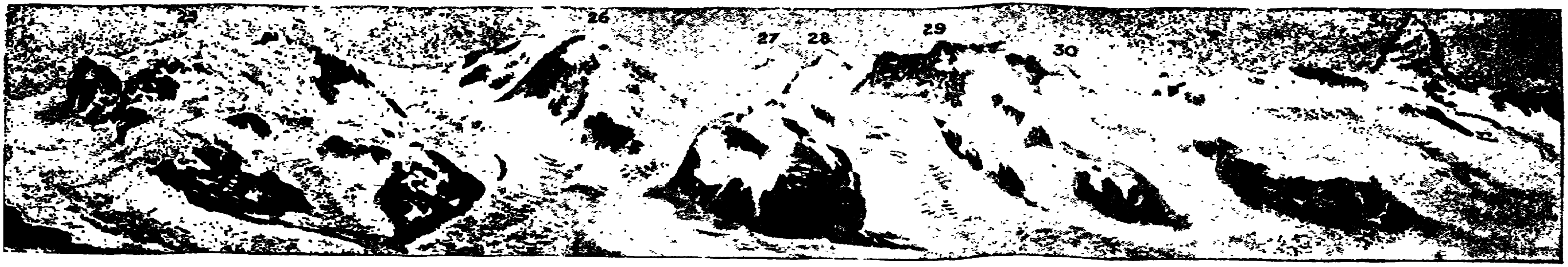
The Mont Blanc Range from the Flegère.

1, Aiguille du Tour; 2, Aiguille d'Argent; 3, Aiguille Verte; 4, Aiguille du Dru; 5, Aiguille du Moine; 6, Les Grands Jorasses; 7, Aiguille de Charmoz; 8, Aiguille de Blaitière; 9, Aiguille du Plan; 10, Aiguille du Midi; 11, Mont Blanc; 12, Dôme du Gouter; 13, Aiguille du Gouter.



The Jungfrau, etc., from the Faulhorn.

14, Schwarzhorn; 15, Wellhorn; 16, Wetterhorn; 17, Berglistock; 18, Great Schreckhorn; 19, Finsteraarhorn; 20, Eiger; 21, Mönch; 22, Aletschhorn; 23, Jungfrau; 24, Breithorn (Lauterbrunnen).



The Monte Rosa Range from the Gornergrat.

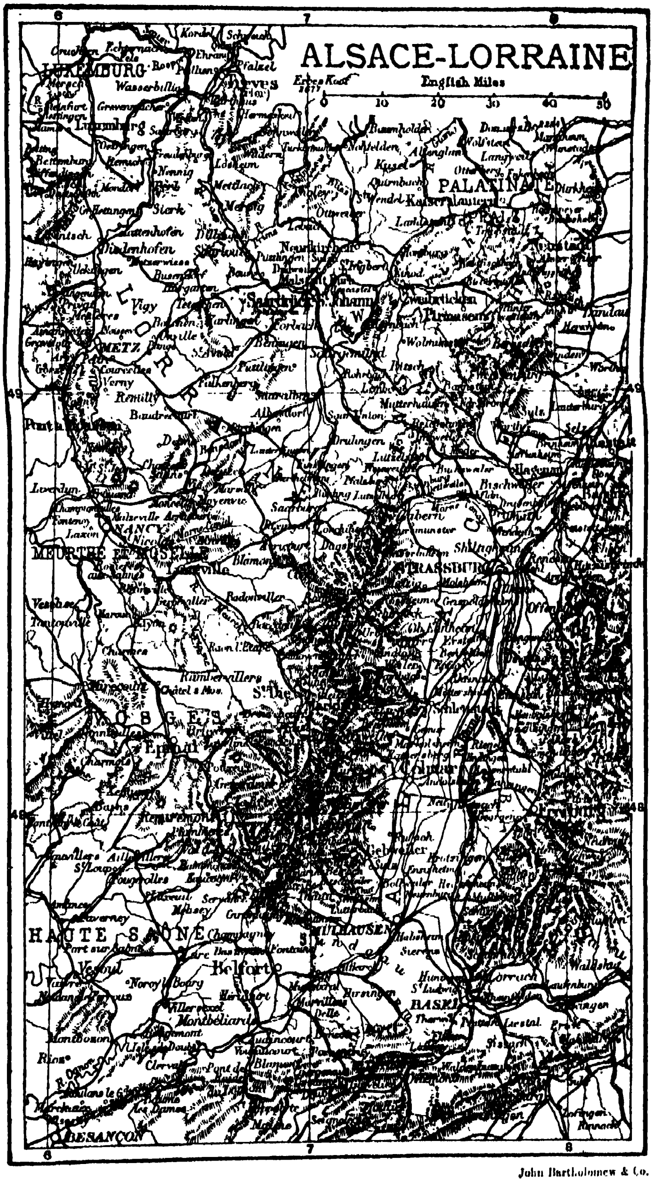
25, Monte Rosa; 26, Lyskamm; 27, 28, Castor and Pollux (Zwillinge); 29, Breithorn; 30, Little Matterhorn; 31, Matterhorn; 32, Tête Blanche.

Landes- u. Reise-beschreibungen (Bern, 1898). General works are: Berlepsch's *Alpen in Natur- u. Lebensbildern* (Eng. trans. 1861); Lendenfeld's *Aus den Alpen* (1896), and *Hochgebirge der Erde* (1899); Umlauft's *Die Alpen* (Eng. trans. 1889). For natural science, Bonney's *Alpine Regions of Switz.* (1868); Heim's *Handbuch d. Gletscherkunde* (1885—Eng. summary in *Alpine Journal*, vol. xii.); *Anleitung zu Wissensch. Beobachtungen auf Alpenreisen* (1882—pub. by the German and Austrian Alpine Club, and relating to *all* the natural sciences). For history of Alpine exploration, see, for the W. Alps, Ball's *Alpine Guide*, vol. i. (1898); for the Central Alps, Studer's *Ueber Eis u. Schnee* (1896-9); and for the E. Alps, Richter's *Die Erschliessung d. Ostalpen* (1892-4). For minute topographical and bibliographical details, see the publications of the various European Alpine Clubs; the *Climbers' Guides* by Sir Martin Conway and Rev. W. A. T. Coolidge (1890-4)—5 vols. referring to the W. and 3 to the Central Alps; and for the E. Alps, the 3 vols. of Purtscheller and Hess's *Hochtourist in den Ostalpen* (2nd ed. 1899). *Maps.*—No single modern map of the whole Alpine chain has as yet been published. For the W. Alps, see the district maps (scale 1 : 250,000) in the new ed. (1898) of Ball's *W. Alps*; and for the Central and E. Alps, the 11 sheets published (same scale) by Ravenstein at Frankfort. All the great Alpine countries have now completed the publication of large scale government maps—France (1:80,000 and 1 : 100,000); Switzerland (the *Dufour Map*, 1:100,000, and the *Siegfried Atlas*, 1:25,000 for the plains and 1:50,000 for the mountains); Italy (1:25,000, 1:50,000, and 1:100,000); Austria (1:75,000); and Bavaria (1:25,000 and 1:50,000). Among the best special maps may be mentioned Duhamel's *Dauphiné* map (4 sheets—Grenoble, 1889; Lond., 1892; scale 1:100,000); Kurz's *Chain of Mont Blanc* (Bern, 1896; scale 1:50,000); and the coloured maps of scale 1:50,000 of the E. Alps issued by the German and Austrian Alpine Club.

Alpujarras, mountain chain in prov. of Granada, Spain, running parallel to and forming a branch of the Sierra Nevada range. The scenery is wild and picturesque, and in these fastnesses the Moriscos of Granada found their last refuge. Their descendants, called 'new Christians,' still linger in separate villages.

Alruna, name given to a witch or prophetess by ancient Teutonic tribes; also a small image, carved from mandrakes, used in certain superstitious rites. The word is connected with runes.

Alsace-Lorraine (Ger. *Elsass-Lothringen*), an imperial territory of the German empire, forming its S.W. border next France. Alsace embraces the W. half of the valley of the Rhine and the E. half of the Vosges Mts. and their valleys. Lorraine, which lies N.W. of Alsace, consists of a low plateau, drained by the Saar in the E. and by the Moselle in the W. The Ill, which enters the Rhine at Strassburg, drains the valleys of Upper Alsace. The climate is exceptionally genial in the Rhine valley. Agriculture is the chief occupation, 50 per cent. of the area being cultivated, and 15¼ per cent. meadow and grass land. The chief crops are hay, wheat, oats, potatoes, barley, rye, tobacco, hops, and beetroot; the production of wine is important (in 1900, 76,770 ac. were under vine). About 30 per cent. of the area is covered with forest, of which about three-fourths belong to the state and public and corporate bodies. Lorraine possesses considerable mineral wealth, especially in iron, coal, salt, and building stone. Chief industries are iron-founding, the manufacture of glass, porcelain, chemicals, cotton and woollen goods, and



John Bartholomew & Co.

paper; also tanning, brewing, and distilling. There is a university at Strassburg. Alsace-Lorraine is administered by a governor-general appointed by the emperor, a ministry of four departments, and a council of state. Legislation is entrusted to a territorial committee of fifty-eight members, all elected indirectly by the people. Alsace-Lorraine is not yet represented in the Federal Council, but elects fifteen deputies to the Imperial Diet. Capital, Strassburg. Area, 5,560 sq. m. Pop. (1900) 1,717,451, of whom 200,000 or more are of French origin.

From the 7th century Alsace was governed as a part of the empire by dukes and other dignitaries. Between 1648 and 1697 it was partly transferred to and partly seized by France, which held it until the war of 1870 1, when it was reclaimed by Germany. Lorraine, too, was a county of the empire from the middle of the 9th century, a duchy from 911, and from 953 was divided into two duchies—Upper Lorraine and Lower Lorraine. The former remained constitutionally unchanged until 1736, when it was granted to Stanislaus, ex-King of Poland, and on his death in 1766 was incorporated in France. Lower Lorraine, which stretched to the shores of the North Sea, was united with the duchy of Brabant in the end of the 12th century, and in 1429 with the duchy of Burgundy. See Trinius's *Die Vogesen in Wort und Bild* (1895); *Elsass-Lothringen, das Reichsland, Landes*, and *Ortsbeschreibung*, ed. by the Statistical Department of the Executive Government (1900, etc.); *Beiträge zur Landes- und Volkskunde von Elsass-Lothringen*, by various writers (1887, etc.); and H. Witte's *Zur Geschichte des Deutschthums im Elsass und im Vogesengebiet* (1897).

Alsatia, a sanctuary for criminals and debtors, called after Alsace (as a debatable country between France and Germany); it included the precincts of the Carmelite House of Whitefriars in London, but lost its privilege in 1697. See Shadwell's *Squire of Alsatia* (1688), and Scott's *Fortunes of Nigel*.

Al segno (It. 'to the sign'), in musical score, directs the musician to turn back from the bar thus marked, to the sign 𝄋 and begin again at that place, continuing to the first double bar.

Alsen, a fertile isl. in the Baltic, belonging to the Prussian prov. Schleswig-Holstein, lies near the S. end of the Little Belt. It is separated from the mainland by the Sound of Alsen, 12 m. long and from a few yards to 2¼ m. wide. Pop. about 25,000. Area, 120 sq. m.

Alster, riv. in Holstein, Germany; passes through Hamburg, of which it forms the harbour, and joins the Elbe (r. bk.) by several channels.

Alstrœmeria (Peruvian lily), plants of the Amaryllidaceæ, from S. America. Several are cultivated as hardy and half-hardy tuberous-rooted perennials. The flowers are brightly and variously coloured.

Alt, a term applied to the notes in the octave above the treble stave, beginning with G; the notes in the next octave above are termed *in altissimo*.

Altai Mountains, one of the principal mountain ranges of Asia, dividing the Russian province of Semiryechensk from E. Turkestan, and stretching E. along the N. side of the Desert of Gobi. The range is built up principally of argillaceous schists, with granite in the highest parts, and diluvium and alluvium at its base. Gold, silver, copper (and latterly iron) have been mined there since the early part of the 18th century. Mean alt. 2,000 ft.; maximum alt. in the Byelukha, 11,000 ft.

Altair, *α* Aquilæ, a white star of 0·74 photometric magnitude. Dr. Elkin's parallax of 0·282″, corresponding to a light journey of fourteen years, indicates for Altair a total luminosity more than sixfold that of the sun. Its spectrum is of the Sirian type, but the absorption lines are exceptionally wide and diffuse.

Altamaha, riv., Georgia, U.S.A., formed by the junction of the Oconee and Ocmulgee. Length, 150 m. It is navigable for small vessels to its source.

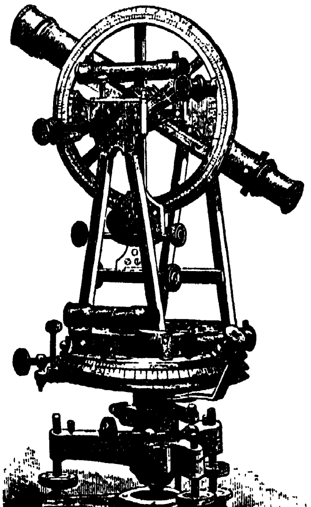
Altamura, tn., prov. of Bari, Italy, 60 m. by rail N.W. of Taranto, with an old Norman cathedral. Good wine is produced in the vicinity. Pop. (1901) 22,683.

Altar (Lat. *altare*, 'a high place'), a raised structure on which propitiatory offerings are laid; in the Christian church, the table or stone upon which the instruments of the eucharist are displayed. The altar has often been regarded as a place of refuge for debtors, slaves, and criminals. In the early Christian church the altar was a portable structure of wood, and the Roman Church still allows a table of that material to be used; but a tablet of stone, which alone is consecrated, and must contain an authentic relic, must be placed upon the table, and is regarded as the true altar. This tablet, or *mensa*, may have one or more steps (*gradini*) towards the back, on which are placed the candlesticks, crucifix, tabernacle, etc. The altar early assumed a somewhat monumental form, its rectangular base often enclosing the body of a martyr. Often the most elaborate design was worked in most precious materials; when it was a simple structure, it was covered, during the celebration, with *antependia*, or elaborately ornamented wooden frames. The rubrics require that the *mensa* should be covered with white linen cloths. The 'high' or principal altar is surmounted by a baldachin or canopy. The reredos is not a part of the altar, but usually accompanies it. The expositorium, or throne for the exposition of the monstrance, as well as reliquaries and shrines, are sometimes grouped with the altar, forming one design. There may be numerous secondary altars in side chapels. The Court of Arches has decided that there are no altars in the Church of England, but only holy tables or communion tables. For altar lights, see LINCOLN JUDGMENT.

The altar has been in use by man from the first dawn of the idea of propitiation in religious worship. The descriptions of the early Jewish altars, often simply built of rough stones when needed, are familiar. Altars of gold and brass constituted a very important part of the furniture of both Moses' tabernacle and Solomon's temple. From early Jewish times the altar provided a protection to fugitives, which it was sacrilege to violate. The altars used in pagan times are of interest. They were of two kinds: some low, and adapted for kneeling on, stood before the images within the temple, so that the worshipper, mounted upon one, could offer up his prayer; the other type was that used for burnt-offerings, which was placed before the temple door. The scale of many Greek sacrifices required altars of a very large size—one measured 600 ft. in length.

Altar-piece, a picture or a framed sculpture in relief of a religious subject or subjects hung over or placed upon an altar. It was one of the earliest forms of Christian art, and some of the most famous works of art in the world are altar-pieces. As a rule, altar-pieces consist of one or more pictures—when of two, they are called diptychs; when of three, triptychs; and when of greater number are usually designated as of so many compartments—and they are frequently provided with shutters, painted on both sides, which may be closed to conceal the principal subject, which, except in a diptych, is the central one. But in some cases, in both Flemish and Italian examples, pictures and sculptures were combined; and in certain Flemish and Spanish specimens, and in many of the Rhenish school, all the subjects were carved in wood, coloured and gilded, and brought together in a carved architectural setting.

Altazimuth, or altitude and azimuth instrument, essentially a large theodolite for determining the altitudes and azimuths of the heavenly bodies, and, indirectly, their right ascensions and declinations, these being deducible from the former, provided that the times of observation are known. In this form of instrument, a telescope revolving on a horizontal axis is rigidly attached to a graduated vertical circle read by microscopes; while the whole can be rotated above a fixed horizontal circle, the readings of which give positions in azimuth. The altazimuth (invented by Olaus Römer of Copenhagen in 1690) is available for measurements in all parts of the sky; and it was with a combination of this type, completed by Ramsden in 1789, that Piazzi made the observations for his great star-catalogue. Airy's erection of an altazimuth at the Royal Observatory, Greenwich, in 1847, for the purpose of a more persistent following of the moon, counted, nevertheless, as an innovation; but it was later imitated at Strassburg, Geneva, Bamberg, Washington, and elsewhere. Airy's instrument was replaced by another of the same class, but much larger, in 1897. Although called a 'universal transit,' it is practically fixed in the meridian.



Altazimuth or 'Universal Transit' Instrument.

Altdorf, or Altorf, cap. of Swiss canton of Uri, on St. Gothard Ry., 34 m. from Lucerne, and 2 m. from Flüelen, its port on Lake Lucerne; is associated with the legend of William Tell, of whom it has a fine statue. Pop. (1900) 3,147.

Altdorfer, Albrecht (c. 1480-1538), painter, architect, engraver; one of the 'Little Masters' of Germany; known in Paris as '*Petit Albert;*' was probably a pupil of Durer. A close student of nature, he has been called the father of landscape painting. The most important of the twenty-five known paintings by him is the *Battle between Alexander and Darius* (Munich). Of his engravings, 111 are on copper (some etched), and 64 are woodcuts. See W. B. Scott's *Little German Masters* (1880).

Altels, the second peak in height (11,930 ft.), but the best known summit, of the mountain group that rises just E. of the well-known Gemmi Pass. First ascended (1834) by a Swiss. It is ill-famed for the avalanches it sends down on the Gemmi path.

Alten, Karl August, Count von (1764-1840), Hanoverian general, fought in the Netherlands, and in 1803 went to England. He served under Wellington in the Peninsula, covering Sir John Moore's retreat to Corunna, and commanding Wellington's light armed troops at Salamanca, Vittoria, Orthez, and other battles, and in the campaign of Waterloo. Returning to his native country, he in 1831 became Minister of War, and in 1832 Minister of Foreign Affairs.

Altena, tn., prov. Westphalia, Prussia, on the Lenne, 38 m. by rail S.E. of Dortmund; large iron and other metal industries. Here are the ancestral castle of the Counts von der Mark and the Süderländer Museum. Pop. (1900) 12,766.

Altenavia, the Latin form of Altona; used in bibliography.

Altenburg, cap. of the duchy of Saxe-Altenburg, Germany, stands on hilly ground, 24 m. by rail S. of Leipzig. The ducal castle, dating originally from the 11th century, but mostly built in 1865-70, crowns a steep rock above the town. Cigars and woollen yarn are manufactured. It was burnt by the Hussites in 1430, and in 1568-9 was the scene of an important conference of Saxon theologians. The episode of the 'Prinzenraub'--*i.e.* the attempted abduction of two Saxon princes by the knight Kunz von Kaufungen--is associated with the place. Pop. (1900) 37,110.

Altendorf, suburb of Essen (incorporated with it in 1901), prov. Rhineland, Prussia. Pop. (1880) 22,229; (1900) 63,238.

Altenessen, commune, prov. Rhineland, Prussia, 2 m. N. of Essen. Coal mines. Pop. (1900) 28,668.

Altenstein, a summer castle of the dukes of Saxe-Meiningen, 13 m. S.E of Eisenach, Thuringia; historically associated with the seizure of Luther in 1521 when returning from Worms.

Altenstein, Karl, Baron von Stein zum (1770-1840), Prussian statesman; was Minister of Finance from 1808-10. In 1817 he became Minister of Public Instruction, which post he occupied over twenty years. He is the author of the famous education law of 1819, which forms the basis of the actual system of education in Prussia, and has been taken as a model by several European nations.

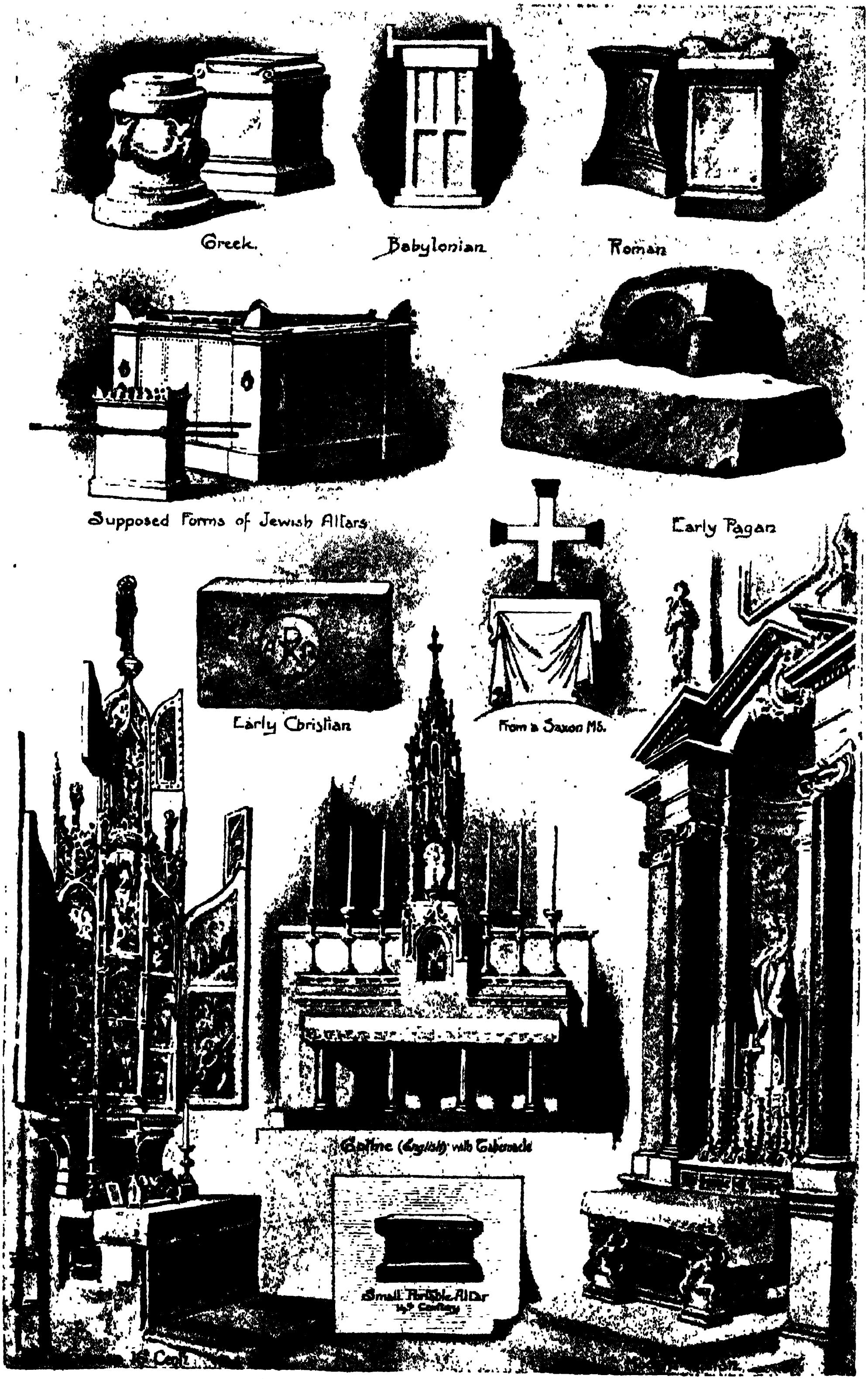
Alteratives, a conventional term used in medicine to denote those remedies which alter the general condition of the body for the better, by an imperfectly understood action which does not obviously modify any particular organ. Mercury, arsenic, and the iodides are conspicuous examples of alteratives, and very valuable where rapid metabolism is aimed at.

Alter Ego, expressing an intimate friend, was officially employed in the kingdom of the Two Sicilies to designate the administrative plenipotentiary or general vicar of the king.

Alternating Current. See Dynamo.

Alternating Motion, a term used in mechanics to indicate motion backwards and forwards, as opposed to rotation. Thus, the reciprocating parts of a steam-engine are in alternating motion, which, as approximately in this case, is frequently a simple harmonic motion.

Alternation of Generations, common to plants and animals, is the alternate occurrence in one life-history of two or more forms, differently produced. In mosses, for instance, there are two generations: one, the plant with which we are familiar, is asexual, producing not male and female elements, but spores, in the little brown capsules which stand up like spears from the green tufts; the other, a minute, green, leaf-like organism, produced on damp earth by the germination of the fallen spore, is sexual, producing egg cell and microscopic active male cells or spermatozoids, which fertilize the former to give rise again to the asexual generation. In the ferns and their allies there is a similar alternation of minute sexual and large conspicuous asexual or spore-bearing forms within the same life-cycle; and in the flowering plants, although the sexual generation is microscopic and lies concealed within the spore-bearing plant, yet botanists recognize the same law, which thus extends right through the vegetable kingdom. Among animals it is of common occurrence, especially in the lower forms. It is exemplified in its simplest form in the Cœlentera, or hollow-bodied animals, where a colony of asexual polypes buds



Examples of Altars, Christian and Pre-Christian.

off a jelly-fish or medusoid, which gives rise to the sexual elements. From the fertilized egg-cell the asexual polype colony arises, and begins a new cycle. Here a sexual generation, possessed of considerable powers of locomotion, alternates regularly with a sedentary asexual generation. More complicated are the conditions which exist in the liver-fluke, where there are at least three generations. See Geddes and Thompson's *Evolution of Sex* (1901).

Alternator, a machine by which an alternating electrical current is produced. It is essentially a form of dynamo. See DYNAMO.

Althæa, a genus of the Malvaceæ, including the marsh mallow and hollyhock.

Althing, the Icelandic house of parliament, was originally founded at Thingvellir in A.D. 928, on the lines of the previously-existing Norse *Thing*. In its modern form it was constituted in 1874, and consists of thirty-six members, thirty of whom are elected by popular vote, and six are nominated by the king. It meets at Reykjavik, and sits every second year only. For a detailed account of the constitution and functions of the ancient Althing, see Sir George Dasent's introduction to the *Story of Burnt Njal* (1861).

Althorn, or TENOR SAXHORN, a valve bugle in E♭ or F, used in military bands, often instead of the French horn.

Althorp, LORD. See SPENCER.

Altitude, a term applied astronomically to the angular distance of a celestial object from the horizon, measured on a vertical circle, which is a circle at right angles to the horizon, and passing through the zenith or pole of the horizon. AZIMUTH is the distance, measured along the horizon, from the S. point to the intersection with the horizon of the vertical circle passing through the object. By its altitude and azimuth the momentary position of an object on the celestial concave, with reference to the horizon, is fixed. Observations of altitude are made at sea with the sextant, and from them many problems essential to navigation can be worked out, such as finding the latitude and rating the chronometers.

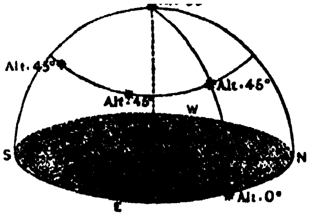
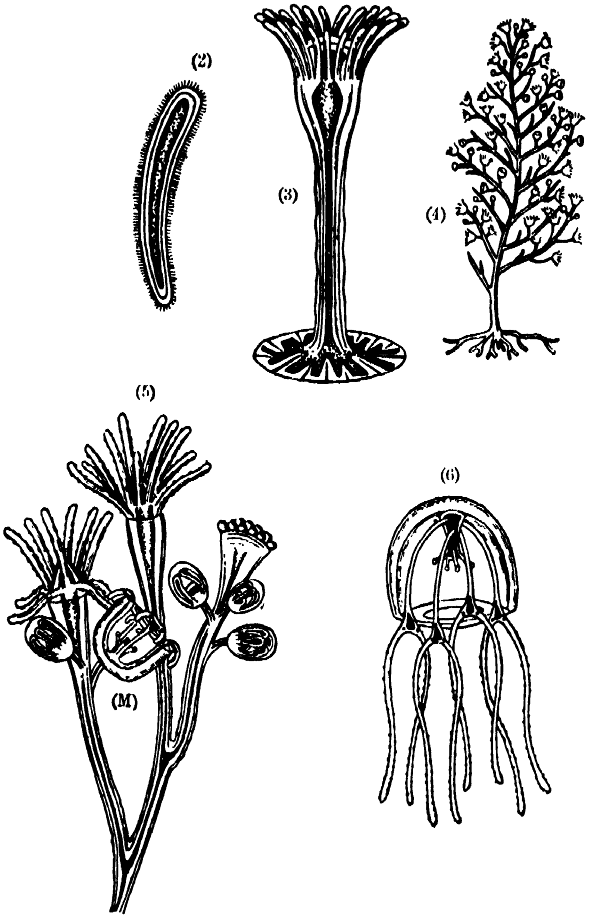


Diagram showing Altitudes 0°, 45°, and 90°.



Alternation of Generations.

Diagram illustrating alternation of generations in the Cœlenterata. (1) Fertilized egg, from which arises the free-swimming larva or planula (2) This fixes itself, and grows into the young polype (3). This single polype buds, and gives rise to a sea fir colony (4) Three polypes of this colony are shown on a larger scale (5), two of which are giving rise, by budding, to members of the second or medusoid generation (M), seen in successive stages of growth. Later, these medusoids float away as independent organisms (6), and, becoming mature, produce eggs and sperms. (Figs. 2-6 after Allman.)

Altmühl, a riv. of Bavaria, rising on the W. border of the country; it has a length of 103 m., and enters the Danube between Ratisbon and Ingolstadt.

Alto, a musical term, strictly applicable to the male voice of the highest pitch, counter tenor, but also used to denote the lowest range of the female voice, contralto. In ordinary four-part music the alto part is an essential constituent with the soprano, tenor, and bass. Alto is also the Italian term for the tenor violin.

Alt-Ofen. See BUDAPEST.

Alton, city, Madison co., Illinois, U.S.A., on the Mississippi, 21 m. above St. Louis. Pop. (1900) 14,210.

Alton (anc. *Auleton*), mrkt. tn. and par., Hampshire, England, at the source of the Wey, 17 m. N.E. of Winchester, on L. & S.W. Ry. It has an ancient church, with portraits of Henry VI., its founder, and of several bishops. Brewing is the chief industry, extensive hop-fields being in the neighbourhood. Pop. (1901) 5,479.

Alton, EDUARD JOSEF D' (1772-1840), anatomist, archæologist, and naturalist; born at Aquileia, near Trieste; was the author of *Die Naturgeschichte des Pferdes* (2 vols. 1810-17), and, in conjunction with Pander, of *Vergleichende Osteologie* (1821-8). His son, EDUARD D'ALTON (1803-54), was for many years (from 1834) professor of anatomy at Halle. He was the author of *Handbuch der vergleichenden Anatomie des Menschen* (1850), and other works.

Altona, tn., Prussian prov. of Schleswig-Holstein, stands above the r. bk. of the Elbe, immediately w. of Hamburg, with which it forms commercially, though not municipally, one community. It has extensive docks, and is the seat of various industries—shipbuilding, brewing, iron foundries, flour-mills, cotton, woollen, glass, and soap factories. The imports amount to £3,500,000 and the exports to £1,700,000 annually. In 1901 a free harbour was opened. In the 16th century Altona was a mere fishing hamlet; but since 1835, when its pop. was 26,393, it has grown very rapidly. Pop. (1870) 74,131; (1900) 161,501. Ottensen, immediately to the w. (pop. 18,635 in 1885), was incorporated with Altona in 1889.

Altoona, city, Blair co., Pennsylvania, U.S.A., situated at the foot of the Alleghany Mts.; is about 120 m. from Pittsburg, and manufactures cars and locomotives. Pop. (1900) 38,973.

Alto-relievo (sometimes spelt, as in Italian, *alto-rilievo*), high-relief, a term applied to sculptured forms which stand out by at least half their true proportionate thickness from the background from which they project or are relieved. Of this style of sculpture the metopes of the Parthenon and the Pergamon frieze in the Berlin Museum may be taken as typical examples. See SCULPTURE.

Altötting, tn., Bavaria, Germany, near the Inn, 60 m. by rail N.E. of Munich; possesses an image of the Virgin which attracts numerous pilgrims. From 1838 to 1873 it was the headquarters of the Redemptorist Fathers. There are iron works. Pop. (1900) 4,344.

Altranstädt, vil., prov. Saxony, Prussia, near Lützen; here was concluded the treaty between Charles XII. of Sweden and Augustus II., king of Poland and elector of Saxony (Sept. 24, 1706). Pop. (1900) 700.

Altrincham, mrkt. tn. and par. in Cheshire, on railway from Manchester to Chester, and on the Watling Street. The Bridgewater Canal affords communication with the Manchester Ship Canal. Cabinetmaking is a local industry, and market-gardening is extensively carried on in the district. Pop. (1901) 16,831.

Altruism, a term brought into use by Comte (*altruisme*), and introduced into English by his positivist followers, denotes (1) the other-regarding or social, as opposed to the egoistic, instinct or impulse in human nature; (2) this instinct or impulse raised to the rank of a conscious principle, the ethical principle which makes the good of others the paramount end of human action. It is evident that altruism cannot be an exclusive principle in ethics, since the individual, if he knows what is good for others, can hardly be ignorant of his own good, and it would be paradoxical to maintain that he can never promote his own good directly. Herbert Spencer (*Data of Ethics*, ch. 11-14) discusses the antagonism of egoism and altruism, and their ultimate 'conciliation' in the course of social evolution. But it is necessary to observe that he applies the term 'altruistic,' not merely to actions prompted by conscious regard for others, but to all other-benefiting actions, whether motived by regard for others or not. And this ambiguity is important from an ethical point of view, since actions which benefit others may be performed from merely prudential motives. So that no direct inference can be drawn from the necessity of altruistic actions, in the wider biological sense, to the authority of altruism as an ethical principle. See ETHICS.

Altstätten, tn., canton St. Gall, Switzerland, station on the Rorschach-Chur Ry., at an alt. of 1,700 ft., with sulphur springs. Pop. (1900) 8,743.

Altwasser, vil., Prussian prov. Silesia, 43 m. by rail s.w. of Breslau; has coal mines and important manufactures of porcelain, machinery, and mirrors. Pop. (1880) 8,087; (1900) 12,141.

Alt-Zabrze, vil., Prussian prov. Silesia, 5 m. by rail E. of Gleiwitz; the seat of iron works, iron foundries, engineering works, and coal mines. Pop. (1885) 9,390; (1900) 19,562.

Aludel Furnace, a cylindrical furnace used in the reduction of mercurial ores. The vapour given off is condensed in tubes or vessels of glass or earthenware, called aludels.

Alum is the double sulphate of aluminium and potassium, which crystallizes with water, and has the formula $Al_2(SO_4)_3K_2SO_4 24H_2O$. The term is also used generically for salts of similar composition, in which the potassium may be replaced by other alkali metals, ammonium, etc., and the aluminium by chromium, ferric iron, or manganese. Common alum is prepared by roasting alum shales, by which aluminium sulphate is formed, and, after extraction by lixiviation, is crystallized with a potassium or ammonium salt. Alum is a white solid, very soluble in hot water, but much less so in cold, from which it crystallizes in octahedra. It has a sweetish, astringent taste and acid reaction, and is mainly used as a mordant in dyeing and in the manufacture of paper and leather. It is employed in medicine chiefly on account of its astringent properties, serving as a hæmostatic, and in dilute solution as a mouth wash or gargle. It is sometimes used as an emetic.

Aluminium (Al, 27·1), though not found free, is one of the most abundant elements in nature. It occurs as silicate in clays, felspar, etc.; but is chiefly extracted from bauxite, an impure hydrated oxide; corundum, the oxide Al_2O_3; and cryolite, the double fluoride with sodium, Na_3AlF_6. It was originally prepared by displacement by sodium from its double chloride with sodium, but is now almost exclusively obtained by the electrolysis of a solution of the purified oxide in molten cryolite. The mixture is melted by the heat given out in the process, the aluminium being set free at an iron cathode immersed in molten aluminium, while the oxygen also obtained oxidizes the carbon anode at which it is liberated. This process has greatly increased the output, for while in 1890 the world's annual production was about 40 tons, in 1900 it had reached 5,000 to 6,000 tons. At the former date the price was 9s. 6d. per lb., while in 1904 it averaged 1s. 4d. Aluminium is a white but somewhat soft metal: takes a fine polish: without odour or taste; highly malleable at 100° to 150° C.; highly sonorous; a fair conductor of electricity; has a high specific heat and a low specific gravity (2·7). It does not oxidize in air, or combine with sulphur at ordinary temperatures, and is soluble in hydrochloric acid and solutions of caustic potash and soda. Its chief impurities are silicon and iron. The great want in working aluminium into articles has been a good solder and flux. It oxidizes so readily at a soldering temperature, and the oxide formed is so insoluble in ordinary fluxes, that the film of oxide prevents the pieces of metal from coming into contact, so that a good joint cannot be formed. Aluminium is also used for electric conductors, and has proved valuable for the preparation of alloys, and in rendering castings of iron, etc., sound. An application in another direction has been the utilization of the intense heat given out on its reaction with iron oxide for welding *in situ*, preparation of small steel castings, etc. The compounds of aluminium of greatest importance are its oxide and its sulphate. The oxide, alumina, Al_2O_3, occurs native as corundum, sapphire, and emery, and is an intensely hard solid. As prepared artificially, it is a white solid, which when hydrated is gelatinous. Aluminium oxide acts both as a basic oxide, giving rise to the aluminium salts, and as an acidic oxide, forming the somewhat indefinite aluminates. Aluminium sulphate is the chief of the aluminium salts, and is prepared both by itself and along with potassium or ammonium-sulphate as alum. Aluminium was discovered by Wöhler in 1827, and again in 1854 by St. Claire Deville, who received great encouragement and assistance in the manufacture of it near Paris from both Napoleon III. and the French Academy. The first really practical electrical method of extraction was patented by Messrs. Cowles in 1885 in England and the United States of America; but that was finally supplanted by the Héroult-Hall method. Owing to its lightness, toughness, and strength, aluminium is extensively used for boat-building, for torpedo boats, for engines, for instruments, balloon fittings, bicycles, cooking utensils, and in chemical works, but does not make a really satisfactory structural material, owing to its being somewhat lacking in tenacity and hardness. It is also used as a substitute for the stone in lithography. Aluminium conducters are employed in telegraphy and telephony. Large works for its manufacture have been erected beside the Niagara Falls, the Falls of Schaffhausen, and the Falls of Foyers in Inverness-shire. See Borchers' *Electric Smelting* (1897); Blount's *Electro-Chemistry* (1901); Richards's *Aluminium* (3rd ed. 1896).

Alumography. See ALGRAPHY.

Alum Root, a name applied to *Geranium maculatum* and *Heuchera americana* (a saxifrage), both found in the United States. An extract from the roots is used in America as a powerful astringent, to stop bleeding.

Alunogen, a fibrous aluminium sulphate found in volcanic débris, clays, feldspathic rocks which contain pyrites, and often as an inflorescence on walls of mines, caves, etc.

Aluta. See OLT

Alva, par. (5,458 ac.) and tn. in Clackmannanshire, Scotland, 6½ m. N.E. of Stirling. Plaids, serges, shawls, tartans, and other woollen fabrics are manufactured, and the neighbouring hills yield cobalt, copper, iron, and lead ores. Pop. (1901) 5,641.

Alva, or ALBA, FERDINAND ALVAREZ DE TOLEDO, DUKE OF (1508-82), Spanish statesman and soldier; first gained military distinction in the battle of Pavia (1525), and in campaigns under Charles V. in Hungary and N. Africa; became general (1534), commander-in-chief (1538), and received the dukedom for his services in the defence of the northern provinces of Spain. Alva led the Spanish forces in Italy against Pope Paul IV. (1555-6), but was recalled on the succession of Philip II. His most famous military exploits, in which his ferocity and his avarice made him the object of undying execration, are associated with his six years' attempt to subdue the insurgent Netherlands to the Spanish rule and the Roman faith. Leading a large force to the Low Countries in 1567, he established the 'Council of Tumults,' known also as the 'Bloody Council,' an arbitrary and cruel instrument of inquisition and rapine, by which many thousands were put to death, reduced to indigence, or expatriated; he was guilty of the execution of Count Egmont and Count Horn; and subjugated the whole country except the intrepid provinces of Holland and Zeeland. Their resistance, supported by the Gueux, or 'Beggars of the Sea,' was successful; Alva's fleet was destroyed, and in 1573 he relinquished the command. His last campaign (1580) was against Don Antonio, pretender to the throne of Portugal, whose forces he routed, and whose adherents he treated with the greatest cruelty, abandoning the country to his licentious soldiery. See Motley's *Dutch Republic*.

Alvarado, JUAN BAUTISTA, a Californian, who raised a revolt against Mexican authority in 1836, and routed the Mexicans in a single battle at San Buenaventura. He was president of California from 1836 until 1842, when he was deposed.

Alvarado, PEDRO DE (1485-1541), Spanish adventurer, and lieutenant of Cortes in the conquest of Mexico, was born at Badajoz. After an exploring expedition to Yucatan (1518), he left Havana with the conqueror. Entrusted with the command in Mexico, while Cortes went to meet Narvaez, Alvarado made the mistake of massacring many of the native nobility, and thus caused the terrible troubles which the Europeans had to endure. He fought with great intrepidity in the nocturnal evacuation of the city. Alvarado invaded Guatemala (1523) with a large force; founded Santiago de los Caballeros, now Guatemala Antigua (1524). Accused of defrauding the royal treasury, he was recalled and tried; on acquittal he returned to Guatemala as governor, and later took part in the conquest of Honduras. See CORTES; Prescott's *Conquest of Mexico*.

Alvares, FERNAM (1540-99), Portuguese poet, born at Goa in India; commanded two expeditions to the Coromandel coast. His chief work is *Lusitania Transformada* (pub. 1607 and 1781), in the style of Camoens' *Lusiad*.

Alvarez, LUIS, Spanish painter (1841-1901), born and died in Madrid; first attracted notice by his picture of *Cæsar's Wife, Calpurnia*, which, as well as its successor, *Isabella the Catholic*, is now in the royal palace at Madrid. In addition to these he painted (1863-73) the large historical canvases of *Philip II. in the Escorial*, *The Cardinal in San Giovanni*, and *The Embarkation of King Amadeus at Spezia*. Subsequently he devoted himself to genre painting—his productions in this line (*e.g. A Funeral*, *The Marriage of Pauline Borghese*, *The Charity Bazaar*, *The Heir's Picture*, etc.) being distinguished for dramatic force, richness of colouring, and accuracy of costume.

Alvarez de Cienfuegos Nicasio (1764-1809), dramatist and philological writer, born at Madrid. His most popular tragedies were *Zoraida*, *Condesa de Castilla*, and *Pitaco*, the latter of which secured for him election in the Spanish Academy. As a poet he was somewhat affected and extravagant.

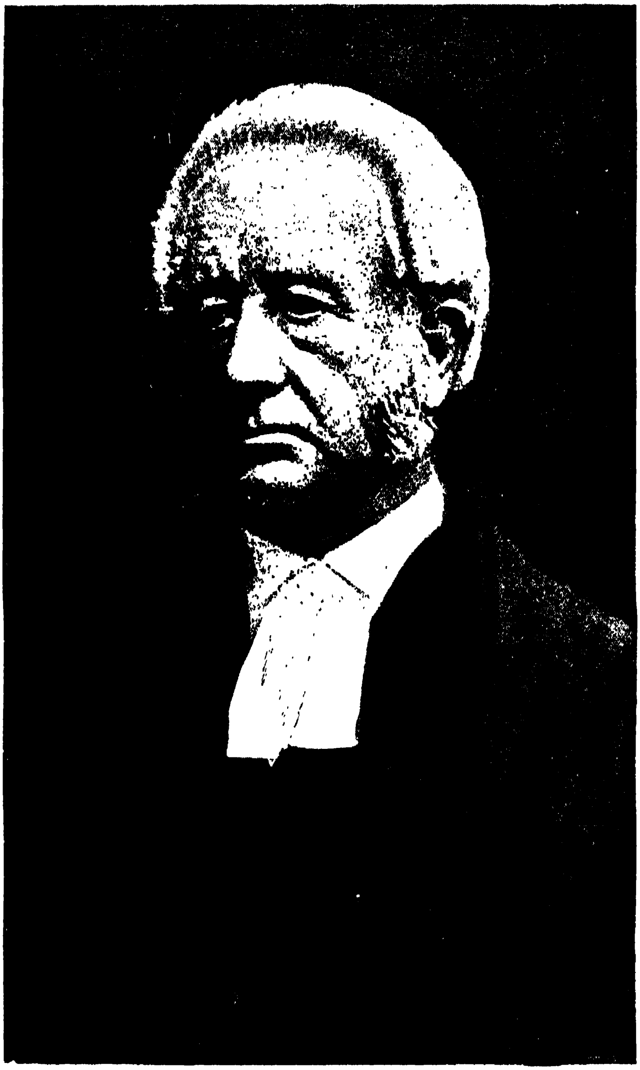
Alvensleben, KONSTANTIN VON (1809-92), Prussian general, served through the Danish war and the war with Austria, and in 1860 was appointed to a post at the war office. He commanded at Königgrätz, and afterwards, as commander of the 3rd Army Corps, played a distinguished part in the Franco-Prussian war, especially before Orleans and at Le Mans. He retired in 1873. One of the forts at Metz was named after him.

Alverstone, LORD (1842), formerly SIR RICHARD EVERARD WEBSTER, Lord Chief-Justice of England, and one of the most brilliant and successful lawyers of modern times, chiefly in commercial, railway, and patent cases, was born in 1842; called to the bar (Lincoln's Inn) in 1868; represented Launceston (1885) and the Isle of Wight (1885-1900) in the House of Commons; was Attorney-general three times under Lord Salisbury (June 1885-Jan. 1886, Aug. 1886-1892, June 1895-Aug. 1900); represented the British government in the arbitrations relating to the Bering Sea with Sir Charles Russell (1893), and Venezuela (1898-9); was for a few months Master of the Rolls (1900), and in 1903 presided over the tribunal which was constituted under a treaty between Great Britain and the United States to define the Canadian and American boundaries of Alaska. As Attorney-general he conducted what was practically the prosecution in the Parnell Commission (1888-9). He was created Lord Alverstone in 1900.

Alvin, LOUIS JOSEPH (1806-87), Belgian poet and librarian, born at Cambrai. His publications include the tragedy, *Sardanapale* (1834); the comedy, *Le Folliculaire Anonyme* (1835); *Souvenirs de ma Vie Littéraire* (1843); *Les Recon-*

templations, a satire on Victor Hugo (1856); *Le Commencement de la Gravure aux Pays-Bas* (1857-9); *André von Hasselt, sa Vie et ses Travaux* (1877).

Alvinczy, JOSEPH, BARON VON (1735-1810), Austrian field-marshal, distinguished himself in the Seven Years' war; fought against the Turks in 1789. In the wars between Austria and France, he defeated the French at Neerwinden, Landrécy, Charleroi, etc., in 1792, but was defeated at Hondschoote (Sept. 6, 1793). Was afterwards appointed commander-in-chief of the forces in Italy against Napoleon, but was defeated at Arcole (Nov. 15-17, 1796) and at Rivoli (Jan. 14, 1797), this last involving also the fall of Mantua. He was later appointed governor in Hungary, made field-marshal in 1808, and died in Budapest.



Lord Alverstone, Lord Chief-Justice of England.
(Photo by Elliot and Fry.)

Alwar, or ALWUR, native state in Rajputana, India; area, 3,144 sq. m.; pop. (1901) 828,487. Its cap. is Alwar, about 85 m. S.W. of Delhi; pop. (1901) 56,771.

Alxinger, JOHANN BAPTIST EDLER VON (1755-97), Austrian poet, was born in Vienna, and studied law there. He wrote the 'Rittergedichte' *Doolin von Mainz* (1787) and *Bliomberis* (1791), in imitation of Wieland; he was also intimate with Gleim, Ramler, Gessner, and Uz. His complete works were published in 10 vols. (1812).

Alyattes, King of Lydia (reg. [illegible] Smyrna, and thus provided his kingdom with a port. Before his death all Asia Minor west of the Halys was included in his kingdom. He was succeeded by his son Crœsus. His tomb, situated north of Sardis, near Lake Gygæa, was one of the wonders of antiquity.

Alypius, a Greek writer on music, who flourished at Alexandria in the middle of the 4th century A.D. His works, under the title *Introductio Musica*, were collected and published, with a commentary and notes, by Meibom (*Antiquæ Musicæ Auctores Septem*) in 1652, and again by Jans (*Musici Script. Græca*) in 1895, and contain the key to the scales and modes of Greek music.

Alyssum, a genus of cruciferous plants, mostly yellow-flowered, of Europe. *A. Cyssum saxatile* (rock madwort) is one of the most conspicuous hardy plants of British rock gardens in April and May.

Alyth, par. (23,296 ac.) and mrkt. tn., 5¼ m. N.E. of Blairgowrie, in E. Perthshire, Scotland; is a terminus of the C.R., and manufactures jute, linen, wool, and shoes. Here the Committee of Estates, including Leslie, Earl of Leven, and James Sharp of Magus Moor fame, were surprised and captured (1651). Pop. (1901) 3,025.

Alzey, tn., 26 m. by rail S.W. of Mainz, Germany, carries on brewing and tanning. The place is mentioned in the *Nibelungenlied*, was a free imperial city, and in 1689 was burned by the French. Pop. (1900) 6,893.

Alzog, JOHANN BAPTIST (1808-78), R.C. historian, born at Ohlau in Silesia; was professor of church history at Posen (1836), Hildesheim (1845), and Freiburg (1853). His chief works are *Lehrbuch der Universalgeschichte der Christlichen Kirche* (1840; 10th ed. by F. X. Kraus in 1882), which was translated into most European languages, and *Grundriss der Patrologie* (4th ed. 1886).

A.M., abbreviation of (1) *anno mundi*, 'in the year of the world;' (2) *ante meridiem*, 'before noon;' and (3) *artium magister*, 'master of arts.'

Amadeo, GIOVANNI ANTONIO (1447-1522), Italian sculptor and architect, born at Pavia. Helped in the decoration of the Certosa at Pavia, and executed some sculptures for the tomb of Gallas Visconti in the church of the same; but his principal works are statues in the chapel Colleoni at Bergamo, regarded as among the best specimens of Renaissance sculpture in Lombardy. He also took part in the construction of the cathedral at Milan, and died there.

Amadeus, the name borne by several princes of the house of Savoy, of whom the most notable are: AMADEUS V. (1249-1323), 'The Great,' Count of Savoy; succeeded his uncle, Philip (1285); engaged in continual warfare, and among his last actions forced the Turks to raise the siege of Rhodes. AMADEUS VIII. (1383-1451), succeeded his father, Amadeus VII. (1391). He was created (1416) Duke of Savoy, and his dominions were greatly increased; but he retired to a monastery at Ripaille (1419). He was elected Pope (1439) under the name of Felix V., but resigned in favour of Nicholas V. (1449).

Amadeus I. of Spain (1845-90), second son of Victor Emmanuel of Italy, was chosen king of Spain (1870), but in vain tried to act as constitutional king in a country unfitted for constitutional government. He abdicated in 1873, and retired to Italy as Duke of Aosta.

Amadeus, Lake, shallow depression filled with salt (probably over 200 m. long), just N. of 25° S., in S. and W. Australia; discovered (1872) by Ernest Giles.

Amadis of Gaul, the hero of a cycle of mediæval romances, similar to the Arthurian cycle in England and the Charlemagne cycle in France. Although the Amadis story was known in the 14th century, and the oldest existing version is in Portuguese, written by Vasco de Lobeira (d. 1403), its popularity was established by Garcia Ordonez de Montalvo (c. 1465; first printed 1508). The best English version is Southey's. The story—one of the leading characters of which is Galaor, brother of Amadis—had several continuators. Chief among these have been Montalvo's *Sergas del Esplandiano* (1485); *Los Grandes Hechos de Florisando*, by, probably, Paez de Ribera; *Coronica de Don Florisel de Niquea*, attributed to Feliciano de Silva; and so on down to the *Flores de Grèce* (1552). See Baret's *De l'Amadis de Gaule* (2nd ed. 1873); Pagès' *Amadis de Gaule* (1868); Braunfels's *Amadis von Gallien* (1876); Braga's *Formaçao do Amadis* (1878).

Amador de Los Rios, JOSÉ (1818-78), Spanish historian, born at Baena; became professor of literature at the Madrid University and member of the Academy. His principal works are *Historia Critica de la Literatura Española* (7 vols. 1861), and *Historia Social, Politica, y Religiosa de los Judios de España y Portugal* (3 vols. 1875). He also wrote historical works on Toledo, Seville, and Madrid.

Amadou, or GERMAN TINDER, a fungus, *Polyporus fomentarius*, growing on trees, is cut into slices and beaten into a felt; it has been used to plug wounds and stop bleeding. The felt steeped in saltpetre forms German tinder.

Amager, a flat, low, fruitful isl., off the E. coast of Zeeland, 10 m. long and 5 m. broad; most densely populated part of Denmark, and is the kitchen garden of Copenhagen. Pop. (exclusive of Christianshavn and the two Sundbys) 8,500.

Amakosa, or AMA-XOSA, an important branch of the Bantu nation, inhabiting the Transkei, Tembuland, and Pondoland; complexion, dark brown; hair, nose, and lips of negro type; good height and well-proportioned; in character intelligent and brave; weapons, assegai and club or knobkerry; religion, animistic.

Amaldar, the governor of a province under the Mohammedan rule in India.

Amalekites, a nomadic Arab people of great antiquity inhabiting the desert region south-west of Palestine. In Gen. 36 : 12 they are traced to Amalek, grandson of Esau; but there are evidences that they were in existence even before Abraham. The Amalekites opposed the Israelites' march from Egypt to Canaan; they harassed them after their settlement; and only after the victories of Saul and David over them did they sink into insignificance, to be finally exterminated in the reign of Hezekiah. Arabian annalists give many details regarding the tribe; outside the O.T. we have little reliable information concerning them. See Ewald's *Hist. of Israel*, i. 109 *f.*

Amalfi, tn. and archiepisc. see of Italy, prov. Salerno, on the N. shore of Gulf of Salerno, and 12 m. W. of Salerno, with which it is connected by a road hewn like a shelf out of the rock. The cathedral dates from the 11th century. First a Byzantine station, Amalfi developed into an independent republic, which was overcome by Roger of Sicily (1131). At this period it was a powerful rival of Pisa and Genoa, with 50,000 inhabitants, and the sea laws bearing its name (*Tabula Amalphitana*) were observed by nearly all the seafaring nations of the Mediterranean. In the 12th century the sea began to wash away the lower parts of the town, and in 1343 it was devastated by an inundation of the sea. Manufactures of macaroni and soap. Pop. (1901) 7,308.

Amalgam, an alloy of mercury. All metals except iron and platinum form amalgams—some, like sodium and potassium, combining with great energy; while others, like lead, bismuth, and tin, require the application of heat. When the mercury is in excess the amalgam is usually liquid, otherwise it is pasty or solid. Amalgamation is used in extracting gold and silver from the ore; for frictional electrical machines (1 part zinc, 1 tin, and 3 mercury, or 2 parts zinc and 5 mercury); and for 'silvering' metals and glass.

Amalia, ANNA, Duchess of Saxe-Weimar-Eisenach (1739-1807), daughter of the Archduke of Brunswick-Wolfenbüttel, married Duke Ernst August Constantine of Weimar (1756), after whose death (1758) she became regent for her son Karl August. She encouraged commerce and industry, but is specially remembered as a generous patron of art and letters; her court was frequented by the most distinguished writers of the day, including Herder, Goethe, Wieland, and Schiller.

Amalia, ELIZABETH, Landgravine of Hesse-Kassel (1602-51), daughter of Count Philip Louis II. of Hanau-Münzenberg, married William V., 'The Constant' (1619), of Hesse-Kassel, after whose death (1637) she was appointed regent. At the peace of Westphalia (1648) she received a large compensation, in lands and money, for the devastation caused by the Thirty Years' war. She was a princess of ability and rare moral qualities. See K. W. Justi's *Amalie Elisabeth Landgräfin von Hessen* (1872).

Amalthæa, the nurse of Zeus, most frequently represented as a goat, and from whom came the horn of plenty which had the power of becoming filled with whatever its possessor desired.

Aman, JEAN E., living French portrait painter, whose very individual art is refined, subtle, full of thought and charm. His aim is to reveal the soul, therefore he usually depicts his subject in repose and absorbed in thought, as in his portrait of the sculptor Dampt. He places his figures in a special atmosphere, in surroundings removed from everyday convention. He is essentially a decorative designer. Among his chief paintings are the portraits of Jules Case and of Paul Verlaine, and the *Jeune Fille au Paon*. In the Luxembourg there are two cartoons for tapestries—*La Beauté* and *Le Regret du Passé*. See the *Studio*, vol. viii. (1896), and Brownell's *French Art* (1902).

Amaranth (*Amarantus*), a genus of the order Amarantaceæ, chiefly tropical plants. Species are grown in British greenhouses under the names of 'prince's feathers,' 'cockscomb,' and 'love-lies-bleeding.'

Amarapura ('city of the gods'), a former capital of Upper Burma, on the E. bank of the Irawadi. The greater part of the city was destroyed by a fire in 1810 and an earthquake in 1839. A colossal bronze statue of Buddha is its chief feature. Pop. (1810) 170,000; (1900) about 7,000.

Amara-Sinha (probably flourished 1st century B.C., though later dates have been suggested), Buddhist grammarian, and compiler of *Amara-Kosha* ('Treasury of Amara'), a Sanskrit vocabulary.

Amari, Michele (1806-89), Italian historian, Orientalist, and statesman, was born in Palermo. In 1834 he published *Fondazione della Monarchia dei Normanni in Sicilia*, and in 1841 *Un Periodo delle Istorie Siciliane del Secolo XIII.*, a study of the Sicilian Vespers. The latter work having been suppressed on account of its politics, Amari brought it out in Paris under another title—*La Guerra del Vespro Siciliano* (8th ed. 1875, 2 vols.). After the Sicilian insurrection of 1848 Amari went to Paris, where he devoted himself to literary pursuits. In 1859 he returned to Italy to join Garibaldi. He was made senator (1861), and was minister of public instruction (1862-4). He was professor of Arabic at Pisa, and afterwards at Florence till his retirement in 1878. His other works are *La Sicile et les Bourbons* (1849), *Storia dei Musulmanni di Sicilia* (1853-73), *Altre Narrazioni del Vespro Siciliano* (1886), etc.

Amarna. See Tell-el-Amarna.

Amaru, Tupac. See Tupac.

Amaryllidaceæ, an order of lily-like plants, having most of the characters of the true lilies, except that the ovary in the former is below the origin of the flower leaves. Familiar species are the snowdrop, snowflake, daffodil, the Cape belladonna lily (*A. belladonna*), the Guernsey lily (*A. sarniensis*), and the American aloe (agave). The so-called roots are either underground stems (rhizomes) or bulbs.

Amasia, tn., vilayet of Sivas, 100 m. S.E. of Sinope, Asia Minor; trade in silk, wine, fruit, salt. Pop. about 30,000.

Amasis, or Aahmes, king of Egypt (570-526 B.C.), under whose reign Egypt prospered greatly, opened the country to commercial relations with Greece, married a Greek wife, and was visited by Solon, Thales, and Pythagoras. In legendary lore it was he who advised Polycrates to fling his ring into the sea.

Amateur, in sport, is the man who practises a sport or pastime for the mere pleasure of it, as opposed to the professional, who makes it a means of livelihood. From a lexicological standpoint, a sufficiently satisfactory definition is to be found in the first rule of the Amateur Athletic Association, which lays it down that 'an amateur is one who has never competed for a money prize or staked bet, or with or against a professional for any prize, or who has never taught, pursued, or assisted in the practice of athletic exercises as a means of obtaining a livelihood.' Other definitions preclude the amateur from any share in gate-money, or from competing in any match under a false name. Theoretically these restrictions are all that could be desired, but in practice nearly every form of sport has its own precise conception of what constitutes an amateur, and in most cases that conception is a rather elastic one. In a few instances, notably rowing, the amateur is such in the strictest sense of the word, not only as regards the nature of the contests into which he enters, but also by reason of the fact that he 'pays his own way.' In cricket, football, cycling, and other sports, on the contrary, there are many so-called amateurs who, if they do not make those sports a means of livelihood, may be said to derive some emolument from them under the head of 'expenses.' It is a matter of common knowledge that these 'expenses' are sometimes on a very liberal scale, and such as to leave a considerable margin over the bare outlay for food and lodging. The status of the amateur is constantly being discussed in the sporting press, and a lucid article is devoted to the subject in the *Encyclopædia of Sport* (1898).

Amati, a famous family of violin-makers, who all resided in Cremona. Andrea (*c.* 1530-1611), founder of the Cremona school of violin-making, built violins, tenors and basses, now very rare; the violins mostly small, of high model; the sound-holes Brescian in character; the tone small, but very sweet.—Nicola, brother of the above, with whom he is believed to have worked.—Antonio (1550-1635) and Girolamo (1556-1630), sons of Andrea, worked together for many years, and produced a large number of most beautiful instruments. Though signing their instruments conjointly, it was seldom that each did not make his own entirely. Antonio retained his father's Brescian type of sound-hole, but lowered the arching considerably; his workmanship is fine in every respect. Girolamo discarded the wide and pointed form of the Brescian sound-hole and substituted a much more graceful form, which was reproduced and improved by his son Nicola. The instruments of the brothers Amati have long been highly prized. The tone, though not seeming very powerful, carries remarkably well, and is rich, sweet, and flexible. Fine specimens by these makers at present command from £200 to £300.—Nicola (1596-1684), the great man of the family, son of Girolamo, followed his father's model until about 1625, when he designed a model—since known as the 'grand Amati'—which has never been excelled in grace and elegance of form, exquisite workmanship, and a sweet and responsive tone. Violins of his best period, in fine condition, realize from £300 to £500. Nicola Amati had many pupils, of whom Antonius Stradivarius was the most famous.—Girolamo (1649-1740), son of Nicola, and the last of the family. Instruments by this maker are rare, but the few known are said to be excellent. See Piccolelli's *Genealogia degli Amati* (1886).

Amatitlan, dep., Guatemala, Central America (area, 463 sq. m.), contains Lake Amatitlan, on which the cap., Amatitlan, 15 m. S.W. of the city of Guatemala, is situated. The chief industry is the production of cochineal. Pop. (1893) of dep. 35,387; of tn. 8,408.

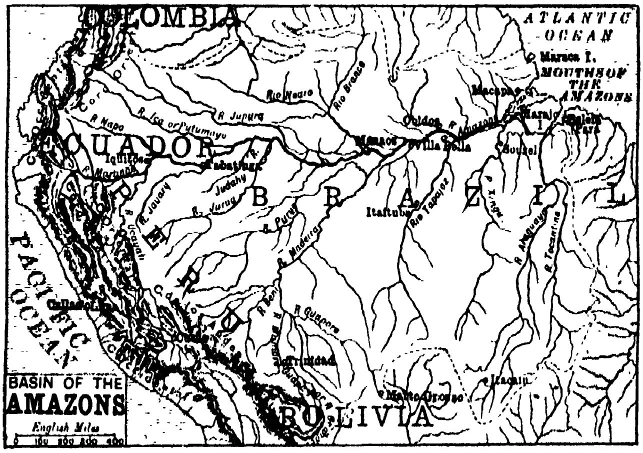
Amatongaland, or Tonga Land, an undulating strip of native territory on the E. coast of S. Africa, with an area of 5,300 sq. m. and a pop. of about 40,000. The Kosi R. forms the boundary between Zululand and Amatongaland. On the N. lies the Portuguese territory of Lourenço Marques, on the W. Swaziland. The Tongas are a branch of the great Bantu race, not so warlike as their neighbours, but good workers in the S. African labour market. Amatongaland is now an integral part of the colony of Natal.

Amaurosis (Gr. 'a darkening') is partial or total loss of vision. The term has now become nearly obsolete, and amblyopia is in common use.

Amazonas, a state of Brazil, occupying a large part of the basin of the Amazon R. The greater part of the state, particularly south of the river, is covered with forests (*selvas*) containing a variety of timber and other natural products, chief among which is india-rubber, extracted from the *Hevea*. Along the Rio Negro and Rio Branco are vast plains where cattle are fed. India-rubber, Brazil-nuts, salted fish, and turtle oil are exported. The immigration is very large, especially from Ceara. Cap. Manaos. Area, 732,250 sq. m. Pop. (1900) 207,600.

Amazons, the largest river in the world, its basin, including that of the Tocantins, covering 2,700,000 sq. m., or two-fifths of the S. American continent. While flowing on an average three miles an hour, it discharges into the Atlantic 2,452,000 cub. ft. of water per second, besides an immense quantity of solid matter. After emerging from the Andes its fall is slight—only about 1 ft. in 8 m. from the Brazilian frontier to the sea, a distance of about 2,000 m.: it forms innumerable lakes, *paranamirins* (branches re-entering the main stream), and *furos* (channels joining two streams), and during high water, when the level rises 26 to 60 ft., floods large areas of the adjacent country. The islands formed by the silt carried down by the Amazons are very numerous, especially near the mouth (which has a breadth of 200 m.), where the largest is the Marajo, 2,060 sq. m., in which are many lakes. Another island, Tupinambararas, formed by the Amazons, Madeira, and *furos*, has an area of 950 sq. m. The Solimoes (*i.e.* the part of the river between Tabatinga and Manaos) has a breadth of 2½ to 4 m., and at Macapa the river expands to 25 m. In spite, however, of its width and slight fall, the current is 1½ m. an hour, and sometimes as much as 4 m. in the Lower Amazons; and the fresh water of the river is perceptible 180 m. out into the Atlantic. The tide affects the river 400 m. up stream, and near spring-tides forms a formidable bore (*pororoca*) rising near Maraca I. from 5 to 12 feet. The water of the Amazons swarms with fish of a great many species, the most remarkable being the *pirarucu* (*Sudis gigas*), which attains a length of 7 ft. Turtles of several kinds are abundant, and the manatee is frequently caught.

The Alto Marañon, which is generally regarded as the upper course of the Amazons, rises in the Andes of Peru, in lat. 10° 30′ s., and long. 76° 30′ w., issuing from the Lauricocha lake at an altitude of 11,980 ft. Obstructed here and there by rapids in its upper course, it becomes navigable below the Pongo de Manseriche, only 250 m. from the Pacific coast, at Payta, and thence to the sea affords a clear water-way of 2,700 m. It is soon joined by the Huallaga and Ucayali on the r. bk., and the Napo, entering on the l. bk. below the town of Iquitos. From this point the lengths navigable by steamers at all seasons are: on the Huallaga, 500 m. (to Yurimaguas); on the Ucayali, 770 m.; on the Napo, 350 m.; and on the Marañon, to Barja, 450 m. From Tabatinga (on the Brazilian frontier) to Manaos the river is known as the Solimoes, and here receives the tributaries Javary, Judahy, Jurua, and Purus on the r. bk., and the Iça or Putumayo and Japura on the l. bk., all navigable for considerable distances. At Manaos the Rio Negro (which is connected by the Casiquiare with the Orinoco, and has a large navigable tributary, the Rio Branco) enters on the l. bk.; and 100 m. farther down is the confluence with the Madeira, the greatest of all the tributaries. From the source of the Guapay, near Cochabamba, at a height of 13,000 ft., the Mamore, as it is called, traverses Bolivia, and receives the Guapore from Matto Grosso, and the Beni, swollen by the waters of the Madre de Dios, after which it takes the name of Madeira, and enters the Amazons after a course of more than 3,000 m. Above and below the mouth of the Beni the bed is obstructed by rapids for 230 m., and a concession for a railway past these obstacles has been granted. From Manaos steamers ply regularly up the Solimoes to Iquitos, 1,150 m.; up the Jurua to Marary, 1,090 m.; along the Purus to Anajaz, 1,400 m., with change of steamers at Hyutanaham; on the Madeira to Santo Antonio, 700 m.; and on the Negro to Santa Izabel, 420 m. Steamers direct from Liverpool and other European ports ascend to Manaos, more than 1,000 m. from Belem (Para), and some to Iquitos. Of the lower tributaries, the Tapajoz (1,100 m.) and Xingu are navigable only for short distances—the former to Itaituba, 200 m., and the latter to Souzel. Indeed, the Xingu has been visited by only three or four explorers. The Araguaya (1,700 m. long) is navigable in its upper course from Itacaiu to the rapids of Santa Maria, a distance of 740 m. Thence to Praia Grande only light-draught vessels can pass with great difficulty and danger. In the section of rapids it is joined by the Tocantins, which, though smaller, gives its name to the united stream. The Tocantins is navigable below Porto Nacional. Smaller affluents besides those mentioned, and many of the secondary tributaries, are utilized by boats and by steamers at high water. The water-ways of the whole system are estimated at more than 31,000 m. See BRAZIL; also Agassiz', *A Journey in Brazil* (1868); Bates's, *A Naturalist on the River Amazon* (1892); Wallace's, *Travels on the Amazon and Rio Negro;* Marajo's, *As Regiões Amazonicas* (1895); Schütz Holzhausen's *Der Amazonas* (1895); and for the whole subject, *Archiv für Anthropologie*, vol. v. (1872), pp. 220-225.



Amazons, according to Greek legend a warlike race of women, who lived in the neighbourhood of the Caucasus, and invaded Asia Minor, Thrace, Greece, Egypt, and other countries. They were governed by a queen, and once every year met a neighbouring race of men, the Gargareans, to propagate their race; they retained only female children, the males being killed, or handed over to the Gargareans. They are said to have cut off their right breasts to give them freedom in using weapons, especially the bow; hence their name, from Greek *mazos*, 'breast.' Probably the legend is a reminiscence of the conquests of the Hittites, who descended from the Caucasian direction and overran all Asia Minor, founding Ephesus and other cities, and whose great nature-goddess, the Artemis or Diana of the Ephesians, was attended by multitudes of armed priestesses. In ancient art the Amazons are represented in the Hittite tunic, and wielding the Hittite double-headed axe. See Corey's *De Amazonum Antiquissimis Figuris* (1891); Sayce's *Hittites* (1889); Stricker's *Die Amazonen* (1868). There are tales of Amazons also in S. America, whence the name of the great river (see above); and women were until recently armed and drilled in Dahomey, W. Africa. See *Archiv für Anthropologie*, vol. v. (1872), p. 220 *ff.*

Ambaca, chief vil. of the *Concelho* of Loanda, in Angola, and centre of a coffee-growing district. It is connected by a narrow-gauge railway, 220 m. long, with Loanda. The railway is open to Lucalla, and is to be prolonged to Malanga, 90 m. Alt. 2,350 ft.

Ambala. See UMBALLA.

Ambassadors. The status and sanctity of ambassadors have been recognized among all civilized nations. The representatives of countries at foreign courts are divided into three classes—ambassadors, ministers or envoys extraordinary, and *chargés d'affaires*. Their functions are regulated by the terms of their commission, but they are seldom granted general powers to treat on all subjects, and for the negotiation of treaties and the like British ambassadors often receive special commissions under the Great Seal. As representatives of sovereign states, ambassadors take precedence after the blood-royal, while ministers rank after dukes. A state is entitled to object to an ambassador accredited to it. An ambassador must not plot against, or take part in the politics of, the country to which he is accredited. His house should not shelter political refugees, except perhaps in certain American states where revolution is endemic. He is not subject to the civil or criminal laws of the foreign state. This doctrine is put in an exaggerated form when it is said that an ambassador's house is extra-territorial. Ambassadors are entitled to audience of the sovereign, but in Britain only in presence of a minister of the crown. Britain sends out eight ambassadors—to Paris, Berlin, St. Petersburg, Rome, Vienna, Constantinople, Washington, and Madrid. The recall or dismissal of an ambassador is often the signal for an outbreak of war. British ambassadors and their attendants are protected from legal process by an act of 1709; but this right, which if pressed might become absurd, is sometimes waived. They do not lose their domicile by foreign residence. The Pope's ambassador is a 'nuncio.' See EXTERRITORIALITY.

Amber, a fossil resin, arises from the exudation of coniferous trees, as is shown by its composition and physical properties, by its occurring in drops and globular masses which resemble the resin seen exuding from the bark of pine trees, and by its common association with fossil wood. Amber is of a clear brownish-yellow colour, varying in shade, and is often clouded with irregular streaks. It is usually transparent, brittle, with a hardness of only 2 to 2½, and a low sp. gr. (1 to 1·1). It burns readily, giving off dense fumes. When rubbed it is negatively electrified, and from this property, which was well known to the ancients, the word 'electricity' has been derived (Gr. *elektron*, 'amber'). It is used chiefly in the manufacture of mouth-pieces for pipes and cigar-holders, beads, necklaces, etc. It is soluble in alcohol, and forms the basis of certain varnishes. When distilled it yields succinic acid and a fine lamp-black. Amber ornaments which have been worn for a considerable time gradually assume a rich, dark, ruddy colour, which is much prized. Much of the amber of commerce is artificial, being made from copal, camphor, and turpentine, or is prepared from chips of natural amber fused under pressure. Amber is found in small quantities in Catania, Galicia, and other parts of the world; but the principal source has always been the shores of the Baltic, between the Frisches Haff and the Kurisches Haff in E. Prussia, also on the shores of Pomerania, W. Prussia, Schleswig-Holstein, and Denmark. It occurs in certain dark sands and clays, from which it is washed out by the action of the sea. Natural amber usually contains flaws and impurities. Fragments of bark, leaves, ants, flies, etc., which adhered to the sticky surface and were enveloped by the exudation, are the most frequent enclosures; these are the subject of a monograph—Conwentz's *Monographie der Baltischen Bernsteinbäume* (1890). Amber beads have been found in the royal tombs of Mycenæ in Greece, in Scandinavian relics of the Stone Age, in the ancient pile dwellings of Switzerland, and in Etruscan ruins. Amber was well known to the Romans, and is described by Pliny. Between 1837 and 1899 it was partly mined, partly gathered after storms by private monopolists; but in the last-mentioned year the mines were bought by the Prussian government. See Tesdorpf, *Gewinnung ... des Bernsteins* (1887); Landsberg, 'Geschichte des Bernsteins,' in *Preuss. Jahrbücher* (1899); and Dana's *Mineralogy*.

Amberg, tn., Bavaria, 35 m. E. of Nuremberg, still surrounded with walls and moats; has iron mines and iron works, and manufactures of earthenware and firearms (state factory). Pop. (1900) 22,039.

Ambergris, a gray fatty substance with ruddy marble-like veins running through it, found floating in the sea or thrown up on shore. It has a pleasant odour, and is used in perfumery. It is derived from the intestine of the spermaceti whale, and is probably a biliary secretion.

Ambianum, the Latin form of Amiens; used in bibliography.

Ambidexterity. See RIGHT-HANDEDNESS.

Ambleside, mrkt. tn., Westmorland, England, 13 m. by rail N.W. of Kendal, and is beautifully situated near the N. end of Lake Windermere. Close by resided, at different times, Mrs. Hemans, Dr. Arnold, and Miss Martineau. Wordsworth's house at Rydal Mount is about 1 m. to the N.W. Pop. (1901) 2,536.

Amblyopia (Gr. 'dim-sightedness'), defective, weak, or blunted vision. Scientifically, the term is supposed to apply only to those cases which cannot be more strictly classified after ophthalmoscopic examination. It is therefore more seldom used as our knowledge extends. The probable causes of amblyopia may be arranged as follows: (1) toxic; (2) functional; (3) changes in the optic nerve; (4) cerebral changes; (5) defective development. The first includes *tobacco amblyopia*, which is very common; heavy smokers are often affected. The defect is at first limited to the central field of vision, and occurs in both eyes, there being often a blind spot for red and green. Sometimes a misty sensation is complained of. It sometimes leads to total blindness, unless tobacco is discontinued. In functional amblyopia there is transient loss of sight, complete or partial, which comes on suddenly and lasts from a few minutes to an hour; one form of this is hysterical. Amblyopia is most frequently seen with congenital squint; it usually occurs with long-sightedness.

Amblyopsis, the blind fish, 1 to 6 in. long, of the Mammoth Cave of Kentucky, U.S.A. The eyes are rudimentary and functionless, but not absent.

Amblypoda, a group of extinct mammals which flourished in the Eocene period; mostly of large size. Many were as large as an elephant, and in their general appearance they must have somewhat resembled the hippopotamus. Remains are found in the London clay, but it is from the Eocene beds of N. America that the most perfect specimens have been obtained.

Amblystoma, the name given to one form of the interesting amphibian known as the axolotl, before the relation of the two was understood. Now used as a generic name for the axolotl.

Ambo, in early Christian churches a reading-desk or pulpit from which the lessons were read or the sermon preached.

Amboise (anc. *Ambatia*), tn., France, dep. Indre-et-Loire, on the l. bk. of the Loire, 16 m. E. of Tours. Industries of cotton and machinery; wine trade. Pop. (1901) 4,538. It has an ancient castle, in which Charles VIII. was born and died, and Abd-el-Kader, the Algerian Arab chief, was imprisoned (1848-52). In the castle of Clos-Lucé, near Amboise, Leonardo da Vinci died (1519). The town is noted for the conspiracy of Amboise, formed by the Huguenots against Francis II. in 1560, and the treaty of Amboise (1563), between Catharine de' Medici and the Prince of Condé, by which the Protestants of France were granted the free exercise of their worship in the feudal dominions of the king, and received an indemnification for the losses they had suffered. Amboise acquired ill fame through its *oubliettes*, or subterranean cells, constructed for political prisoners by Louis XI. See L. Boileau's *Le Château d'Amboise et ses Environs* (1860).

Amboise, GEORGES D' (1460–1510), cardinal, and minister of Louis XII. of France; became bishop of Montauban (1474), prime minister (1498), and was made cardinal by Pope Alexander VI., after whose death he aimed at the popedom, and, failing to secure it, became strongly opposed to the Popes. See *Lives* by Montagnes (1631) and Legendre (1726), and Baudier's *Histoire de l'Administration du Cardinal d'Amboise* (1634).

Amboyna, or AMBOINA, an isl. in the Dutch E. Indies, one of the smallest, but one of the most important and, though hot, the most healthy of the Moluccas group. It consists of two peninsulas, connected by a narrow isthmus, and is a hilly island (4,020 ft.). Until 1873 the cultivation of cloves was jealously restricted to this island. The soil is abundantly fertile, and the island is clothed with vegetation. Including the adjacent Uliasser group, the area is 300 sq. m., and the pop. about 30,000. The town of Amboyna—pop. (1899) 7,978 has a good harbour, with a trade valued at about £85,000 annually; it is the principal fortified post of the Dutch in this part of the E. Indies. The residency of Amboyna—pop. (1899) 295,768—embraces the islands of Amboyna, Buru, Ceram, and the island groups of Aru, Banda, Kei, Tenimber, and the S.W. Islands. Their chief products are sago, rice, maize, sweet potatoes, timber, cloves and other spices, cocoanuts, cajeput oil, trepang, cocoa, and nutmegs.

Ambracia, anc. tn. of Greece, on the N. of the Ambracian Gulf (Gulf of Arta), in Epirus, colonized from Corinth about 630 B.C. Pyrrhus made it his capital; later it joined the Ætolian League, and was taken by the Romans in 189 B.C. After the battle of Actium, Augustus transferred its inhabitants to his newly-founded city, Nicopolis, near the modern Arta.

Ambree, MARY, who fought at the siege of Ghent (1584) to avenge her lover; referred to in Fletcher's *Scornful Lady*, and in a ballad included in Percy's *Reliques* (1765).

Ambriz, one of the chief harbours in the Portuguese colony of Angola, W. Africa, on a bay into which the Loje R. flows; near the mouth there is anchorage in 9 to 10 fathoms. Exports are principally coffee, india-rubber, and copal. Pop. 2,500.

Ambrose, ST. (c. 340–397), patron saint of Milan, and one of the most famous of the church fathers. He was born in Gaul, but went when young to Rome. Having devoted himself chiefly to the study of law, Ambrose was appointed prefect of Liguria and Æmilia, with Milan as his centre. On the death of the bishop (Auxentius) in 374, Ambrose, though a layman, was elected to the vacant see. In the theological conflicts that raged over the question of Christ's divinity, Ambrose took up a resolute position against Arianism. When the Emperor Valentinian and his mother Justina sought the use of two churches in the diocese of Milan for the Arians, the bishop stoutly resisted their requests (384), declaring that though ready to suffer death he would never betray the church of Christ. Six years later he administered a severe reproof to the Eastern emperor Theodosius for having permitted the massacre of 7,000 inhabitants of Thessalonica; and the emperor underwent eight months of penance. On the assassination of Valentinian and the usurpation of Eugenius in 392, Ambrose fled; but when Theodosius defeated the usurper he returned to Milan, and continued there till his death, in 397. The life of Ambrose, written by Paulinus and dedicated to Augustine, is incorporated with the best edition of his works the Benedictine (1686 and 1690). Though ambitious, Ambrose was amiable and generous. As a statesman he was vigorous and indomitable; as a theologian he was both a scholar and a philosopher, his knowledge of Greek making him a link between the East and the West. The hymnology of the church was enriched by him, and he is the author of the proverb, 'When in Rome do as Rome does.'

Ambrose, an Edinburgh tavern-keeper of the early years of the 19th century. His rooms were a favourite resort of the literary men of that day, notably of the *Blackwood* coterie, whose famous *Noctes Ambrosianæ* record their real and imaginary conversations during these symposia.

Ambrosia, in Greek mythology the food of the gods, which bestowed immortal youth and beauty upon all who partook of it. The Sanskrit *amrita*, the elixir of the gods, corresponds to ambrosia.

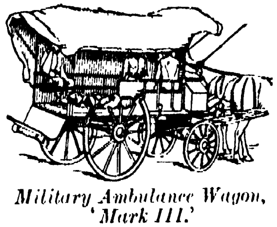
Ambrosian Chant, a generic name for the choral music of the Christian church in use antecedent to the 6th century. It was introduced into Italy from the East by St. Ambrose, but was superseded, except in Milan, by the Gregorian music of Pope Gregory the Great in the 6th century.

Ambrosian Library, a famous library in Milan, founded in 1602–9 by Carlo Borromeo, and named in honour of St. Ambrose, the patron saint of the city. It contains upwards of 8,000 manuscripts, many of them of very great value.

Ambrosius, AURELIANUS, the Welsh EMRYS (c. 440 A.D.), emperor of Britain, reputed to have driven the Saxon invaders under Hengist to the Isle of Thanet. Early legend calls him son of Constantine; Geoffrey of Monmouth makes him son of Arthur.

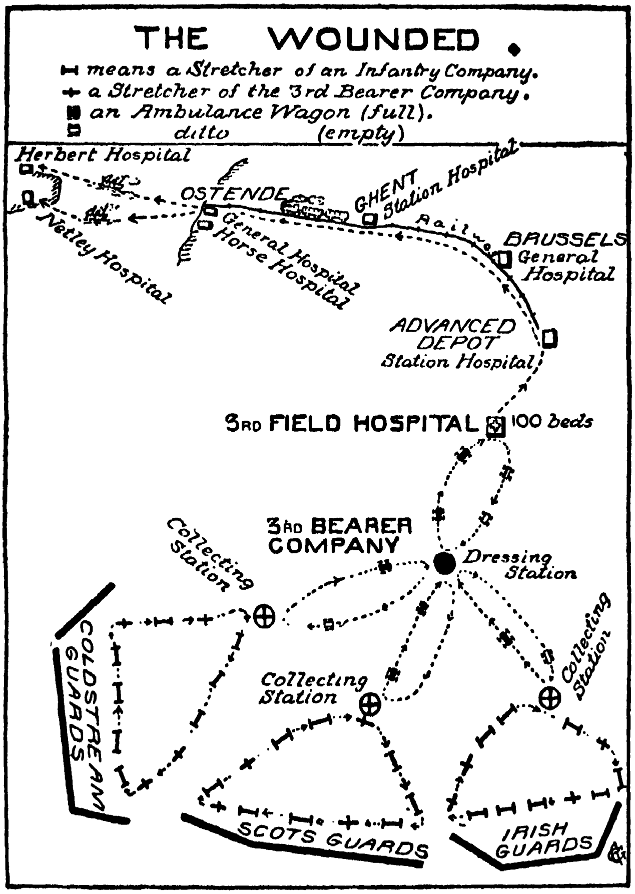
Ambrosius, JOHANNA, pen-name of JOHANNA VOIGT (1854), German peasant poetess, wife of a farmer at Gross-Wersmeninken. Her poems reflect the hardness and narrowness of life on the soil, but are noble and valorous in tone. A collection was published with introduction—*Johanna Ambrosius, eine deutsche Volksdichterin* (1894); trans. by Mary Safford (1896), and a second in 1897. See Franke's *Glimpses of Modern German Culture.*

Ambry, AUMBRY, or ALMERY (O. Fr. *almarie, armarie;* Low Lat. *armarium*, 'a place for implements'), in churches a niche or press in the wall near the altar for vestments and sacred utensils. (See Pugin's *Eccl. Ornament and Costume*, 1868). In domestic life, the word is applied to a chest for keeping plate and household utensils, or to a pantry or cupboard, and is still current in Scotland and the north of England.



Military Ambulance Wagon, 'Mark III.'

Ambulance, a wagon, litter, or other means of transport used for the conveyance of the sick and disabled. In a wider sense it means the work of the hospital establishments that follow an army in time of war, for the purpose of providing surgical aid to the wounded and medical assistance to the sick. The organization and general procedure are much the same in all armies. A soldier who is wounded or falls sick is not only useless as a fighting man, but is a serious encumbrance to the unit to which he belongs. In campaigns against uncivilized races, to whom the Geneva Convention and the courtesies of modern war are unknown, a disabled man must not only be medically treated, but also be protected from falling into the hands of the enemy. To every unit (battalion, regiment of cavalry, detachment, etc.) is attached a medical officer, who has at his disposal trained ambulance men in the proportion of two per company, and a mule, which carries in panniers some drugs and medical stores. The bearer company (allotted to each brigade) is composed of three surgeons and a number of stretcher-bearers, orderlies, cooks, batmen, etc., together with ambulances and wagons for the conveyance of provisions, tents, utensils, drugs, and water. When a soldier falls wounded in the fighting line, he is reached and attended to as quickly as possible by the medical officer attached to his regiment or corps. He is then carried to a collecting station, which is usually under shelter, and as near the fighting line as is consistent with safety. The sergeant in charge of it is provided with a supply of bandages and first dressings, as well as some restoratives for the most serious cases. From the collecting station the wounded are moved in ambulances, or by other means, to the dressing station, a mile or more from the scene of the engagement. Here are surgeons, with all the necessary surgical and medical equipment, who give what relief they can, and perform operations in cases that will not admit of delay. As a rule, buildings or shelters are utilized; but if these are not available, an operating tent is pitched. The arrangements so far come under the general head of the first line of assistance. As soon as the wounded are dressed they are transferred by road or rail to the nearest field hospital, a number of which constitute the second line of assistance. In buildings or tents are collected the medical stores and conveniences of an ordinary hospital; and the men, after treatment for a few days, are either discharged to duty or passed on to the base or intermediate hospitals, which constitute the third line of assistance. After treatment at a base hospital the patients either return to the front, or are sent home in hospital ships. The last stage is the disembarkation in Britain, and a transfer to a military hospital or convalescent home. The above arrangements must necessarily be varied to meet the ever-changing phases of warfare. In some cases, and invariably with mountain equipment of pack carriage and mule transport, the collecting and dressing stations will be combined. War ambulances are said to have been formed in the 15th century by Isabella of Castile, and were organized by the French in Italy in 1630.



Army Ambulance Work.

NOTE.—This diagram shows the hospital and ambulance arrangements of the Guards Brigade during an imaginary Waterloo campaign fought under modern conditions. (See *Modern Warfare*, by 'Ubique.') The base and intermediate hospitals are shown along the line of communication through Brussels, Ghent, and Ostend to the military hospitals in England.

Ambulance Classes. See FIRST AID.

Ambuscade, the disposition of troops who conceal themselves in a suitable locality with the object of lying in wait for an enemy and falling upon him unawares. The column of march of a force is generally protected from surprise by scouts or cavalry. In many cases, however, especially in guerilla and savage warfare, the difficult nature of a country or the paucity of troops available makes it impossible to obtain absolute security. A convoy of wagons or a long column of troops may be confined to a single track through country that it would be difficult to search effectively in a reasonable time. In such cases an ambuscade may be successfully laid, and, owing to the range of modern firearms, a well-planned attack may result in the destruction or capture of a hostile force. The formation of ambuscades by the Boers in the broken ground of the veldt was a prominent feature in the S. African campaign, as at Sannah's Post in March 1900.

Ameer. See EMIR.

Amelia (anc. *Ameria*), tn. and episc. see, prov. Perugia, Italy, 12 m. w. of Terni, with remains of ancient cyclopean walls. It has been a bishop's see since the 5th century. Important trade in raisins. Pop. (1901) 10,434.

Amelia, or PORT AMELIA, seapt. on Pemba Bay, E. Africa, recently constituted the new capital of Portuguese Nyasaland. It is the starting-point of the projected Pemba-Nyasa railway.

Amelia Island, in Nassau co., Florida, U.S.A.; 16 m. long.

Amelie-les-Bains, wat.-pl., France, dep. of Pyrénées-Orientales, 7 m. s.w. of Céret; has hot mineral springs, known since the time of the Romans; until 1840 called Bains d'Arles. It changed its name in honour of Queen Marie-Amélie. Pop. (1901) 1,340.

Amen, a Hebrew word signifying 'firmly' or 'surely,' from *aman*, 'to prop or support.' It is used in Scripture—(1) to indorse the assertion of another—*i.e.* 'so is it' (1 Kings 1:36); (2) to confirm one's own statement, either at the close (Rev. 1:7), or initially (the 'verily' of Jesus, often double—Mark 10:15, John 1:51); (3) as a confirmation of prayer (Rom. 11:36, Neh. 5:13); and (4) as a name of God or Christ (Isa. 65:16, Rev. 3:14). The use of the word, especially in the sense of (3) above, has become a characteristic of Christian worship, and it has also passed into the liturgical diction of Mohammedanism. See an article by Hogg in the *Jewish Quarterly Rev.*, Oct. 1896.

Amen. See AMMON.

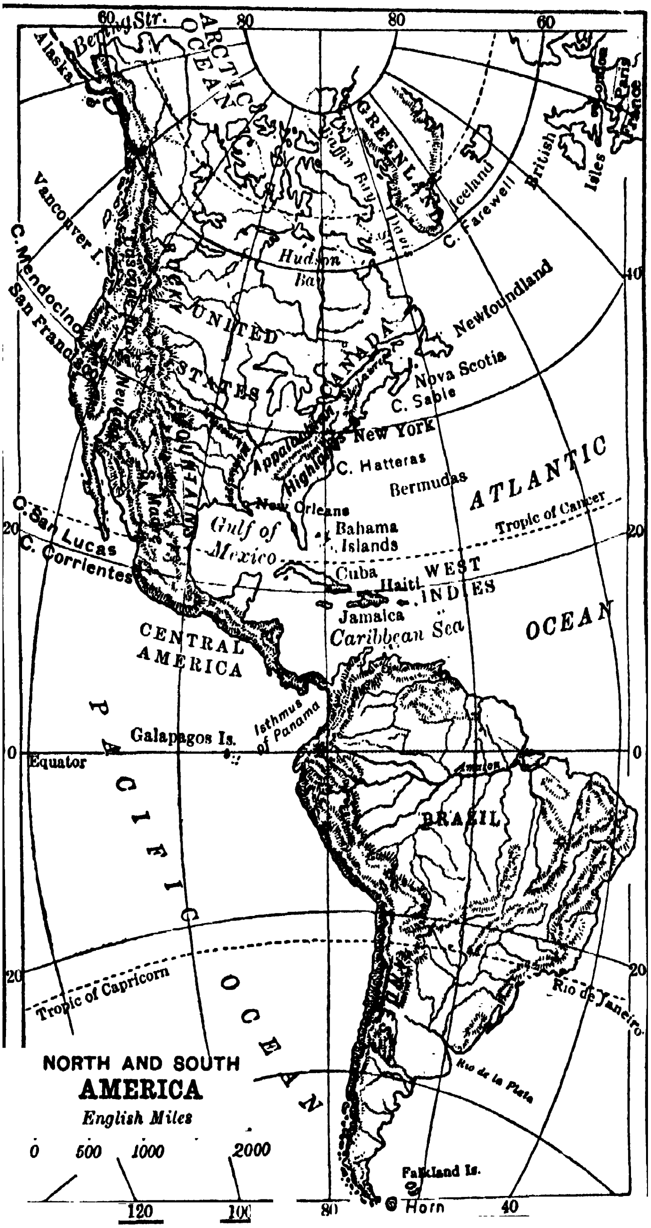
Amendment. See PARLIAMENTARY PROCEDURE.

Amenhotep, the name of four Pharaohs of Egypt of the 18th dynasty. (**1.**) Son of Amasis I., reigned for about ten years (*c.* 1570 B.C.). His mummy is in the Ghizeh museum. (**2.**) Son of Thothmes III., reigned twenty-five years, from about 1450 B.C. (**3.**) Son of Thothmes IV., reigned thirty-six years from about 1410 B.C., and is noted for his buildings. He erected the great temples at Thebes, of which only the ruins of the temple of Luxor, and the two colossi, one of which was known in classical times as 'the Vocal Memnon,' now remain. (**4.**) Son of the preceding, reigned eighteen years, from about 1375 B.C. He was the son of a foreign mother, and married a foreign princess, probably of Indian (Aryan) race. He endeavoured to introduce the worship of the sun, calling him *Aten*, not by the Egyptian word *Ra*.

Amentaceæ, or AMENTALOS, a collection of orders of dicotyledonous plants whose flowers, devoid of corolla, and often of calyx, are grouped into unisexual inflorescences, called amenta or catkins. Sometimes both kinds of inflorescence are on one plant, as in birch; sometimes on different plants, as in willow. Other examples are bog myrtle, poplar, alder, beech, oak, hazel, and hornbeam.

Amenthes, the lower world of the ancient Egyptians, to which souls descended after death to await the judgment of Osiris.

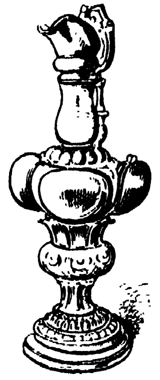
Amercement. In England, during the 13th century, if an offender was found guilty, the court declared that he was 'at the mercy' (*in misericordia*) of the king in a royal court, of the sheriff in a county court, or of the lord in a seignorial court. The offender gave security. At the end of the session his peers were sworn to 'affeer' or assess the amercement or fine payable. In theory the declaration of amercement forfeited all the offender's goods, but in practice amercements often did not exceed two or three pence. By Magna Charta and other enactments amercements were graduated according to the offender's rank. See Pollock and Maitland's *Eng. Law*, ii. 513-15 (1898).



NORTH AND SOUTH AMERICA

America, or the NEW WORLD, is the second largest island on the globe. It has an area of 15,000,000 sq. m. If all adjacent islands are added, the area of the New World is 16,700,000 sq. m.—half that of the Old World. The New World and Old World are separated by Bering Str., 35 m. wide. The mainland lies between 71° N. and 54° S. lat., and between 35° and 168° W. long. The meridian of 80° W. divides it approximately into a W. and N. and an E. and S. mass, which are connected by the narrow isthmus of Panama. These two masses of N. and S. America have several common characteristics. They are broad at the N. and taper to the S.; the W. part consists of a belt of lofty mountain chains enclosing extensive plateaus; the centre is a great lowland, continuous from N. to S., and drained by great rivers, the Mackenzie and the Orinoco, the Mississippi and the Plate Rivers; and the E. is a highland broken by the St. Lawrence in the N. and the Amazons in the S. The coast-lines, however, present a striking contrast. N. America, with its irregular coast-line and great peninsulas, may be compared with Europe and Asia; while S. America, with its regular, unbroken coast, is the counterpart of Africa. The two main masses are attached to each other by the long, narrow isthmus of Central America and the chain of W. India Islands, which extend between the Tropic of Cancer and 10° N. These are usually reckoned with N. America, notwithstanding that both their physical and biological conditions resemble rather those of S. America. See NORTH AMERICA and SOUTH AMERICA.

America Cup. This international yachting competition is of British origin, and arose out of a Royal Yacht Squadron contest, for which a prize, called the Queen's Cup, was offered, the course being round the Isle of Wight. The cup having been carried off by the U.S. schooner *America*, the winners conveyed it by deed of gift in 1857 to the New York Yacht Club, to be held by that club against all challengers as an international trophy. In 1870 and 1871 Britain challenged with the *Cambria* and *Livonia*, both of which were defeated. A similar fate befell Canadian challengers in 1875 and 1881, and further British challengers in 1885, 1887, 1893, and 1895. In the two last cases Lord Dunraven challenged with *Valkyrie II.* and *Valkyrie III.* respectively, attributing his second defeat largely to the crowded state of the course. In the deciding race, Lord Dunraven, not being able to come to terms with the committee as to the complete clearance of the course, merely crossed the line with *Valkyrie*, in order to give the American *Defender* a start, and withdrew from the contest. A heated controversy ensued, and no further challenge from Britain was forthcoming till 1898, when a challenge was sent over by Sir Thomas Lipton, and met with a particularly cordial response. The result was the building of the British *Shamrock* and the American *Columbia*—the former designed by Mr. W. Fife, jun., of the Clyde; the latter by Mr. A. G. Herreshoff, for the owners, Mr. J. Pierpont Morgan and Mr. C. Oliver Iselin. The contest took place in October 1899, outside Sandy Hook, a series of five races being arranged. Only three, however, became necessary—*Columbia* winning the first by 11 minutes; *Shamrock* losing her topmast, and *Columbia* finishing alone, in the second; and *Columbia* winning the third by 6 minutes 34 seconds. In 1900 Sir Thomas Lipton again challenged, and in 1901 a new boat, *Shamrock II.*, was designed for him by Mr. G. L. Watson, and built by Messrs. Denny of Dumbarton. In the races of that autumn *Columbia* won three races consecutively—the first by about 200 yds., and the second by somewhat more than a minute. Sir Thomas Lipton took *Shamrock III.* (designed by Messrs. Fife and Watson, and built by Messrs. Denny) across the Atlantic, to contest the cup with the American boat *Reliance* in the autumn of 1903. In this year, again, he failed to win a single race, though the Clyde boat showed wonderful qualities in the light and fluky airs characteristic of those waters at the season in which the races take place. Sir Thomas Lipton offered, before leaving New York, a cup for an ocean race from Sandy Hook to the Needles, without handicap or restriction of measurements or of sail area; but when he learned that the Emperor of Germany had proposed to found a prize for a similar contest, Sir Thomas courteously withdrew. In August 1904 Sir Thomas announced his intention of making a fourth attempt, and offered a commission to Mr. Watson (d. Nov. 1904), who refused it on the ground that he could not build a 'freak' boat which would safely carry 60 men across the Atlantic. See YACHT.



The America Cup.

American Aloe. See AGAVE.

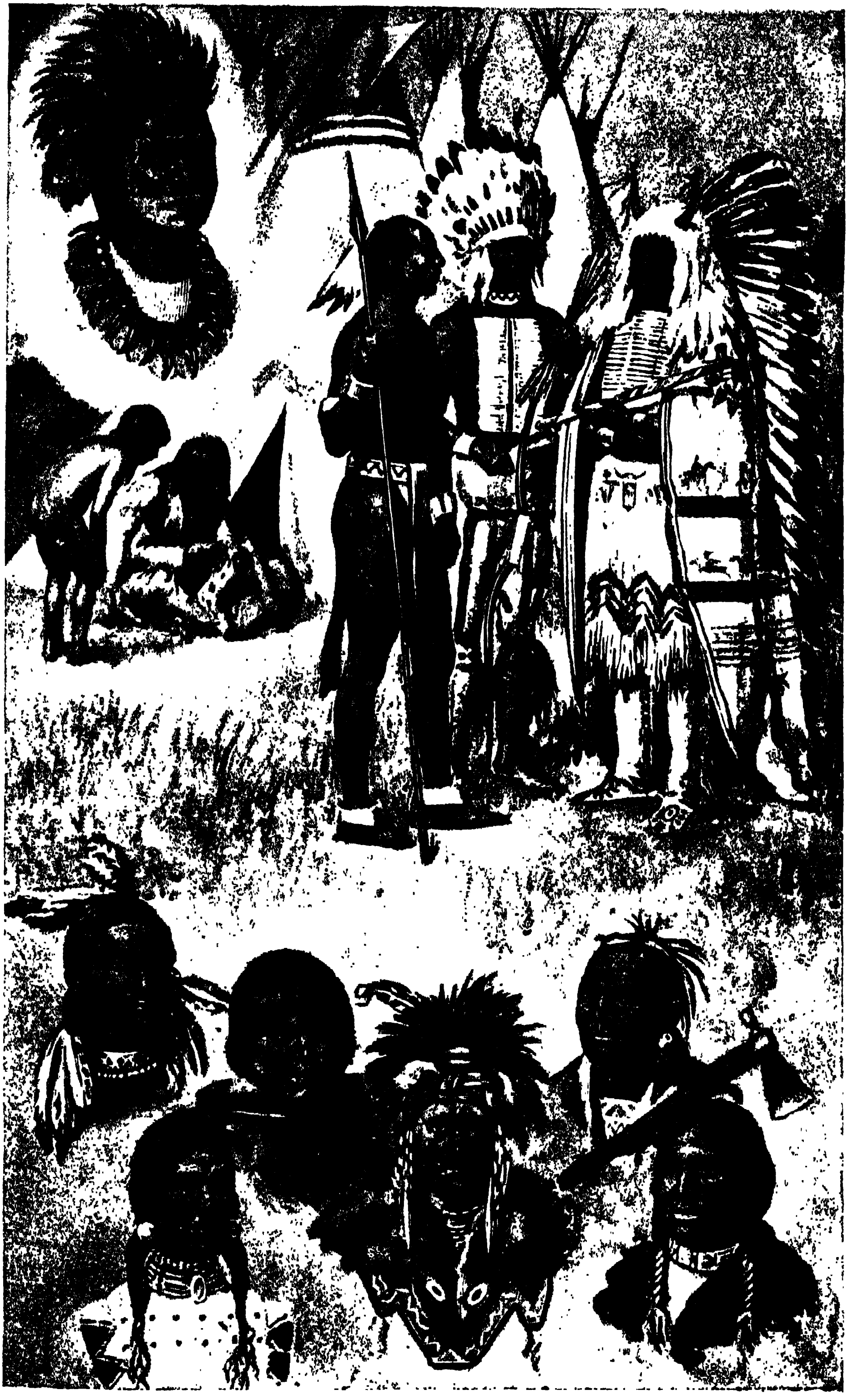
American Blight, a disease attacking apple and pear trees throughout the whole of N. America east of the Rocky Mts.; it has also been known in Great Britain for upwards of a century. It affects the bark, which falls off, and thus causes the death of the tree. The disease is due to a minute insect (*Eriosoma mali*), a kind of plant-louse, known as the 'woolly aphis,' from the white protective material, like cotton-wool, with which it covers itself. Eggs are laid in minute crevices of the bark by the oviparous females in autumn, thus spreading the pest. The bark splits open, canker begins, and the tree, if not killed, becomes of little value. No part of the tree is safe from attack. Washing, spraying, or painting with paraffin and soft soap or an insecticide two or three times in the spring and early summer, is one of the most effective remedies. This is best applied after the sun has gone down, in order not to injure the foliage. Spraying in winter with a solution of caustic soda and pearl ash is also recommended. Firs and larches are also subject to the blight.

American Cloth, or LEATHER CLOTH, is a textile fabric coated or enamelled to resemble leather. Unbleached calico is generally the foundation; this is coated with a mixture of boiled oil, dark pigments, and driers. Another common method of preparation is to coat the fabric with gelatin which has been rendered insoluble by chemical means.

American Colonization Society, founded for the purpose of establishing in Africa a colony of the free blacks of America. The first movement started in 1773, in Massachusetts and Connecticut. The Rev. Samuel Hopkins in 1787 made an attempt to establish a colony in Sierra Leone, but it was unsuccessful. In 1815 a company from New Bedford emigrated there; in December 1816 a constitution was adopted; and in January 1817 the American Colonization Society elected its first president. In 1820 thirty-eight emigrants established themselves at Liberia; and in 1824 a civil government was planned. Certain difficulties with the British government, however, led Liberia to declare her independence in 1847.

American Indians (*Amerinds*), the aborigines of the New World, so called from the original delusion of Columbus, who supposed that the land discovered by him was the India, and its inhabitants the Indians, of the eastern hemisphere. Hence these came later to be distinguished as East Indians, and the others as West or American Indians, for which the contracted form *Amerinds* has lately been proposed and adopted by some writers. The great divisions—Eskimos, Athapascans, Algonquians, Siouans, Aztecs, etc.—are treated elsewhere, and this notice must be confined to the natives in general.

1. *Origin.*—No ethnological



Types of American Indians.

1. Otoe Sioux. 2. Headdress of war leaders. 3. Chippewayan Athabascan. 4. Eskimo. 5. Thayendangyea, Chief of Six Nations, Mohawk Iroquois. 6. Flat Head. 7. Fox Algonquin. 8. Pueblo.

question has been more warmly discussed than that of the peopling of the New World. The polygenist view that its inhabitants were really *autochthonous* — *i.e.* sprung from the soil—must be dismissed as absolutely untenable. All, in fact, agree that they came from the Old World, and the differences of opinion turn after all merely on the questions of the *whence* and *when.* Africa is at once excluded, because between Negro and Amerind there is nothing in common. Asia, and more particularly the northeastern region separated from Alaska only by the sixty miles of Bering Strait, has always been, and continues to be, generally regarded as the most likely source. Indeed, it may be taken as established that a great part, perhaps the great bulk, of the natives did arrive by the Bering route. But all conditions are not met by any single hypothesis, and it will presently appear that Europe also must be included as an important factor of the problem. So far the *whence.* Many considerations require the *when* to be set back to remote postglacial, if not interglacial, Pleistocene (Quaternary) times, when Europe was still connected by almost continuous land through the Faroes and Iceland with Greenland and N. America. The question of Paleolithic man, in the strict sense of the term, is still undecided, though opinions are more and more converging in that direction. But nobody denies the presence of Neolithic man everywhere in the New World, and it has been shown (by Sir William Turner amongst others) that the Neolithic (New Stone) Age had a vast duration of some tens of thousands of years. This is sufficient for all purposes, and it will be seen that every condition of the problem is satisfied on the simple assumption that America was peopled, partly from Asia, partly from Europe, during the Stone Ages, and after that received no further contributions of any moment from the eastern hemisphere till Norse and Columbian days.

2. *Physical and Mental Characters.*—That the Amerinds are stamped by a certain bodily and mental *cachet,* which lends them a distinct ethnic unity, and enables them to be at once recognized as a separate division of mankind, is admitted by all the best observers. The terms of this unity are essentially four—the disproportionately large, massive head; the almost universal coarse, black, very long and lank hair of the horse-tail type, round in transverse section; the absolutely universal polysynthetic structure of their speech (see below); and their generally wary, impassive, reserved, taciturn, or almost sullen temperament. There are many local and even general differences noticeable, especially in the colour of the skin, varying from all shades of brown (Iroquois, Dakotas, Aztecs, Peruvians, Araucanians) to blackish in one direction (Charruas of Uruguay, Lower Californians), and yellowish or whitish in another (Guarani, Botocudos, Haidas of Queen Charlotte Is.); in the stature, ranging from the undersized Calchaquis, Peruvians, Fuegians (5 ft. or under) to the gigantic Brazilian Bororos and Patagonians (6 ft. to 6 ft. 4 in.); but above all in the shape of the skull, which shows all the transitions between that of the Greenland Eskimo, almost the longest, and that of the Argentine Calchaquis, absolutely the shortest yet recorded. From all this it follows that the ethnic unity is not primordial, but a growth, a gradual fusion during long isolation of two originally distinct elements—the short-headed, yellowish-brown Mongol from Asia, and the long-headed, presumably fair men of the Stone Ages from Europe. Hence it is that intelligent observers are often so greatly puzzled, and declare, with Mr. E. im Thurn, for instance, that it is impossible to classify the Amerinds except on a linguistic basis; or, with Dr. Paul Ehrenreich, that many differ no more from Europeans than from Asiatics. 'The constituent elements of our aborigines would therefore appear to be proto-Europeans of the First Stone Age, a somewhat generalized primitive Caucasic type; and proto-Asiatics, a somewhat generalized primitive Mongolo-American type—both Europeans and Asiatics still preserving many common features of the common Pleistocene precursors' (A. H. Keane, *Man Past and Present,* p. 353).

3. *Speech and Culture.*—In a general survey of the American aborigines, what perhaps most arrests attention is the unique character of their languages, which, despite their endless diversity, present only a single morphological type, and that type fundamentally different from all other known forms of speech. To the three orders recognized in the Old World—the Isolating, Agglutinating, and Inflecting—a fourth, the Polysynthetic, has to be added to make room for the American languages in any general linguistic scheme. No doubt some philologists, Hovelacque amongst others, have endeavoured to show that polysynthesis does not differ essentially from agglutination, and that the Amerind tongues belong substantially to the same order as, for instance, the Basque, the Finnic, the Turki, and some other highly agglutinating Eurasian tongues. But it is not so; and if these freely incorporate both direct and indirect *pronominal* object—as when we say even in Italian, *Datemelo,* 'give-to-me-it'—the American incorporate the *nominal* as well, and much more besides, saying, for instance, 'Give-it-to-me-the-stick-quickly,' all in one 'bunch-word,' often of prodigious length. And as the *pronominal* elements are limited and the *nominal* unlimited, it follows that the difference is one, not of degree only, but of kind. Furthermore, not a single example of nominal incorporation has ever been found in the eastern hemisphere, while nothing else can be found in the western from Alaska to Fuegia, all the Amerind tongues being cast in this extraordinary polysynthetic mould. As, for instance, the Tarascan of Mexico cannot say *hoponi,* 'to wash,' but only *hopocuni,* 'to-wash-the-hands,' *hopodini,* 'to-wash-the-ears,' etc., so the Ipurina of Amazonia says all in a breath, *Nicuçacalçaurumumatinii,* 'I draw-the-cord-tight-round-your-waist.' It is the same in Eskimo, Algonquin, Aztec, Peruvian, Araucanian (Chile); and if there are any apparent exceptions, as in the so-called 'monosyllabic' Otomi of Mexico, it is due to later disintegration and phonetic decay, as clearly shown by Charancey. It follows that the Pleistocene Amerinds can have brought nothing with them from the Old World except the elements, the first articulate germs, of speech, which in their new homes they developed on polysynthetic lines, and diffused throughout the continent from a single centre of dispersion. Thus are explained both the unity of American speech and its radical difference from Eurasian and Eurafrican speech.

It was the same with American culture, of which the germs alone—stone, wood, and bone implements, possibly the fire-drill, basketry, and the like—came from the eastern hemisphere during the Stone Ages, and were afterwards elaborated in the New World independently of all extraneous influences. This is, of course, a fiercely debated point, and there is an 'Asiatic school' which still denies to the Amerinds the light of reason, refuses them the right to invent anything, and brings all their belongings ready-made from the Old World. But its voice grows daily fainter, and has recently been all but stilled by such writers as Powell, Payne, Dellenbaugh, and others. The pyramid argument, for instance, is seen to be baseless when it is pointed out that the Egyptian pyramids were royal tombs terminating in a point, and made as inaccessible as possible; while the Central American and Mexican were all truncated with platforms for temples and sacrificial rites, and were approached by broad flights of steps; and further, that an interval of at least two millenniums lay between the Egyptian and the Mexican pyramid-building epochs. So also Humboldt's astronomic argument, the mainstay of the Asiatics, collapsed when it was shown that the Maya and Mexican calendar was locally evolved, and had next to nothing in common with the Chinese, the Indian, or any other Old World systems. It was based on a year of eighteen months of twenty days each with five epacts, hence was unlike anything in use out of America. On the other hand, the absence of such cultural accessories as wheat, rice, tea, silk, the ox, the horse, the pig, poultry, the lamp (except amongst the Eskimos), seaworthy ships propelled with sail and rudder, and needed in order to cross the Pacific and Atlantic Oceans, is inexplicable, and, in fact, never has been explained on the assumption of Eastern civilizations introduced bodily into the New World. Hence it may be confidently affirmed that all the native arts and industries, social, religious, and political institutions, may be traced on the spot from rude beginnings in Pleistocene times through all the transitions up to a certain standard of excellence. Dellenbaugh justly stigmatizes as 'ridiculous' the assumption that a fully specialized cultural people came over from Asia 'and passed down to Mexico and Yucatan, and even S. America, carrying with them their arts, but not exercising them on this interminable journey' (*The North Americans of Yesterday*, 1901). And elsewhere this great authority concludes that 'there is nothing in any of the remains that indicates foreign influence. Every architectural work on the continent is purely Amerindian, or modified by contact with other races subsequent to 1492.'

This indigenous culture was by no means of a homogeneous nature. On the contrary, it presented, perhaps, as many different aspects as did that of the Old World, ranging from the sheer savagery of the Fuegians and Amazonians, through the hunting and fishing stages of the Eskimos, Athapascans, and Missourians, and the agricultural condition of the Muskhogeans, Natchez, Mound-builders, Puebloans, and Cliff-dwellers, to the relatively civilized Aztecs, Mayas, Quiches, Chibchas, Quichuas (Peruvians), and Aymaras.

4. *Classification.*—Owing to the generally homogeneous nature of their physical and mental characters, no classification of the aborigines is possible except on a linguistic basis. The languages themselves are no doubt also homogeneous, in so far as they all belong to the same polysynthetic order of speech, and would therefore afford no ground for separate groupings but for the fact that they have often so widely diverged within the limits of that order as to be no longer reducible to a common origin. Such 'stock' languages, as they are called, are, however, very numerous, perhaps outnumbering those of all the rest of the world. Their distribution is also remarkable. In N. America the vast majority of these stocks are crowded together along the Pacific seaboard between Alaska and California, at some points, as about Puget Sound and the Lower Columbia, in indescribable confusion. Thus the rest of the continent east of the Rocky Mountains is occupied by very few stocks, and here the great families —*Athapascan*, *Algonquian*, *Siouan*, *Shoshonean*, *Muskhogean*, *Iroquoian*— range or have ranged over immense areas. But these, again, are divided into numerous branches, which often constitute separate 'nations,' and are of great historic importance, hence cannot be overlooked in any comprehensive grouping. In Central America (including Mexico) the stocks are more uniformly distributed, although here also two great families—the *Nahuan* and *Maya-Quichean*—occupy very wide domains. Lastly, in S. America the distribution again differs, inasmuch as most of the western seaboard from Ecuador to Chile is held by two large stocks — the *Quichua-Aymaran* and the *Araucan;* and the central and eastern parts (Amazonia with Brazil proper and the Guianas) by three—*Tupi-Guaranian*, *Cariban*, and *Arawakan*—around or intermingled with whom are a multiplicity of smaller groups whose claims to be regarded as true stocks cannot always be verified. In the extreme south there are at least four—the *Pampeans* (*Puelcheans*) of Argentina, the Patagonian *Tehuelcheans*, and the *Yahgans* and *Alacalufans* of Fuegia. It should be stated that Powell's convenient plan of distinguishing the N. American stocks from their branches by the final syllable *an* or *ian*, which has been extended by Léon to Mexico and Central America, is here adopted for the whole continent. Thus *Iroquoian*, the stock name, comprises the Iroquois proper, the Hurons, the Tuscaroras, and Cherokees as branches of the family. So the Shawnees, Delawares, Micmacs, Cheyennes, and many others, are all branches or members of the *Algonquian* family, and so on. Subjoined are all the stocks, as far as known, with the more important branches of the great families:—*North America.*—ESKIMAUAN: Alaska, Baffin, Labrador, Greenland, Yuit, Aleut sub-branch. ATHAPASCAN: Kutchin, Ahtena, Taculli, Chippewaya, Slave, Hupa, Apache, Navajo. ALGONQUIAN: Abnaki, Arapaho, Cheyenne, Cree, Delaware, Fox, Micmac, Mohegan, Ojibwa, Ottawa, Powhatan, Sac, Shawnee, Stockbridge. IROQUOIAN: Iroquois (Mohawk, Cayuga, Oneida, Onondaga, Seneca), Huron (Wyandot), Cherokee, Tuscarora. SIOUAN: Dakota, Assinaboin, Omaha, Ponca, Kansa, Osage, Quapaw, Iowa, Otoe, Missouri, Winnebago, Mandan, Hidatsa, Tutelo, Biloxi, Catawba. THLINKITAN, HAIDAN, TSIMSHIAN, CHINOOKAN, SHOSHONEAN: Snake, Bannock, Comanche, Utah, Hopi. CADDOAN: Pawnee, Arikara, Wichita. SALISHAN: Flathead, Atnah, Bellacoola, Chehalis, Spokan. CHIMAKUAN, KALAPOOIAN, KIOWAN, MARIPOSAN, PUEBLOAN: Zuñi, Tegua, Tao, Picuri, Tusaya. MUSKHOGEAN: Creek, Choktaw, Chickasaw, Alibamu, Seminole, Natchez. SHAHAPTIAN, WAKASHAN, YUMAN. *Mexico and Central America.*—PIMAN: Pima, Papago, Cahita, Yaki, Mayo, Opata, Tarahumara, Tepehua, Sinaloa. SERIAN, NAHUATLAN: Aztec, Huichol, Pipil, Zacateca, Acaje, Cora, Nayarit, Colotla. COAHUILTECAN, OTOMIAN, MATLALTZINCAN, ZOQUE-MIXEAN: Zoque, Popoloco, Mixe, Tlapaneca. TOTONACAN, CHAPANECAN, TARASCAN, MIXTECAN, ZAPOTECAN, MAYA-QUICHEAN: Huaxtec, Maya, Lacandon, Quiché, Mame, Tzeltal, Chontal, Tzotzil, Chaneabal, Chol, Chorti, Poconchi, Pocoman, Cakchi. CHOROTEGAN, LENCAN: Tuca, Wulwa, Rama, Paya, Melchora, Guatusa. COSTA RICAN: Bribri, Talamanca, Terreba, Guaymi, Cuna, Durasco. DARIEN: Choco, Tule. *South America.*—CHIBCHAN, PAESEAN, COCONUCAN, CHINCHASUYAN, YUNCAN, QUICHUA-AYMARAN: Inca, Huanca, Chanca, Cana, Colla, Lupaca, Pacasa. CALCHAQUIAN, ANTISUYAN, JIVARAN, ZAPARAN, BETOYAN, PANOAN, TICUNAN, JURIAN, PARUAN, MOJOAN, BARREAN, CURETUAN, CARIPUNAN, CATAUXIAN, CHARRUAN, CARAPUYANAN, CHUNCHOAN, CONIBAN, CARIBAN: Macusi, Akawai, Calina, Galibi, Rucuyenne, Bakairi, Apiaca, Arecuna. ARAWAKAN: Wapitiana, Atorai, Maypure, Parexi, Arawa. WARRAUAN, CHIQUITAN, BORORAN, BOTOCUDAN, CARIJAN, HUAMBISAN,

HIPURINAN, TUPI-GUARANIAN: Guarayi, Caribuna, Siriono, Mundrucu, Mauhé, Chiriguano, Tupinamba, Omagua, Goajire, Ovampi, Guaycuru. ARAUCAN, MOCOBI-LULEAN, MATACOAN, TOBAN, PUELCHEAN (Pampas), TEHUELCHEAN (Patagonian), YAHGAN, ALACALUFAN. See E. J. Payne's *History of the New World called America: The Aborigines* (vol. ii. 1899); Zelia Nuttall's *The Fundamental Principles of Old and New World Civilizations* (1901); F. S. Dellenhaugh's *The North Americans of Yesterday* (1901); D. G. Brinton's *On Various Supposed Relations between the American and Asian Races* (1893), and *The American Race, a Linguistic Classification of the Native Tribes of North and South America* (1891); A. D'Orbigny's *L'Homme Americain considéré sous ses Rapports Physiologiques et Moraux*, 2 vols. (1839); J. W. Powell's *Linguistic Families of America north of Mexico* (1891); N. Léon's *Familias Linguisticas de Mexico* (1902); A. Gallatin's *A Synopsis of the Indian Tribes within the United States, etc.*, 2 vols. (1836); R. G. Latham's 'Ethnography of North America,' in *Proceedings of Philological Society, London* (1846); F. V. Hayden's *Contributions to the Ethnography, etc., of the Indian Tribes, etc.* (1862); A. S. Gatschet's *Indian Languages of the Pacific States, etc.* (1877); A. H. Keane's 'Ethnography and Philology of America,' in Stanford's *Compendium*, 1st series (1878), and *Man Past and Present* (1900); F. Boas's *Anthropology of the North American Indians*, and *Social Organization, etc.* (1897); P. Ehrenreich's *Anthropologische Studien, etc.* (1897); De Nadaillac's *L'Amérique Prehistorique* (English ed. 1885); H. H. Bancroft's *The Native Races of the Pacific States of North America*, 5 vols. (1875-76); A. Bastian's *Die Culturländer des Alten America*, 2 vols. (1878); J. D. Baldwin's *Ancient America* (1872); G. Catlin's *Illustrations of the Manners, Customs, and Conditions of the North American Indians*, 2 vols. (1866); A. von Humboldt's *Researches concerning the Institutions and Monuments of the Ancient Inhabitants of America* (English ed. 1814); S. G. Morton's *Crania Americana* (1839); H. R. Schoolcraft's *Ethnological Researches respecting the Red Men of America*, 5 vols., and *Historical and Statistical Information respecting the History, etc., of the Indian Tribes, etc.*, 3 vols. (1851-53); *Smithsonian Institution, Annual Reports of the Bureau of Ethnology*, and *Contributions to North American Ethnology*.

Americanisms. By this term are understood, by all English-speaking people, certain words, locutions, phases of meaning, and methods of spelling peculiar to the United States, and in a less degree to Canada. Many so-called Americanisms are disowned by the cultivated class in the United States; and it was maintained by Richard Grant White that the differences between the speech of educated people in New England and Old England are so slight as to be almost, if not altogether, imperceptible. The following expressions may be noted, however, as peculiar to N. America. Timber is known as *lumber*, biscuits are *crackers*, rolls are *biscuits*, confections are *candy*, running streams are *creeks*, all climbing plants and tendrils are *vines*, and the vine itself is distinguished as the *grape-vine*, while, to the ordinary American, *corn* only means maize or Indian corn. During the past thirty years—as far back, at any rate, as the Philadelphia Exhibition of 1876—the English word 'exhibition' has been yielding place to *exposition*. This form appears to have been brought over from Paris, in the first instance, by unlettered 'drummers' (*Anglice*, 'bagmen'). In the United States one hears of goods being *shipped* by rail; and the railway terminology presents several differences. Thus, *track* is used instead of line, the engine-driver is called the *engineer*, the train is often spoken of as *the cars* and the station as the *depôt* (with the hybrid pronunciation *dee-po*), while *railroad* is more commonly used than railway. But the last three instances are by no means invariable, though their occurrence is worth recording. '*On* time,' moreover, is used to signify punctual, or (as with us) 'up to time;' and a railway time-table is a *schedule*. Instead of our antiquated booking office—meaningless since the era of *booking* seats—*ticket office* is properly substituted. Other Americanisms are: *back of* for 'behind;' *right away* for 'immediately;' and an expansion of the Scotticism '*on* the street' into such applications as, 'he lives *on* Fifth Avenue,' 'he crossed *on* the *Campania*,' 'he came *on* the afternoon train.' Instead of adopting the French *galoche*, as we have done ('golosh'), the Americans call their overshoes *rubbers* and *gums*. The latter, however, is more local than the former, and the Philadelphia lady who 'wiped her gums on the door-mat' before entering the house of her New York friend aroused as much merriment by that expression as she could have done in London. Mention may further be made of such variations as *side-walk* instead of 'pavement' (a term less frequently applicable in American towns), *hack* for 'hackney-carriage,' *hackman* for 'cabman,' *side-whiskers* and *chin-whiskers* for 'whiskers' and 'beard,' *bureau* for a bedroom chest of drawers, *Cologne* instead of eau de Cologne, the use of *cream-pitcher* instead of the British 'cream-jug,' and the restriction of *boots* to top-boots—*shoes* being held to indicate ankle-boots, as well as what we understand as shoes. This last, however, is more distinctly a usage of the Western States.

It would be a great mistake to assume that Americanisms are necessarily novelties, or aberrations from good English. Some of those cited above are of this class—*e.g.* the misuse of *lumber*, *creek*, and *exposition*. But many are Americanisms merely in the sense that they are English words which are nowadays peculiar to N. America in their use or in their application. It is quite good English to call railway carriages 'cars;' and, indeed, we have borrowed back that very application in our dining, sleeping, and tramway car. Other expressions—*e.g. I reckon*, *I guess*, *I allow* (in the sense of 'I think or suppose'), or *to home* (meaning 'at home'), or the nouns *hub* and *chores*—have all been used in England, and some are even yet in use in rural districts. Certain Old English words, indeed, still survive in the United States which seem to have vanished from England. Conversely, some English words are obsolete or obsolescent in the United States—*e.g.* sledge (supplanted by *sleigh*), fortnight, ironmonger, and luggage. As regards the so-called American spelling of such words as *favor*, *honor*, *plow*, *center*, *theater*, *miter*, all these forms have been used in England. Thus, a large number of the divergences between American-English and British-English are due to the fact that the two great English-speaking communities have lived separate lives for many generations. It may be added that the term 'Briticism' has been employed in the United States to denote certain novelties in the English speech of the British Islands which have arisen since 1776. But to recognize such expressions as 'Briticism' and 'British-English' (used above for the sake of antithesis) is to assume that the speech of a mother country stands on precisely the same level as that of its offshoots—a premise not likely to be granted by any of the older civilizations. See R. G. White, in *Atlantic Monthly*, vols. xli.-xlv.; T. R. Lounsbury, in *Internat. Rev.*, vol. viii.; G. M. Tucker, *N. Amer. Rev.*, vol. cxxxvi.; W. W. Crane, in *Putnam's Mag.*, vol. xvi.; Brander Matthews, in *Harper's Mag.*, 1891; and Lowell's, Introd. to *Biglow Papers*.

Americanists, those who make a special study of American ethnology, archæology, etc. Several international congresses of such students have already been held in Europe. See the *Report* (in French) of the Copenhagen Congress of 1883, 436 pp. (Copenhagen, 1884).

American Line (steamship) is a descendant of the International Navigation Co., a Pennsylvania undertaking, formed in 1871, which gradually enlarged its operations until it embraced the Red Star Line, running from 1873 between Antwerp and Philadelphia, and the Inman Line (acquired in 1886), running between Liverpool and New York. In 1893 all the undertakings were merged in the American Line, running weekly between Southampton and New York. The company has a fleet of 21 steamers, which aggregate 170,943 tons. It owns the *St. Louis, St. Paul* (which has a record of 21·08 knots on the westward run), *New York*, and *Philadelphia.* It now forms part of the International Mercantile Marine Co. See ATLANTIC SHIPPING TRUST.

American Literature. See UNITED STATES—*Literature.*

American Organ. See HARMONIUM.

American Protective Association, a league formed at Clinton, in Iowa, U.S.A., in 1887, by a lawyer, Mr. Bowers, for restricting immigration into the country, and for checking the privileges of the Roman Catholics.

American Rails, the name given to the group of stock-exchange securities consisting of the common stock and bonds of the railways (or rail*roads*, as they are called in America) of the United States and Canada. For history see RAILWAY.

The total mileage of American and Canadian railways was, in 1903, 226,860. The capital invested amounted to more than £3,000,000,000. Of this sum, over £1,400,000,000 was represented by common stock (corresponding to our 'ordinary'), and over £1,475,000,000 by bonds. The common stock is generally of a speculative character. A great deal of it is 'water,' issued to arrange for control of a line, or to carry through some financial arrangement.

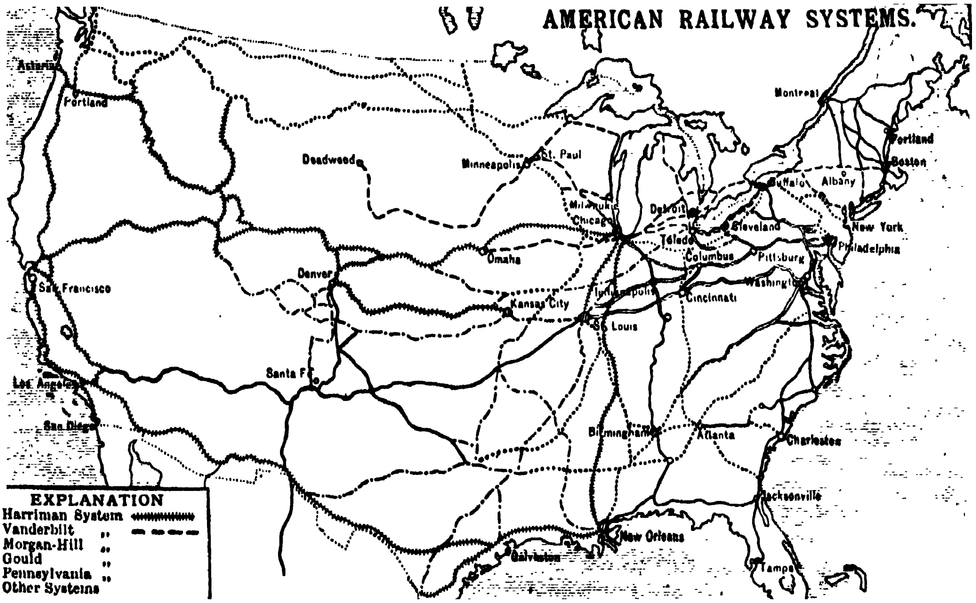
Bonds are not so speculative nor so fluctuating in price as common stock. They are secured by a mortgage on the railway, or on some part of its property. Though now regarded as securities for investment rather than for speculation, they have as a class passed through many vicissitudes before reaching their present position. Between 1870 and 1875 over a hundred companies were insolvent, and no less than £100,000,000 of bonds were in default with their interest. The position is now entirely altered. The growth and prosperity of America have enormously increased the traffic and earnings of American railways. The costs of working have been greatly reduced by careful management, and confidence has been restored by reorganizations, proper accounting, and, above all, by the publicity given to accurate reports and statistics. The best American bonds command as high prices as corresponding British securities.

American railway securities were placed on the London market as early as 1838. They have long been dealt in to such an extent that they are treated as a distinct class in stock-exchange quotations.

Transactions in rails form the largest part of stock-exchange business in America. On the New York Stock Exchange, of the 1,200 'listed' securities (*i.e.* those which occupy the highest position owing to their fulfilling the conditions of the Stock Exchange as to publication of reports, etc.) nearly 200 are railroad stocks, and over 600 are railroad bonds.

At least one-fifth of American capital is invested in railroads. The extent to which speculation takes place on the chief Stock Exchange (New York) may be gathered from the fact that in a single year some of the railroad stocks have been sold ten or twenty times over. In a single day two-thirds of all the shares of the Union Pacific and three-fourths of the Southern Railway have changed hands.

These enormous sales are due to the frequent struggles between groups of financiers for the control of some particular line. The result of these constant struggles



The great American Railway Interests, adapted from Sell's 'Commercial Intelligence.'

has been the combination of a large number of railroads under a single financial control, and such groups or systems are generally named after the chief financier among the controlling parties. The accompanying map shows the main lines controlled by the largest interests, which represent about 7,000 million dollars of railroad stocks and bonds, or considerably more than one-third of all American stock-exchange securities.

Besides the groupings above referred to, American rails are generally classified according to the nature of their business. Thus, the *Trunk Line* group includes the main through lines between the eastern seaboard and the middle states. The *Coalers* and the *Grangers* are the great coal-carrying and wheat-carrying lines respectively. The so-called '*Transcontinental' Roads* connect the middle and the Pacific states:—Union Pacific (1869), Southern Pacific (1881), Northern Pacific (1883), Great Northern (1893), and the Atchison, Topeka, and Santa Fé. The Canadian Pacific Railway is really transcontinental; as are also the Grand Trunk Pacific and the Canadian Northern, now being built.

Many of the chief American railroads are known by recognized nicknames or contractions—the 'Big Four' is the Cleveland, Cincinnati, Chicago, and St. Louis; the 'Nickel-plate' is the New York, Chicago, and St. Louis.

For full information on American railroad securities, see *Poor's Manual* (annual).

Americus, a city, Georgia, U.S.A., co. seat of Sumter co., 53 m. S.E. of Columbus. It is situated in the centre of a cotton and sugar-cane district, and has large iron, machinery, and chemical industries. Pop. (1900) 7,674.

Amerigo. See VESPUCCI.

Amerind, and AMERINDIAN or AMERINDIC (adj.), terms invented by members of the Anthropological Society of Washington (U.S.) to denote, in scientific treatises, the aboriginal tribes of the American continent and adjacent islands, including the Eskimos.

Amerling, FRIEDRICH (1803–87), painter, born in Vienna, whose portrait of the Emperor Francis I. (1832) made him the favourite portrait painter of the court and the aristocracy. He painted about a thousand portraits; among his historical pictures is *Moses in the Desert* (1829). See *Life* by Frankl (1889).

Amersfoort, tn., prov. Utrecht, Netherlands, 14 m. by rail N.E. of Utrecht. Theological seminary of the Jansenists. Manufactures of tobacco, cottons, glass, hats, and beer. Pop. (

Amersham, or AGMONDESHAM, tn. and par., Buckinghamshire, England, 26 m. W.N.W. of London. Straw-plaiting and chair-making are the principal industries. Pop. (1901) 3,209.

Ames, JOSEPH (1689–1759), antiquary and bibliographer, born at Yarmouth. His chief publications are: *An Index to the Pembrokian Coins and Medals* (?1746); *A Catalogue of English Heads* (1748), the first general description of English engraved portraits; *Typographical Antiquities* (1749), a history of printing in England, and a register (copied from the books themselves and not from catalogues) of printers and their books from 1471 to 1600. He also wrote *Parentalia, or Memoirs of the Family of the Wrens* (1750). See Gough's *Memoir of Ames*, in editions of *Typog. Antiq.* by Herbert and Dibdin; Nichols's *Literary Anecdotes and Illust.* (8 vols. 1817–58); Bigmore and Wyman's *Bibliog. of Printing* (3 vols. 1880–6).

Ames, JOSEPH (1816–72), American painter, born at Roxbury, New Hampshire. His portraits include Ristori, Prescott, Emerson, Rachel, and Pope Pius IX.

Ames, WILLIAM (1576–1633), known also as AMESIUS, Puritan divine, born at Ipswich. Persecuted for nonconformity, he sought refuge in Holland, where he engaged in controversy with Grevinchovius and Episcopius. He was appointed professor of theology at Franeker (1622), and at Rotterdam (1632). His works include *Medulla Theologiæ*, a student's handbook; the famous *Coronis ad Collationem Hagiensem*; *De Conscientia, ejus Jure et Casibus*; and *Bellarminus enervatus*. See *Life* by Nethenus.

Amesbury, tn. and par., Wiltshire, England, on the Avon, 8 m. N. of Salisbury. About a mile to the W. is a large intrenchment, covering an area of 39 ac., called Vespasian's Camp, but supposed to be of British origin; and a little farther W. Stonehenge. Elfrida, widow of Edgar, founded here, in 980, a Benedictine nunnery. At Milston, near Amesbury, Joseph Addison was born in 1672. Pop. 1,000.

Amesha Spenta (mod. *Amshaspends*), the 'immortal holy ones' of the later Avesta, are the principal spirits who assist Ormuzd in his works of creation. They are seven, including Ormuzd. The affinities between the Zoroastrian and Jewish theogonies, manifest in Ormuzd (the Creator) and Ahriman (Satan), are further illustrated by the Amesha Spenta, who have been compared to 'the seven Spirits which are before His throne' (Rev. 1:4). See ZEND-AVESTA; ZOROASTER.

Amethyst, a kind of quartz distinguished by its purple colour. The presence of a small amount of manganese has been regarded as the origin of the peculiar colour, which may vary considerably in the same specimen, and is readily destroyed by heating. Amethyst is most often found lining fissures and cavities, or in the interior of agates. Fine specimens come from Oberstein (in the Nahe valley, Prussian Rhineland), Hungary, Brazil, and Ceylon. The ancients supposed that this stone was a charm against intoxication. See Church's *Precious Stones*; C. W. King's *Precious Stones*; Traill's *Quartz and Opals*.

Amfortas, or ANFORTAS, king of the Holy Grail, in Wolfram von Eschenbach's *Parzival* and Wagner's opera of *Parsifal*.

Amhara ('highlands'), the central division of Abyssinia. Also the 'happy valley' in Dr. Johnson's *Rasselas* (1759).

Amharic Language, spoken since the 13th century throughout a large part of Ethiopia, succeeded Geez or Ethiopic (still the literary and ecclesiastical language), and, like it, is Semitic in origin; written from right to left.

Amherst, tn., sanatorium, and important pilot station at the mouth of the Moulmein River, Burma. Pop. about 3,500.

Amherst, JEFFREY (1717–97), created BARON AMHERST (1776); British field-marshal; chosen by Pitt to command the army for the conquest of French North America. Montreal having fallen, Amherst reached the climax of his career by his selection as governor-general of British North America (1760).

Amherst, WILLIAM PITT (1773–1857), created EARL AMHERST OF ARAKAN (1826), British diplomatist and statesman, nephew of the above, was sent in 1816 as envoy to the emperor of China; and, after a brilliant diplomatic career, became governor-general of India (1823–8). See Ellis's *Journal of the Proceedings of the late Embassy to China* (1817); Taylor's *Manual of the History of India* (1870).

Amice, a long cloak worn by priests in the 9th century and subsequently. The term is still applied to the hood of French canons, and also to a linen band worn on the shoulders by Roman Catholic priests during mass.

Amicis, EDMONDO DE (1846), Italian writer, born at Oneglia. He became editor of the Florentine paper *L'Italia Militare* in 1867. For this he wrote a series of bright and natural tales, *Bozzetti della Vita Militare* (1868; subsequently recast), which became very popular. In 1871 De Amicis devoted himself entirely to literature, though two works which appeared at this time—*Ricordi 1870–1* (1872) and

Roma Libera (1872)—have political rather than literary interest. These were followed by a series of books of travel, remarkable for great charm of style and power of description—*La Spagna* (1873), *Ricordi di Londra* (1874), *L'Olanda* (1874), *Marocco* (1876), *Constantinopoli* (1877), *Ricordi di Parigi* (1879), *Sull' Oceano* (1889). In fiction De Amicis's greatest success is the sentimental *Il Cuore*, primarily intended for young people. In his later efforts—*Il Romanzo d'un Maestro* (1895), and *Il Primo Maggio*—he essays social themes, bordering even on social democracy. (See, too, the pamphlet, *Ai Nemici del Socialismo*, 1896.) Less good are the early *Novelle* (1872), and the collection of historical tales, *Alle Porte d'Italia* (1884). Opinion is divided as to the value of the *Poesie* (1880); while admiring the descriptive passages, most critics are agreed that De Amicis is a master of prose rather than a poet. His latest books are, *La Carozza di Tutti* (1899), *Memorie* (1899), *Speranza e Gloria* (1900), and *Ricordi d'Infanzia et di Scuola* (1901).

Amicus Curiæ. Any person present at the hearing of a lawsuit, who, though not concerned in it, informs or corrects the court as to some fact or decision, is called *amicus curiæ*.

Amides, a group of organic compounds derived from ammonia by the replacement of a portion of the hydrogen by an acid radical. They are usually solid substances, are neutral to litmus, but act as bases to acids, with which they form salts. Treated with phosphoric anhydride, they are dehydrated, and become nitriles; while if they are boiled with aqueous caustic potash they give off ammonia, and leave the potash in combination with the acid.

Amidogen is the group NH_2. It is known only in combination, forming amides with acid radicals, and amines with alkyls; the products being generally known as amido compounds.

Amiel, Henri Frédéric (1821-81), French author, born at Geneva. He published many poetical and literary works, but *Fragments d'un Journal Intime* (1883-4; English trans. by Mrs. Humphry Ward) is the book by which he is best known. It is a diary of 1,700 pages, the revelation of an almost morbidly introspective mind.

Amiens, tn. on l. bk. of Somme, cap. of dep. Somme, formerly cap. of Picardy, 81 m. N. of Paris, France. It is the seat of a bishop, and is the headquarters of the 2nd Army Corps. The cathedral (1220-88), is supposed to exhibit the highest point in the history of Gothic architecture. (See Ruskin's *Bible of Amiens.*) Amiens is one of the principal manufacturing centres of France: flax, wool, silk, cashmeres, velvet, lace, dyeing, and iron factories; trade in wines, spirits, soaps, and timber. Previous to the Roman occupation it was an important place under the name of *Samarobriva*. Pop. (1901) 90,758. Birthplace of Peter the Hermit.

The Mise of Amiens, Jan. 23, 1264, marks an epoch in the Barons' war under De Montfort against Henry III. of England. The questions in dispute between king and barons, notably the validity of the 'Provisions of Oxford,' were referred to Louis IX. of France as arbiter. The decision was in Henry's favour, although he was to observe established liberties. De Montfort rejected the Mise, and fighting began.

The Treaty of Amiens, Mar. 27, 1802, between Britain and France (with Spain and the Batavian Republic), brought a truce in the great revolution and the Napoleonic struggle. Chief terms: Britain to restore conquests except Trinidad (Spanish) and Ceylon (Dutch); Malta (taken by Britain in 1800) to be restored to the Knights of St. John, under guarantee of a European power; France to evacuate the Two Sicilies and Papal States; Egypt to revert to the Porte; integrity of Portugal recognized by France; republic of Ionian Islands recognized. From fear of Napoleon's designs, Malta was not surrendered by Britain, and war was renewed in May 1803.

Amines are compounds derived from ammonia by replacing the hydrogen with one or more alkyls or alcohol radicals; they are primary, secondary, or tertiary according to the number of hydrogen atoms replaced. The amines are mostly volatile, and act as bases, forming salts with acids in a similar manner to ammonia. Trimethylamine, one of the members of the group, occurs in herring brine, and as a by-product in beet-sugar manufacture.

Amir. See Emir.

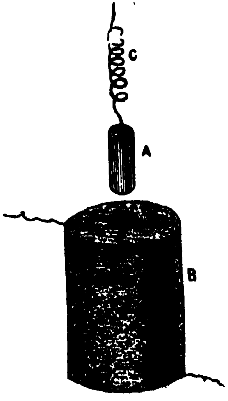
Amirante or Admiral Islands (called after Vasco da Gama), a group of small coral isls., dependencies of the Mauritius, Indian Ocean, S.W. of the Seychelles; produce cocoa-nut oil. Pop. scanty.

Amman, Jost (1539-91), Swiss wood engraver and painter, born at Zürich; lived chiefly at Nuremberg, where he executed a large number of engravings on wood, and a series of portraits of the kings of France. G. Hirth has edited Amman's *Stände und Handwerker* (1896), *Wappenbuch und Stammbuch* (1881), *Frauentrachtenbuch* (1880), etc.

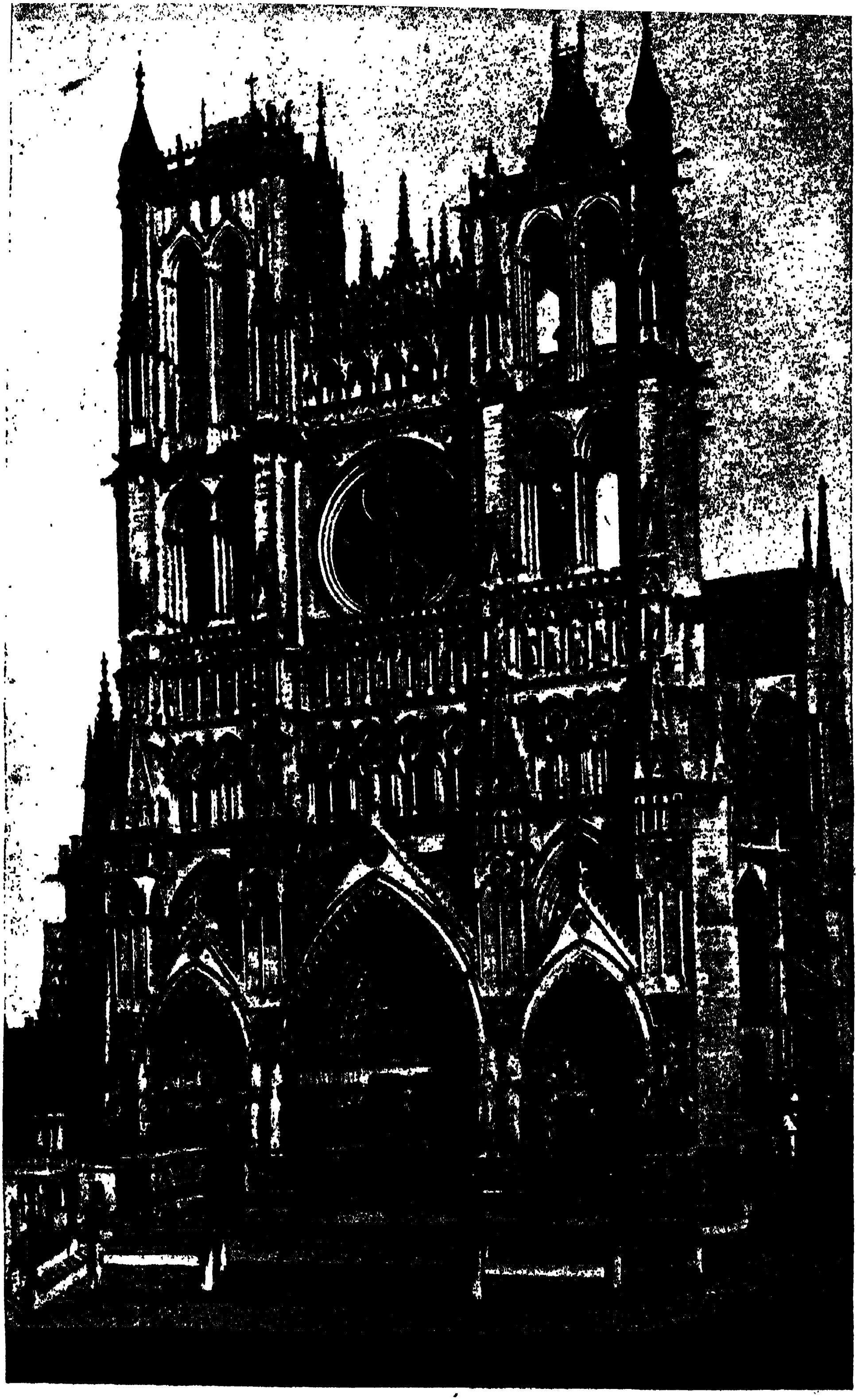
Ammanati, Bartolomeo (1511-92), architect and sculptor, born at Settignano, near Florence. His most noted works are the *Ponte della Trinita* and the *Leda* at Florence, a *Neptune* in St. Mark's Place, Venice, and a gigantic *Hercules* at Padua.

Ammersee, lake, Bavaria, 25 m. S.W. of Munich, is 10 m. long by 4 m. wide, and stands 1,750 ft. above sea-level.

Ammeter, an instrument for measuring electric current in terms of ampères. A piece of soft iron, if free to move in a magnetic field, is attracted towards the strongest part of the field. Thus, if a current be sent round the coil B (Fig.), the iron rod A will move down towards the centre of the coil, against the action of the spiral spring C. This movement, which may be measured by a pointer on A, gives a measure of the current; but the instrument has not a uniform scale. Instead of a spiral spring, the force of gravity may be used as a control, A being supported by a balanced lever. Other arrangements of soft iron cores are in use, and for general switchboard work these are very useful; but errors are caused by the residual magnetism of the iron cores when they are used with continuous currents. For alternating currents, if specially made for the purpose, they are very suitable. Other types, the moving coil and hot-wire ammeters, are similar to the voltmeters of these forms; but for measuring anything more than very small currents, a thick strip of special metal alloy is joined as a by-pass or shunt across the terminals of the instrument, so that only a definite small fraction of the current traverses the coil or hot wire. These instruments may likewise be regarded as measuring the fall of pressure between the two ends of the resistance strip, and by Ohm's law the fall of pressure is proportional to the current, and is therefore a measure of it.



Ammeter.



Amiens Cathedral, the finest Example of Gothic Architecture.

The scale is marked in ampères. The hot-wire instrument can be used for alternating currents, but the moving coil type only for continuous currents. For accurate measurement, an instrument is used in which the force of attraction or repulsion between two coils carrying an electric current is measured. By balancing this against a weight on a sliding arm (Kelvin's current balance), the current is measured in terms of a length and a weight which can be accurately read, and are not liable to change; and such instruments are used to standardize or calibrate the commercial types described above. See Ayrton and Perry's *Practical Electricity*; Aspinall Parr's *Electrical Engineering Measuring Instruments.*

Ammianus Marcellinus (330-400 A.D.), by birth a Greek, was a member of the Roman imperial bodyguard; served (350 354) in Gaul. He attended the Emperor Julian, 'the Apostate,' on his Persian campaign (363). After 371 he lived in Rome, and wrote his continuation of Tacitus's history in thirty-one books. The last eighteen contain the events from 353-378 A.D., and are the most important source for the history of that period. As a historian he is accurate and impartial. See edition of his works in the Teubner Series, ed. by Gardthausen (1874-5).

Ammir, a canoe formerly used in the Scottish Highlands.

Ammirato, SCIPIONE (1531-1601), Italian historian, was born at Lecce, and went to Naples to study law, where he published *Famiglie Napolitane* (1580). His chief work is *Istorie Fiorentine* (1600 and 1641), which carries the account from the foundation of Florence to the year 1574 (ed. Scarabelli, 1859), valued for its accuracy. A second archæological work is the *Famiglie Fiorentine* (1615). The *Discorsi sopra Cornelio Tacito* (1591), an imitation of Machiavelli's *Discourses on Livy*, were intended as a counterblast to that writer's attacks on the papacy.

Ammon, AMUN, or AMEN ('the Unrevealed'), a deity of the ancient Egyptians, appearing later in Greece as Zeus and in Rome as Jupiter. Represented variously as a ram, or as a throned human figure holding in one hand the sceptre of power, in the other the cross of love, Ammon was worshipped principally at Thebes, or, as it was then called, No-Ammon—the Diospolis of the Greeks. The colossal ruins of his temple still stand at Karnak. See EGYPT.

Ammon, OTTO (1842), German anthropologist, born at Karlsruhe; author of 'Ammon's law,' that the immigrants from country to town tend to group themselves in two divisions—a 'round-headed' division pursuing commercial and industrial pursuits, and a 'long-headed' division recruiting the ranks of the learned and official classes. The law rests upon anthropometric measurements, and is expounded in *Die natürliche Auslese beim Menschen* (1893) and *Die Gesellschaftsordnung und ihre natürlichen Grundlagen* (1896).

Ammonia (SPIRITS OF HARTSHORN), NH_3, occurs in nature in minute quantities in the atmosphere, and in natural waters, being derived from the decomposition of nitrogenous organic substances. It appears to have been known to the ancients, and in modern times was obtained by Priestley (1774), though its exact composition was demonstrated by Berthollet in 1785. Ammonia may be produced by several methods, but is usually prepared by heating a salt of ammonium, such as ammonium chloride (sal ammoniac), with slaked lime. When organic substances containing nitrogen, such as bones, horn, leather, and flesh, are decomposed, much of the nitrogen is evolved as ammonia gas. This is also the case with coal, which contains from one to two per cent. of nitrogen. The total annual production of ammonia in Britain does not exceed 200,000 tons of sulphate, about half of which is obtained in the manufacture of coal gas, the remainder being produced in the distillation of shale, and from the coal used in blast furnaces and coke ovens. The gas liquor is heated with steam in stills, when the ammonia gas distils over, and is passed into sulphuric acid, with which it forms ammonium sulphate, the crystals of which are fished out from time to time. Liquor ammonia is obtained by passing the purified gas into water. In some works lime is added to the stills; this decomposes the sulphide and some other compounds of ammonia in the liquor, and gives a larger yield of gas. Ammonia is a colourless gas with a well-known pungent odour. It is poisonous when inhaled in quantity, and will not burn under ordinary conditions, but when mixed with oxygen it burns with a yellow flame. It is about half the weight of air, and is very soluble in water: 1 volume of water at 0° C. absorbs 1,150 volumes of the gas. The strongest solution of commerce has the sp. gr. ·880 (water = 1), and contains 35 per cent. of ammonia. It is readily detected by its odour, and by its alkaline reaction on red litmus, which it turns blue. Minute quantities of ammonia in solution are estimated by Nessler's solution (see WATER ANALYSIS), and stronger solutions by titration with a standard acid. Ammonium salts are decomposed when heated with an alkali, the ammonia being evolved as gas. Ammonium sulphate, by far the most important of these, is largely used as a manure, and also in the preparation of ammonia alum and other ammonium compounds. Ammonium chloride (muriate or sal ammoniac) is prepared by allowing a stream of ammonia liquor to meet and combine with a stream of hydrochloric acid. The liquor is boiled down and crystallized. It is also made by subliming a mixture of ammonium sulphate and common salt in large iron pots covered with an iron dome. It is used in pharmacy, in soldering metals, in the manufacture of galvanized iron, and for many less important purposes. Ammonium carbonate (sal volatile) is prepared by heating ammonium sulphate (one part) with chalk (two parts) in cast-iron vessels. The vapours are condensed in lead vessels, and purified by resublimation. It is used in scouring wool, and as a baking powder, and in medicine as a stimulant, antacid, diaphoretic, and expectorant. Ammonia liquor is also used in pharmacy, in dyeing, in the ammonia soda process, and for the absorption of heat in ice-making machines or refrigerators. The preparation of ammonia from the nitrogen of the air is a chemical problem which has not yet been successfully effected on a commercial scale; nor has the extraction of it from sewage and animal excreta, which contain much of it, been carried out by economical methods. The sewage is known to be of great value, yet it is still a source of expense to the

Statue of Ammon.

community, a polluter of streams, and a danger to the public health. The sewage of London alone contains sufficient ammonia to produce 100,000 tons of sulphate of ammonia. See Lunge's *Coal-tar and Ammonia*; Mond's and Beilby's *Presidential Addresses to Soc. of Chem. Industry*, 1899 and 1900 (*Journal*, vols. viii. and xviii.).

Ammoniacum, a gum resin obtained from an umbelliferous plant found in Persia. It has a nauseous smell, and is used medicinally as an expectorant and disinfectant in cases of chronic bronchitis, and externally to reduce tumours, chronic swellings of the joints, and chronic inflammation of glands.

Ammonite, an explosive composed of pure ammonium nitrate and nitro-naphthalene; used in coal mines.

Ammonites, a tribe occupying the region to the east of the lower Jordan north of Moab. With the Moabites they hired Balaam to curse Israel, and otherwise obstructed the migration to Canaan. Though there was kinship between Ammon and Israel (see Gen. 19:38), the two peoples were almost constantly at war—*e.g.* under Jephthah; Saul, by whom, as also by David, they were defeated (1 Sam. 11:11; 2 Sam. 10:6-14); under Jehoshaphat, Jotham, Nehemiah, and Judas Maccabæus. Their chief city was Rabbath-Ammon; their national deity was Milcom (Moloch). See Dillmann's *Genesis*, on Gen. 19:38.

Ammonites, a group of animals belonging to the Cephalopoda, at one time abundant, but now extinct. The name *Cornua Ammonis* is derived from their resemblance to the coiled rams' horns which decorated the statues of Jupiter Ammon. The shells vary from a fraction of an inch to nine or ten feet in diameter. In certain formations they are very common and important fossils. The earliest ammonites are found in the Permian of Sicily; they became extinct at the close of Cretaceous times. In Jurassic and Cretaceous seas they abounded; and their shells are among the most characteristic ingredients of the calcareous rocks of those periods. They were not only individually numerous, but developed also a great variety of genera and species, which were, as a rule, short-lived, one species appearing and flourishing for a time, soon to become extinct and to be replaced by another. Their spirally-coiled shells, like the shell of the living nautilus, were divided into a series of separate chambers by transverse partitions. The outermost chamber was open in front, and was inhabited by the animal; the posterior chambers contained only gases. The mouth of the 'living chamber' was often ornamented with projecting processes or horns. By an aperture in its posterior wall this chamber communicated with a tube, the 'siphuncle,' the walls of which were mostly calcified, which ran backwards through all the empty chambers, and ended in the little initial chamber which formed the centre of the coil. Lying in the living chamber a calcareous plate is sometimes found, the 'aptychus,' which is believed to have served as an operculum, with which the mouth of the shell could be closed. The external surface was sometimes smooth, but more usually ornamented with projections, ribs, and furrows. See Zittel's *Palæontology* (1900); Nicholson and Lydekker's *Palæontology* (2 vols. 1889); J. G. Taylor's *Common Brit. Fossils* (1885).

Ammonite.

Ammonium is the name given to the group NH_4 present in the salts formed by the union of ammonia with acids. This group has not been isolated, but behaves very like the element potassium in its compounds, and so is often classed along with it.

Ammonius. (**1.**) Of Alexandria (b. 458), presbyter and œconomus of the church in that city, was an Egyptian. His extant works are, *An Exposition on the Book of Acts*, *A Commentary on the Psalms*, *On St. John's Gospel*. See Angelo Maio's *Nova Collect. Script. Vet.*, vol. i. p. 166 (1825). (**2.**) Son of Hermeas (5th century), studied at Athens under Proclus, and was afterwards the master of Simplicius, Asclepius Trallianus, John Philoponus, and Damascius. His extant commentaries are, *On the Isagoge of Porphyry* (pub. Venice, 1500), *On the Categories of Aristotle* (1503), and *De Interpretatione* (Venice, 1503). See Fabricius's *Bibliotheca Græca*, vol. v.; Brandis's *Memoirs* of the Berlin Acad. (1833). (**3.**) Saccas, a Greek philosopher (d. 243 A.D.), founded the Neo-Platonic school of philosophy. He lectured at Alexandria; his greatest pupils were Origen, Plotinus, Longinus, and Herennius. See Fabricius's *Bibliotheca Græca*, vol. v.; Dehaut's *Essai Hist. sur la Vie et la Doctrine d'A. Saccas* (1836).

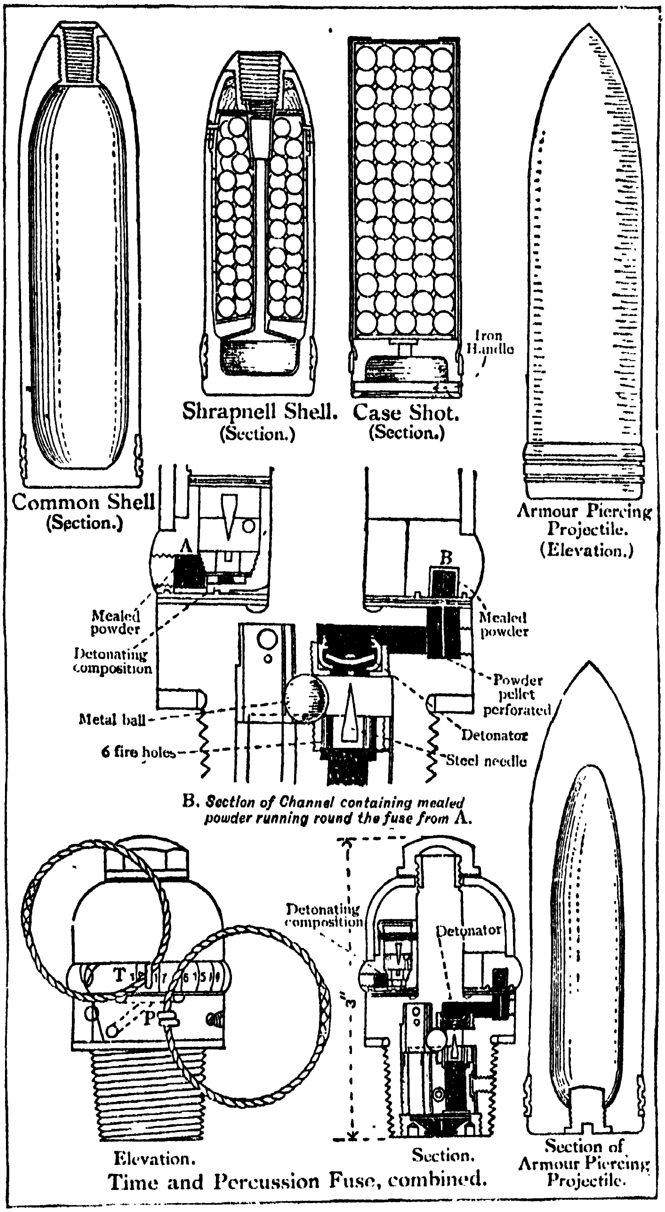
Ammunition, a term formerly including all the military stores conveyed with an army in the field, but now confined to projectiles and the various articles necessary for their effective employment. A bullet or shell has to be fired from a rifle or gun by an explosive agent which gives the projectile a high velocity without injuring the weapon it is fired from. The propelling agents used in the British service are gunpowder of various kinds, and cordite, or smokeless powder. A shell, when discharged and used as a travelling mine, has to be burst at a certain point in its flight by a more quickly-acting explosive of a disruptive character, such as gun-cotton or lyddite. For the purposes of safety in handling, and convenience and rapidity in loading, the propelling agent is enclosed in an envelope or cartridge. In the case of machine-gun, rifle, and small-arm ammunition, the cartridge consists of a solid drawn brass case, in which the bullet is fixed. Quick-firing guns, varying in size from a 3-pounder to a 6-inch, differ as regards ammunition from an ordinary gun in having their charge and its means of ignition contained in a metal case. The projectiles for the smaller types of guns, such as the 3-pounder and the 6-pounder, are attached to the case, and the ammunition thus formed is termed 'fixed.' The metal case must be of the same length as the chamber of the gun, and when smokeless powder is used part of the cartridge case is filled by a paper cylinder. In the base of the case is inserted an electric primer or an adjuster, according to whether electricity or percussion is used as a means of firing. The ignition of the charge of cordite is facilitated by the employment of a little fine-grain powder.

Cartridges for ordinary guns are bags made of silk cloth of a strength proportionate to the size. Serge was formerly used, but is apt to leave a smouldering residue after firing, which is a source of danger. In loading cartridges with cordite, the sticks are laid lengthways, while prism powders are carefully built up in layers. The mouth of the bag is choked with silk twist, and the shape preserved by hoops of silk braid.

The projectiles of rifled ordnance are of numerous patterns, owing to the varying size of the guns and the different systems of construction. The light field-guns (muzzle velocity, 1,600 ft. per second; rate of fire, 25 rounds per minute; range, 10,000 yards) are of the newest type; but in the heavier calibres specimens of bygone systems of manufacture still exist, and will be utilized for many years, on the ground of the time and expense it would take to replace them. All shot and shell are of similar form, consisting of a cylindrical body with an ogival head. The projectiles of rifled muzzle-loading guns (R.M.L.) were formerly provided with two or three rings of soft-metal studs which fitted into the grooves of the rifling, and thus ensured rotation on discharge. The rush of powder gas over the top of the shell eroded the bore, but this defect was overcome by attaching a gas-check to the base of the projectile. Studs have now been discarded, and an automatic gas-check is firmly attached to the projectile on discharge, while at the same time the copper of the gas-check is compressed against the bore and into the grooves, and thus gives the rotation. The shells made for guns on the original Armstrong system (R.B.L.) have their sides coated with lead. On firing, the lead is pressed into the numerous shallow grooves of the rifling, and thus secures the necessary twist.

In breech-loading ordnance of the modern type (B.L.) the rotation of the projectile is effected by means of a copper driving-band attached near the end of the base. When the gun is fired, the soft copper of the band is cut into by the bore and compressed into the grooves of the gun. It is often necessary to attach augmenting strips of copper to the band when the bore of a gun has become enlarged by constant firing. With B.L. guns firing cordite charges, the driving-band is fitted in rear with a projecting ring of copper, which serves to seal the gas and lessen the erosion and wear of the gun. The projectiles thus adapted in different ways to secure rotation may be classified under four general heads:—

1. Armour-piercing projectiles—shot with a pointed head, made of forged or cast steel—are provided for the heavier kinds of ordnance, from the 4-inch upwards, their bases being closed by a screwed-in plug, and the small internal space filled with dust shot and sawdust. The Palliser shot and shell still used in the service are made of a special white cast iron, and the heads are cast in an iron chill, to ensure great hardness. These projectiles are nearly equal to steel shot as regards penetration of wrought iron, but they do not possess sufficient tenacity to enable them to be effectively employed against compound or steel-faced armour. The efficacy of armour-piercing guns and projectiles is tested by comparing the number of inches of wrought iron they can penetrate at a range of 1,000 yds. Take, for instance, two guns of the latest type. The 12-inch wire-gun of 46 tons can penetrate 28·6 in. of iron with a shot weighing 850 lbs., while a 9·2-inch wire-gun of 27 tons can drive a shot of 380 lbs. through a plate 27·5 in. thick.



Modern Ammunition.

2. A common shell is a hollow cast-iron or steel cylinder with an ogival head, the aperture in which is bushed with gun-metal, to admit of the insertion of a fuse. It may be described as a locomotive mine for the destruction of *matériel* at a distance, and should contain as large a bursting charge as possible. The shell is exploded by the action of a fuse, which is generally screwed into the nose, and certainty of ignition is ensured by the use of a small primer of fine-grain powder, or a picric powder exploder when lyddite is used. The destructive effect of lyddite is much greater than that of powder, owing to the excessive blast produced by the very violent and rapid explosion. For carrying a bursting charge through the

lighter kinds of armour, special shells are forged with a solid pointed head, while a percussion fuse is screwed into the base. Lyddite shells are usually made of forged steel, in order to minimize the risk of their breaking up in the bore; but a forged shell does not burst so effectively into fragments as does one of cast metal. Common shells vary in size from the 1 lb. Maxim shell to the gigantic missile three-quarters of a ton in weight fired from the 110-ton gun.

3. A shrapnel shell differs from a common shell in having the greater part of its interior filled with bullets, which are released and fly forward when the shell bursts. The shell acts merely as an envelope to convey the bullets to a desired point, and the bursting charge should be only just sufficient to open the shell and leave the bullets free to continue their course. The charge is usually placed in a chamber at the base of the shell; a metal tube, round which the bullets are arranged, extends to the fuse hole. A primer of fine powder conveys the flash down the metal tube to the powder chamber. This shell is essentially designed for use against the *personnel* of an enemy, its effects on *matériel* and obstacles being small. In the shrapnel for field-guns the bullets are contained in a wire cage, which prevents undue dispersion.

4. Case-shot is simply a cylinder of tinned iron filled with bullets. It is made sufficiently strong for transport, and breaks up on leaving the bore. It is not made to take the rifling, and is essentially a weapon for close quarters. There are also several shells of an exceptional nature, such as the Armstrong 'segment shell,' in which the ordinary shrapnel bullets are replaced by cast-iron segments built up in layers; 'ring shell,' which consists of a thin cast-iron envelope covering a core of iron rings, which are weakened so as to break up into segments; 'star shell,' which contains a light composition that burns for about forty seconds, giving a brilliant light; etc.

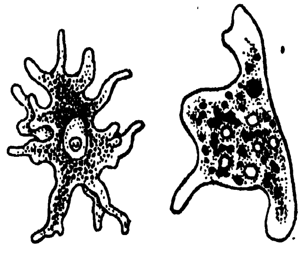
The explosion of a shell is effected by means of time or percussion gun-metal fuses, which are usually screwed into the nose of the shell. A time fuse has a ring of fuse composition which is ignited by a detonating arrangement on the shock of discharge, and the fire is communicated to the primer of the bursting charge after a certain number of seconds, which time is arranged when setting the fuse. In percussion fuses the shock of discharge sets free the detonator to act when the shell strikes against any object. For the smaller projectiles double-action fuses are in use, combining both the above arrangements. The tubes used for igniting charges in all ordnance are fired by friction, percussion, or electric current. The ordinary friction tube is of copper filled with pistol powder, and is fired by the ignition of detonating composition on a friction bar when pulled out by a lanyard. For axially-vented guns vent-sealing tubes of a stronger and more complicated construction are used. See Longridge's *Treatise on Ammunition*, Gov. pub. (1890).

Amnesia (Gr. 'forgetfulness'), loss or defect of memory; now restricted to the loss of memory of spoken words. Show an amnesic patient common objects—a match-box, pencil, penknife, etc.—and ask him to name them; if he cannot do this, he has word-forgetfulness (amnesia verbalis). Sometimes the patient has a vague idea of the word he wants, but cannot pronounce it properly, although he may be able to write it. This has been called articulative amnesia. Amnesia is due to cerebral conditions which may be temporary or permanent. Most people experience a certain degree of amnesia when exhausted or out of health.

Amnesty (Gr. *amnestos*, 'not remembered'), a general act of pardon and oblivion of past offences. The term is applied to a pardon extended to classes or communities rather than to individuals. Though it may be granted by the sovereign, it is usually granted by Act of Parliament. Amnesties have been allowed:—(1.) After rebellions—*e.g.* in 1660. (The last general act of amnesty in Britain was in 1747, after the Jacobite rebellion of 1745-6.) (2.) On auspicious occasions—*e.g.* coronations, etc. (3.) After wars, in which persons may have violated the law. (4.) For unconstitutional acts—*e.g.* the Act of 1767, protecting the king's ministers. Perhaps the term is only strictly applicable to (1) and (2), whereas (3) and (4) are more properly acts of indemnity; (2) is probably obsolete.

Amnion, a protective investment which surrounds the embryo in mammals, birds, and reptiles, but not in amphibia, fishes, or lower vertebrates—*i.e.* in those cases only where the embryo does not develop in the relatively dense medium water. The amnion originates as a double fold of membrane, which rises up on all sides of the embryo, and unites above it to form a domelike structure. As the embryo becomes more and more folded off from its yolk-sac, the amnion spreads beneath and around it, forming a double sheath. Between the inner of its two membranes and the embryo a fluid appears, which forms a water-bath about the embryo and protects it from shock. Between this inner membrane, or true amnion, and the outer, or false amnion, a space is left which is continuous with the body-cavity of the embryo, and into which the allantois later spreads. At birth, or hatching, the amnion becomes functionless, and is ruptured and cast off. Amniota is a general term applied to those vertebrates in which the amnion is present. See ALLANTOIS.

Amœba (Gr. 'changing'), a genus of Protozoa, or simple unicellular animals; but the term is also used in a more general sense, to designate any protozoön which structurally resembles a true amœba. Thus many Protozoa are said to pass through an amœba stage; and the term amœboid is also applied to cells, such as the white blood corpuscles of man, which have the power of protruding and retracting blunt processes (*pseudopodia*). A typical amœba consists of a naked mass of protoplasm, is without definite shape, and moves by pushing out pseudopodia in the anterior region and contracting the cell-mass in the posterior region. As to size, a diameter of a hundredth of an inch is not uncommon, but some amœbæ are much larger than this. There is no permanent distinction between outer and inner layers in the protoplasm, but the marginal layer contains fewer granules than the central. Within the central protoplasm a denser patch forms the usually single nucleus. The central protoplasm contains also one or more pulsating bubbles of fluid—the so-called contractile vacuoles, whose function is apparently excretory. Also included in the protoplasm are the food vacuoles, consisting of a food particle—*e.g.* a diatom—surrounded by a film of water ingested with it. According to some authorities, a ferment is poured by the surrounding protoplasm into the food vacuole, and the food substance is digested and absorbed, while the indigestible residue is got rid of at the surface. Although, for various reasons, the amœba has become the most familiar member of the



Typical Forms of Amœba, showing Pseudopodia (greatly magnified).

Protozoa to the general public, it has not been the object of so many experiments as some other members of the group, and many points in regard to its physiology are conjectural only. The life history of amœba is very simple. It grows until the limit of advantageous size is reached, and then divides to form two amœbæ. Under unfavourable conditions it is capable of rounding itself off and forming a protective investment or cyst, within which it may lie passive until the environment again becomes favourable to the resumption of active existence. The formation of spores is also stated to occur. The general interest of amœba, as indicated above, is that it retains throughout life a type of cell structure which tends to recur, permanently or temporarily, among the cells of many higher animals, and in the life-cycle of many other Protozoa. See Huxley and Martin's *Course of Elementary Instruction in Practical Biology* (rev. by Howes and Scott, 1888); J. A. Thomson's *Outlines of Zoology* (1899); and for amœboid cells in higher animals, Metchnikoff's *Lectures on the Comparative Pathology of Inflammation* (trans. 1893).

Amœbean Verses, verses which exhibit persons answering each other alternately.

Amok, also called *mataglap*, is a Malay term denoting a sudden frenzy which seizes an individual, sometimes as a result of intoxicants, but often unaccountably. Only the Malay peoples appear to be thus affected. It has been compared to the 'madness' of the ancient Norse Berserker, but the latter was essentially a frenzy of rage or valour in war. (See Metzger, in *Globus*, 1887.) In Malaysia, as soon as a man is known to be 'running amok,' alarm gongs are sounded, and every effort is made to check his career.

Amol, tn., prov. Mazanderan, Persia, 20 m. s.w. of Barfrush, s. of Caspian Sea. Pop. varies with the season—10,000 to 20,000.

Amomum. See CARDAMOMS and GRAINS OF PARADISE.

Amontillado, a favourite variety of Spanish sherry, light in body and in colour.

Amor, among the Romans the god of love and harmony, equivalent to the Greek Eros; had no place in their national religion. The cult was derived from the Greeks.

Amorites, a name applied generally to the primitive inhabitants of Canaan, practically equivalent to Canaanites, but very loosely used. The Amorites seem originally to have been a tribe or group of tribes occupying the district of Anti-Lebanon, who, overrunning most of Canaan, were in turn conquered by the Hittites. They were still strong enough, however, to make some resistance to the Israelites in the time of the Exodus, at which period they had settlements in the south and east of Palestine; but their chief kings, Sihon and Og, were overthrown by Moses, while Joshua utterly discomfited five Amorite kings at Gibeon. See Sayce's *Races of the O.T.* (1891).

Amphibia.

Anura: 1. Surinam toad (Cuvier); 2. Green frog (life). Urodela or Caudata: 3. Proteus (Cuvier); 4. Salamander (life). Gymnophiona or Apoda: 5. Siphonops (D'Orbigny); 6. Cæcilia (Cuvier).

Amoroso, in musical score, indicates a tender, delicate style.

Amorphous, a term applied to substances devoid of characteristic shape, or of different properties in different directions, in contradistinction to crystalline bodies. Glass, glue, opal, obsidian may be cited as examples. The faculty of solidifying in the amorphous form is well marked in the borates, phosphates, and silicates, which readily cool from fusion in the glassy form. Very often, however, the amorphous state is unstable, and tends to pass into the cryptocrystalline, or minutely crystalline; this change is known as devitrification.

Amortization, a method of contracting terminable loans, with gradual repayment within a specific time. The system is chiefly used in countries whose credit is low. See NATIONAL DEBT.

Amory, THOMAS (?1691-1788), an eccentric writer of disordered intellect, Irish by descent; lived a secluded life in Dublin, Westminster, and Hounslow. His books, of which the chief were *Memoirs containing the Lives of Several Ladies of Great Britain* (1755), and its sequel, *The Life of John Buncle, Esq.* (1756-66), are a medley of rhapsodies, descriptions of scenery, theological disquisitions, and autobiography. See Hazlitt's *Round Table*, Essay 18; *Saturday Review*, May 12, 1877.

Amos, one of the twelve 'minor prophets,' and the earliest of the prophets whose writings are extant. He prophesied in the reign of Uzziah of Judah, the contemporary of Jeroboam II. of Israel (ch. 1:1; 7:10 *ff.*), *c.* 765-745 B.C. He impeaches the nations of Syria and Palestine (ch. 1, 2); denounces the luxury and cruelty of Israel, but specially the insincere though elaborate and punctilious worship maintained at Beth-el and elsewhere; and predicts disaster (3-6). Ch. 7-9 contain a series of five visions intended to reinforce the foregoing indictments, but close with a promise of ultimate restoration. Though a rustic, Amos wields a style of remarkable refinement; his writings are singularly vivid and orderly, illuminated by many apt images borrowed from rural life. His book is of importance as affording contemporary evidence of religious belief and practice in Israel during the 8th century B.C. He traverses the popular notion of the 'day of Jehovah,' showing that it will be a day not of national triumph but of catastrophe; inveighs against the false trust in sacrifice and ritual as substitutes for righteousness; proclaims that Jehovah is no mere national Deity, but the God of the whole earth; and declares that His special covenant with Israel, far from justifying national pride and frowardness, will count as a reason for the more exemplary punishment of an unfaithful people. See Driver's *Joel and Amos* (Camb. Bible), and G. A. Smith's *Bk. of Twelve Prophets* (Expos. Bible).

Amoy, port, prov. Fu-kien, China, on two islands at the mouth of the Lung-kiang ('Dragon river'); is in almost daily communication with Hong-kong by steamer, and a bi-weekly service exists between Hong-kong, Amoy, and Foochow. The depth of water in the harbour makes it a frequent resort for men-of-war. Its tea trade with the United States, though much diminished of late years, is still considerable. Sugar, rice, turmeric, and ginger are among its chief articles of produce. Pummel, oranges, hing, and other sub-tropical fruits abound. It is also noted for its delicately-flavoured oysters. The value of the foreign trade averages about £3,500,000 sterling annually. European trade with Amoy dates from early in the 16th century. The East India Company had a station there at different times between 1661 and 1730. The port was opened to foreign trade by the treaty of Nanking (1842). Pop. (1897) 96,370.

Ampelopsis. See VIRGINIA CREEPER.

Ampère, the practical electric unit of current, is theoretically defined as equal to 10^{-1} C.G.S. electro-magnetic units of current. It is practically defined as current which deposits 1·118 milligrams of silver per second out of a specific solution of silver nitrate. For measuring currents, various types of ammeters, galvanometers, and current meters are used. The milliampère is one-thousandth of an ampère. See AMMETER.

Ampère, ANDRÉ MARIE (1775-1836), physicist and mathematician, born at Lyons, was professor successively at Bourg and Lyons from 1801-5. He then removed to the Polytechnic School at Paris, where he was appointed professor of analysis in 1809, and professor of physics at the Collège de France in 1824. His fame rests on his physical researches, especially on his development of electro-dynamics and demonstration of the relations between magnetism and electricity. His chief works are: *Recueil d'Observations électro-dynamiques* (1822); *Théorie des Phénomènes électro-dynamiques* (1830); *Essai sur la Philosophie des Sciences* (2 vols. 1834, 1843). See his *Journal et Correspondance* (1872); *André Marie Ampère et Jean Jacques Ampère; Correspondance et Souvenirs 1805-1864* (1875); Saint-Hilaire's *Philosophie des deux Ampères* (1866); Valson's *La Vie et les Travaux d'A. M. Ampère* (1886).

Ampère, JEAN JACQUES ANTOINE (1800-64), French philologer, archæologist, and historian, son of the preceding, was born at Lyons. Assistant of Fauriel and Villemain at the Sorbonne (1831-32), he became (1833) professor of French literature and history at the Collège de France, and in 1847 was elected to the Academy. His chief work, *L'Histoire Romaine à Rome* (1858) first appeared in the *Revue des Deux Mondes*. His other works include *Littérature et Voyages* (1834); *Histoire Littéraire de la France avant le XII^e Siècle* (1840); *Histoire de la Littérature Française au Moyen Age comparée aux Littératures Etrangères* (1841); *La Grèce, Rome et Dante* (1848); *Promenade en Amérique* (1855). See Barthélemy Saint-Hilaire's *Philosophie des deux Ampères*.

Ampersand ('and' *per se*), in typography, the character *&* or & = 'and.'

Amphiaraus, son of Œcleus and Hypermnestra, a legendary hero and prophet of Argos in ancient Greece. He was married to Eriphyle, and their children were Alcmæon, Amphilochus, Eurydice, and Demonassa. Polynices, by the gift of the necklace of Harmonia, won Eriphyle to persuade her husband to join him in the first expedition of Seven against Thebes. This he did, though he foresaw its failure, and on leaving Argos charged his sons to punish their mother for his death. At Thebes, after a brave resistance, he fled, and was swallowed up by the earth. He became immortal, was worshipped as a hero, and had an oracle between Potniæ and Thebes. Æschylus's *Seven against Thebes* tells much of the story.

Amphibia, a group of vertebrates characterized by the fact that gills are typically present at some period of life, though the adults possess functional lungs and breathe air through the nostrils. When limbs are present, they bear fingers and toes, and are not fins. Though unpaired fins may be present, they never have supporting fin-rays, and the skin is typically smooth, soft, and scaleless. The heart is three-chambered, and the blood is cold. Development nearly always takes place in water, and the young usually pass through a metamorphosis. The following is an outline classification: (1.) Anura, forms without tails when adult, including the frogs, toads, tree-frogs, and others. (2.) Urodela or Caudata, forms which keep the tail throughout life, such as the newts, salamanders, the cave proteus, the axolotl, and others. (3.) Gymnophiona or Apoda, wormlike forms without limbs, and subterranean in habit, such as *Cæcilia* and *Siphonops*. Amphibia are specially interesting because they mark the transition between the aquatic and the terrestrial life, the young being typically aquatic, and the adults typically terrestrial. The Anura, as the highest forms, show this transition in its best-marked form. Among the Caudata one larval characteristic, the tail, is always retained; and in a few cases the gills, the larval breathing organs, may also persist throughout life. In the case of the axolotl there are two forms, a permanently larval and an adult, both capable of breeding. See Gadow's *Amphibia* (Cam. Nat. Hist. vol. viii.; 1901), and *Amphibia and Reptiles* (1902).

Amphiboles, a large group of minerals, the silicates of many different bases, the commonest being alumina, iron oxide, lime, magnesia, and the alkalis. They are constituents of many crystalline igneous rocks and of metamorphic schists. In many of their properties they closely resemble the pyroxenes, of which they are probably only a dimorphous form. They occur generally in black or dark green crystals, usually long, narrow, and bladelike; and, owing to their perfect cleavages, their surfaces are smooth and bright. The commoner varieties are hornblende (black), actinolite (dark green), tremolite (pale gray to white). The tendency to elongated fibrous forms is best seen in asbestos and crocodilite.

Amphibrach, a metrical foot of three syllables, the first and the last short or unaccented (˘), and the middle one long or accented (‾). The Greek *ameinon* is a quantitative amphibrach. Compare the following accentual amphibrachic measure:—

There cáme to | the shóre a | poor
éxile | of Érin ;
The déw on | his thín robe | was
heávy | and chíll.

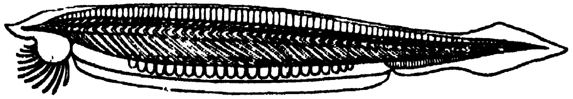
Amphictyonic Council. An amphictyony was an assemblage of deputies of tribes (not cities) dwelling around any important temple, gathered together to manage the affairs of that sanctuary. Of numerous examples throughout Greece, the most celebrated was that which took its name first from the temple of Demeter at Anthela, near Pylæ, and afterwards from the temple of the Pythian Apollo at Delphi. Twelve tribes, with their colonies, composed the amphictyony of Delphi Malians, Phthians, (Œtæans (Ænianes), Dolopes, Magnetians, Perrhæbians, Thessalians, Locrians, Dorians, Phocians, Bœotians, Ionians. To the two annual meetings, in spring and autumn, each tribe sent two 'wardens' with voting powers, and several 'deputies' who might speak but could not vote. They bound themselves to observe certain intertribal principles of right, and thus the amphictyony became a political force. They agreed not to destroy any city of the league, nor wholly cut off its supply of running water, during war; but they would unite to punish those who had broken the compact, or had injured the temple of Delphi. These rules were, however, not fully realized in action. The first sacred war was declared against the Phocian city of Crissa (594 B.C.); in the second (346 B.C.) the Phocians were temporarily expelled from the league; and from the third (339 B.C.), against Amphissa, followed the destruction of Greek liberty by Philip of Macedon. The amphictyonic council continued, with limited powers, under Roman sway, the last mention of it occurring in the 2nd century A.D.

Amphilestes, one of the primitive mammals of the Jurassic epoch. Little is known of its anatomy, the remains which have been found being only lower jaws with teeth; it was probably related to the existing monotremes.

Amphimacer, a metrical foot consisting of three syllables, the first and last long (‾), and the middle one short (˘)—*e.g.* Oidĭpoūs.

Amphion, son of Zeus and Antiope, and twin-brother of Zethus. Their family was connected with Thebes. Lycus, Antiope's husband, maltreated her on finding her with child by Zeus; and the children, Amphion and Zethus, were exposed, but were brought up by shepherds. When they grew up their mother escaped to them, and told them her wrongs; whereupon they killed Lycus and Dirce, his second wife, torturing her by fastening her to a bull (represented by the famous Farnese bull in the Naples Museum), and took possession of Thebes. They then fortified it—the stones uniting of their own accord to form the wall, moved by the strains of a lyre given to Amphion by Hermes. Amphion married Niobe, and after the death of his children slew himself. His story is told in Ovid, *Metamorphoses*, bk. vi., and in Apollodorus, bk. iii.

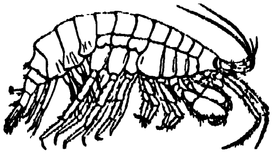
Amphion, a British second-class cruiser launched in 1883. The ship-name is associated with the capture of four Spanish frigates (1804), Hoste's victory off Lissa (1811), Bomarsund (1854), Sveaborg (1855).



Amphioxus (*diagrammatic section*).

Amphioxus, or LANCELET (*Amphioxus lanceolatus*), is a small, pointed creature (length, 1½-2 in.), interesting as being one of the most primitive of vertebrates. It is a marine animal, widely distributed in shallow water off sandy shores, and differing in many striking ways from fishes. Thus, it has no limbs, no skull, no distinct brain, no jaws, no heart, no ears, no eyes; but it has down the back that important supporting structure, the notochord, which occurs at some period of life in all vertebrates. In most vertebrates this notochord is replaced at a very early stage by the vertebral column, a structure which is absent in amphioxus. Though exceedingly simple in structure as compared with higher vertebrates, amphioxus is in some respects specialized, possessing characters not represented in higher forms. It appears to be most nearly related to the degenerate tunicates or sea-squirts; but it is interesting to note that this fact is not of great assistance in bridging the gulf between vertebrates and invertebrates, for the relation of the tunicates to the invertebrates is still obscure. See Willey's *Amphioxus and the Ancestry of the Vertebrates* (1894).

Amphipoda, an order of Crustacea characterized by the fact that, of the six pairs of legs borne by the abdomen, the anterior three are used in swimming, and the posterior three are directed backwards and are used in jumping. Many species are known, but naturalists are not agreed as to their relationship. The order includes the sandhopper and the beach flea (*Talitrus* and *Orchestia*), and many other forms abundant in fresh and salt water. A few, such as *Cyamus*, the whale louse, are parasitic.



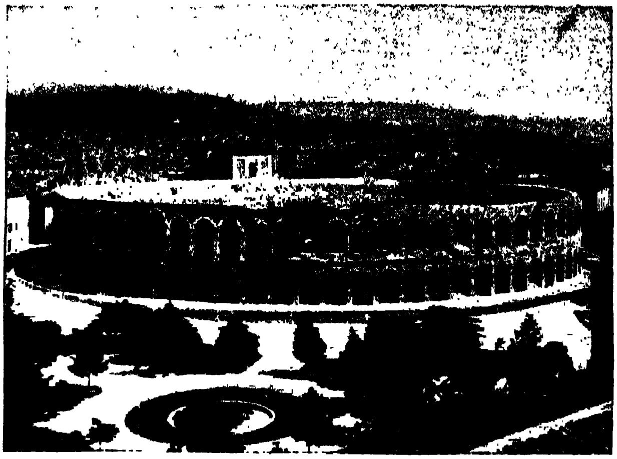
Amphipoda (*Gammarus locusta*).

Amphipolis, anc. city, Macedonia, on the E. bk. of the river Strymon, near to its port Eion. The Athenians founded a colony here in B.C. 437; the Romans made it the capital of one of the four districts into which they divided the province, B.C. 167. It is mentioned (Acts 17 : 1) as a stage in St. Paul's second missionary journey.

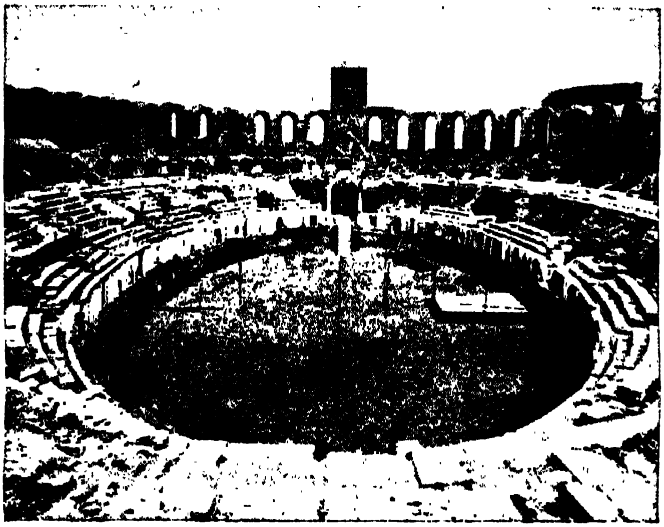
Amphisbænidæ, a family of aberrant lizards, found for the most part in America. They are from 18 in. to 2 ft. long, with a body of equal thickness throughout, head and eyes small, tail very short, limbs absent. The animals live underground, and feed on insects and worms.

Amphissa (formerly *Salona*), tn., Greece, to the W. of Mount Lyakura (Parnassus), 31 m. N.E. of Lepanto. It is connected with Itea, which serves as its port. In antiquity it was the capital of the Locrides Ozoles. In 339 B.C. the town was captured and destroyed by Philip of Macedon.

Amphitheatre, the structure, usually oval in its ground-plan, surrounding the arena which, in ancient Rome, was the scene of gladiatorial and other combats. The term is often held to include the arena also, but the amphitheatre proper was occupied solely by the spectators. Like the arena, it was roofless, and the seats were ranged in long tiers rising in successive gradation. Ruins of these ancient amphitheatres are found all over the area of the Roman empire, the finest specimen being the Flavian amphitheatre or Colosseum at Rome. Next in size is the amphitheatre at Capua, 558 ft. by 460 ft.; while that at Nîmes is next in age. Verona possesses a beautiful example of the amphitheatre, which is in admirable preservation owing to the care bestowed on it during the middle ages. The amphitheatre at Pola, in Istria, had an arena of wood, which has disappeared, while the walls stand. Arles, in France; Italica, near Seville, in Spain; Cirencester and Silchester, in England; Alt-Ofen or Buda (*Aquincum*), in Hungary, are some of the many sites of Roman amphitheatres. The first of the buildings erected in stone dates from about 31 B.C., in the reign of Augustus; and they ceased to be built only with the decadence of the empire. But visitors to the modern Spanish bull-ring never fail to be struck with the fact that this is, in all essentials, the lineal descendant of the Roman amphitheatre; and the preliminary salute given by the performers to the 'president' recalls at once the emperor and the '*Ave, Cæsar!*' of the gladiators. See Lanciani's *Pagan and Christian Rome* (1893), and *Ancient Rome in the Light of Recent Discovery* (1889); also J. H. Parker's *Historical Photographs of the Colosseum* (1878).



Roman Amphitheatre, Verona.



Roman Amphitheatre, Arles.

Amphitherium, a primitive mammal, remains of which are found in the Stonesfield slate (Jurassic) of England. Four imperfect jaw-bones have been obtained, and they indicate a small animal allied to the marsupials.

Amphitrite, a sea-goddess, wife of Poseidon or Neptune, and mother of Triton. In Homer the name is used simply of the sea.

Amphitryon, a Theban general, son of Alcæus and Hipponome, husband of Alcmena, and nominal father of Hercules. His name is commonly used as a synonym for a generous host. He gives title to comedies by Plautus, Molière (1668), and Dryden (1690).

Amphiuma, a genus of American amphibians, including long, eel-like forms, with weak, widely-separated limbs. Though gills are absent in the adult, the branchial aperture persists throughout life.

Amphora, a large, double-handled Roman vessel, of reddish-yellow coarse clay, for holding liquids. Two forms were common—(*a*) nearly spherical and short-necked, pointed at the base

Roman Amphitheatre, Nîmes.

for setting in the earth; (*b*) semi-oval and long-necked. Very similar vessels were used to contain the ashes of the dead.

Amplitude, the horizontal distance of a heavenly body from the east or west point. Its measure is the angle intercepted between the prime vertical and the vertical circle passing through the object, and it is thus complementary to the azimuth, which is measured from the north or south point.

Ampthill, ODO WILLIAM LEOPOLD RUSSELL, FIRST BARON (1829–84), British diplomatist, born at Florence. From 1850–2 he was employed at the Foreign Office, whence he passed successively to the embassies at Paris, Vienna, Constantinople, and Washington. From 1858–70 he was secretary of legation at Florence, and at the same time the official representative of Britain at the Vatican. In 1871 he was sent as ambassador to Berlin, where he remained until his death, at Potsdam, in 1884. He took part in the Congress of Berlin (1878), and was raised to the peerage in 1881.—His son, OLIVER ARTHUR VILLIERS RUSSELL, SECOND LORD AMPTHILL (b. 1869), acted as private secretary to Mr. Chamberlain when Colonial Secretary, and in 1900 became governor of Madras. He was acting governor-general of India during Lord Curzon's absence in 1904.

The Ampulla used in the Coronation of our Sovereigns.

Ampulla, an ancient Roman vessel made of glass or earthenware, with wide body and narrow mouth, used for holding oil and other liquids. An ampulla, shaped like an eagle, is used in the British coronation ceremony.

Amputation is the operation of cutting away a limb, or a portion of a limb, either because of a hopelessly crushed or shattered condition, or to prevent the spread of disease. The aim is to remove all diseased, dead, or useless tissue, at the same time saving as much as possible, and leaving a useful stump, which will be serviceable alone, or which can have an artificial limb fitted to it. Amputations are broadly divided into the 'flap' and the 'circular' operation, modified as far as necessary to meet the necessities of the case. The flap operation is the most favoured, but choice depends upon the site of operation. Both have for their object the provision of a serviceable pad for the end of the stump, and it is obvious that more is needed in the case of a leg than in that of a finger or an arm. The circular amputation is achieved with the help of an assistant, who grasps and retracts the soft parts as far as possible before the surgeon makes his circular sweeping incision. Thus the soft parts are left longer than the bone. In the flap operation the knife transfixes the soft parts close to the bone, and is then brought downwards and outwards, thus separating flesh from bone in a flap of the necessary length. The knife then transfixes the limb on the opposite side of the bone, and a second flap is formed. The bone is sawn through on a level with the base of the flaps, which can then be easily joined over the end. Care is taken to make the flaps of a size which fully allows for shrinkage and for muscular contraction, and that no splinter of bone is left to irritate the covering tissues. Bloodlessness, painlessness, and cleanliness—*i.e.* antisepsis—are the outstanding features of a modern operation, due respectively to the tourniquet or its equivalent, to anæsthetics, and to antiseptic treatment.

Amraoti, tn., cap. of the dist. of the same name, Berar, India, 108 m. S.W. of Nagpur, is an important centre of the cotton trade, both raw and manufactured. It is celebrated for its temples, one of them—the temple of Bhawani—built a thousand years ago. Pop. (1901) of dist. 630,118; of tn. 34,216.

Amravati, or AMARAVATI (*Amara Ishwara*), tn. in Kistna dist., Madras, India, is 20 m. N.W. of Guntur, and was one of the centres of the Buddhist kingdom of Vengi. It is of interest to the antiquarian; portions of its Buddhist tope, once of great magnificence, have been removed to the British Museum.

Amrilcais, or IMRU AL-KAIS, Arabian poet, son of Hodshr, chief of the Benu-Asad tribe, was a contemporary of Mohammed, against whom he wrote satiric verses. His *Moallaka* is rich in imagination, and seems to have served as a model for the Arabian poets of the following centuries. Editions have been published by Müller (1869), Frenkel (1876), Ahlwardt (Eng. trans. in *Six Ancient Arabic Poets*, 1870).

Amritsar, or UMRITSAR. (**1.**) An important commercial city, cap. of the dist. of the same name, in the Punjab, India, 32 m. E. of Lahore, is the religious capital of the Sikhs; founded (1574) by Guru Ram Das, who excavated a sacred tank, which gives the city its name (lit. 'pool of immortality'), and in the midst of which is the chief temple of the Sikhs. Noted for the manufacture of cashmere shawls, and silks. Pop. (1901) 162,548. (**2.**) District; area, 1,601 sq. m.; pop. (1901) 1,023,902.

Amru, Ibn-el-Aas (?600–663 A.D.), an Arab general, who at first opposed Mohammed, but later became a convert, joining the prophet in his refuge at Medina. Under Abu-Bekr he conquered Syria (634), and in the caliphate of Omar served in Palestine, capturing Cæsarea in 638. In 639 he invaded Egypt, took Misrah (the ancient Memphis), and Alexandria (641). He is credited with having projected a canal between the Mediterranean and Red Seas; and with causing the destruction of the famous library of Alexandria, but this charge is probably unfounded, as it was not made until the 13th century.

Amsler, SAMUEL (1791–1849), engraver, born at Schinznach, Switzerland. In 1829 he became professor of engraving at the Academy of Fine Arts, Munich, where he died. His works are best represented by the *Triumphal March of Alexander the Great*, after Thorwaldsen; the *Triumph of Religion in the Arts*, after Overbeck; and several *Virgins*, after Raphael.

Amstelodamum, the Latin name of Amsterdam, used in all Latin books issued from the Amsterdam press.

Amsterdam, seapt. and largest city, Netherlands, prov. N. Holland, stands at the mouth of the Amstel, on the Ij bay at the S.W. corner of the Zuider Zee, and is connected with the North Sea, 15 m. to the W., by the North Sea Canal, which gives access to the largest vessels. Although its shipping trade is less than that of Rotterdam, Amsterdam is the commercial capital of the Netherlands. It is the headquarters of Dutch finance and of the shipowning interest, and the principal market for the produce of the Dutch E. Indies, especially rice, coffee, sugar, tobacco, tin, and spices. The city is intersected in every direction by canals. In the older central parts of the town the more conspicuous buildings are constructed of brick, in the Dutch style of the 16th and 17th centuries. On the S. bank of the Ij are the docks and quays, and in the midst of these the central railway station (1889). Southwards from the central harbour are the church of St. Nicholas (1885–6); the old church (*c.* 1300); the new exchange (1900); the new church, a cruciform basilica in the Late Gothic style; the royal palace (1648-55), converted into a royal residence for Louis Bonaparte in 1808; the university (1754), attended by about 600 students; the Royal Academy of Sciences; and the arsenal. Farther south are three large museums. One of these, the National Museum, erected 1877-85, is the most important art depository in the Netherlands. It includes a valuable picture gallery containing works by the most famous Dutch artists of all periods; also antiquarian collections, a library, engravings, porcelain, glass, industrial art, ecclesiastical shrines, a marine museum, armoury, and a colonial collection. The others are the Museum Fodor (1860) and the Museum Suasso (1892-5), both containing paintings by modern Dutch artists. In the same quarter is the Vondel Park, and the Palace for National Industry (1855-64), used principally as a 'people's palace.' Amsterdam also possesses zoological and botanical gardens. Prominent industries are diamond cutting and polishing, sugar-refining, the manufacture of tobacco and cigars, rice-husking, saw-milling, shipbuilding, brewing, engineering, the preparation of cobalt, borax, and camphor, and the manufacture of chocolate, glass, porcelain, jewellery, cottons, woollens, leather, liqueurs, etc. In addition to the E. Indian goods already mentioned, Amsterdam imports tea, indigo, cocoa, hides and skins, cereals, timber, petroleum, rapeseed, linseed and other oil seeds, and coal; and exports butter, cheese, margarine, and pork. Pop. (1854) 243,304; (1884) 361,314; (1899) 510,853. In the 13th century Amsterdam was merely a fishing village, but rapidly grew in importance, especially after the middle of the 16th century, when the United Provinces shook off the Spanish yoke. Its commercial supremacy is in great part owing to the foundation of the Dutch E. India Company in 1602, and the Bank of Amsterdam (1609-1796). In 1808 the city was chosen as the capital of the Netherlands by Louis Bonaparte. The present epoch of prosperity dates from the opening of the North Sea Canal (1876). Distinguished natives are Spinoza (1632), Swammerdam (1637), and the poet Bilderdijk (1750). See Baedeker's *Guide to Holland and Belgium*.

Amsterdam, city, Montgomery co., New York, U.S.A., situated on the Mohawk R. and Erie Canal, 33 m. N.W. of Albany. Pop. (1900) 20,929.

Amu Daria, or JIHUN, a river in Russian Central Asia, formed by two streams which rise on the Little Pamir near the Indian frontier—(1) the Ak-su ('white water'), from which, perhaps, the ancient name Oxus is derived, which issues from the Gaz Kul, and is called lower down the Ak-tash and then the Murghab; and (2) the Panj, the sources of which flow from the glaciers of the Hindu-Kush, N.W. of the Kitik Pass. After the confluence of these, the river emerges into the Aralo-Caspian plain. It then flows N.W. At Charjui it is 1¼ m. broad and 7 to 10 ft. deep, with a current of 3 m. an hour; in some places it expands to 4 m., and forms islands. Having skirted the N. boundary of the Khiva khanate, it enters the Sea of Aral by a large delta 327 ft. above sea-level, after a course of some 1,400 m. Steam navigation extends from Charjui up to Faizabad-kala (370 m.), and down to Kungrad in the delta (350 m.).

Amulet. (**1.**) Any object worn suspended or attached to the person, as a charm against disease, or as the medium of good fortune. The ancient Chaldæans and Egyptians wore these charms in divers forms, and they were frequently inscribed with magic letters or signs. The Jews' phylactery was essentially an amulet. Curative amulets, often consisting of texts from the Koran written on strips of paper, are worn by Mussulmans. The old Norsemen were fond of wearing an image of Thor as an amulet. In ancient Etruria special heed was given to waxen *phalli*. Italian peasants carry amulets in the form of pigs, mice, bulls, and crosses of oak twigs (see C. G. Leland's *Etruscan-Roman Remains*, 1892). Lamaists carry an image of Buddha (*burkhan*), generally made of terra-cotta, and worn in a case (*gavo*) round the neck. Sometimes more than one is worn by the same person, and they are worn on the back as well as on the chest. The serpent amulet is all but universal; nails symbolically inscribed were widely used (see Elworthy's *The Evil Eye*, 1895); while pebbles, certain seeds, and crystal balls were common in Britain (see Black's 'Scottish Charms,' *Proc. Soc. Antiq. Scot.*, vol. xxvii.). Compare the 'luck of Edenhall,' a painted glass goblet preserved as a magic heirloom by the Musgrave family in Cumberland, and the story of *The Talisman* which Sir Walter Scott wove about it. (**2.**) A term applied in architecture to a ringlike moulding on a column. (**3.**) In decorative art, a band painted in relief round a vase or similar object. (**4.**) In heraldry, a ring borne as a charge, being a mark of cadency.

Amun. See AMMON.

Amur, a province of E. Siberia lying between the Amur R. and the Stanovoi range on the N. The country slopes S.E. to the Maritime Province from a height of nearly 1,500 ft., and is crossed by spurs of the Stanovoi range and by the Great and Little Khingan, the greatest elevations (in the Stanovoi range) being more than 7,000 ft. above sea-level. The Amur and its chief tributaries, the Zeya and Bureya, have cut down their beds considerably below the general level. The greater part of the country is mountainous and covered with forest, especially in the W., and the broader valleys are marshy. The wet summer and cold winter, without snow, are unfavourable to farming. The mean winter temperature is -9° F., and the summer 66° F. Gold is extracted, chiefly by convicts, on the Jalinda and other rivers in the basin of the Upper Amur, in the basins of the Zeya, Silinja, and Bureya, and in the Little Khingan. Of the inhabitants of the province, 88 per cent. are Russians; the remainder is made up of Manchus and of Tungus nomads who live by the chase. The conquest of the Amur was commenced in 1650 by the Cossack Khabarov; but the country was ceded by China to Russia only in 1858, by the treaty of Aigun. It is a province administered by a military governor at Blagoveshchensk, subordinate to the governor-general of the Amur region. Area, 172,840 sq. m. Pop. (1897) 118,510. See Schrenck's *Reisen und Forschungen im Amur Lande* (1858-92); Shirukievitch's '*Reisen bei den Amur-Völkern*,' in *Globus* (pt. lxxiv. 1898); also works cited under CHINA and MANCHURIA.

Amurath, or MURAD, name of several Sultans of Turkey.

Amurnath, or HAMARNATH, a cave in the mountains of N.E. Kashmir, is the reputed abode of the god Siva, and a resort of Hindu pilgrims.

Amur Petroglyphs. Unknown to science until a few years ago, these curious and apparently very ancient sculptures are traced on a series of boulders at the mouth of the river Orda, a tributary of the Amur. They represent conventionalized drawings of the human face and of animals, in wavy and spiral lines, with faint suggestions of Chinese affinities. These petroglyphs were first discovered by the officers of the U.S. 'Jesup North Pacific Expedition.'

Amur River, one of the most important rivers of Asia; also named the He-lung-Kiang, or Black Dragon R., by the Chinese, and the Sakhalinula, or Black Water, by the Manchus. It is formed by the union of the Shilka and the Argun, the former rising on the N. flank, and the latter on the S. side, of the Khan-ula range. The total length is about 2,760 m. On its course the Amur breaks through the Great Khingan and

Little Khingan ranges, and from the mouth of the Usuri is forced northwards by the Sikhota-alin Mts., entering the sea at Nikolaievsk, not far from the N. end of Sakhalin I. The fall is slight and the current moderate, but the river is wide and full of islands, except where it crosses the Little Khingan. At its mouth there is a bar with shallow water outside, and the lower section is much encumbered with sandbanks, so that the traffic from the interior is diverted along the Usuri, and so to the coast at Vladivostok. Steamers ply regularly during the season of navigation, May to October, up to Strietensk on the Shilka, the depth of water in this river being on an average 4 to 5 ft. Occasionally barges are towed 100 m. farther up. The great tributary, the Sungari, rising in the Chang-pai-shan, or Ever-White Mountain, drains with its affluents the greater part of Manchuria, and affords navigable water-ways 1,300 m. in length. The Usuri gives access also by the Sungacha to Lake Khanka, 3,070 sq. m. in area; and other tributaries of the Amur, the Zeya, Bureya, and Amgun, are navigable for short distances. The total length of navigable water-ways is nearly 8,400 m.

Amyclæ, anc. tn., 2½ m. S.E. of Sparta, chief town of the Achæans; it remained unsubdued long after the Dorian conquest. It was said to be the birthplace of Castor and Pollux. Its early prosperity has been proved by the discovery of a splendid tomb belonging to its princes, which contained, among other treasures, two magnificent gold cups, the finest specimens of Mycenæan art.

Amygdaleæ, a sub-order of the Rosaceæ, including many trees with stone fruits—*e.g.* almond, peach, cherry, laurel.

Amygdalin ($C_{20}H_{27}NO_{11}$), a glucoside occurring in the bitter almond, in laurel leaves, and in the kernels of the peach, apple, and pear. Bitter almonds are crushed, the pressed cake is boiled with alcohol, and the clear liquid concentrated; ether is then added, and amygdalin is precipitated in the form of white crystalline scales. Amygdalin is decomposed by emulsin (also present in almonds), into benzaldehyde, glucose, and prussic acid.

Amygdalitis, synonym for acute tonsilitis or quinsy.

Amygdaloidal, a name given to igneous rocks, usually old lava flows, full of almond-shaped cavities which have been filled up with secondary minerals, such as calcite, agate, or the zeolites. These cavities vary in size up to several inches across, and were formed while the rock was still fluid and in motion.

Amyl (C_5H_{11}), an alkyl or radical in a number of organic compounds. Of these, amyl alcohol occurs in fusel oil; amyl nitrite is a powerful poison, with a specific action on heart and blood-vessels, and is inhaled in small doses in certain diseases of the heart and in asthma; amyl acetate is used as a flavour and solvent, etc.

Amyloid. See WAXY DEGENERATION.

Amylopsin, the diastatic ferment in the pancreatic secretion. See PANCREAS; DIGESTION.

Amyntor, GERHARDT VON, pseudonym of Dagobert von Gerhardt.

Amyot, JACQUES (1513-93), translator of Plutarch (his version has become one of the classical works of French literature), grand almoner of France, bishop of Auxerre, was born at Melun, of humble origin; made by Marguerite of Navarre professor of Greek and Latin at Bourges University. There he translated the *Æthiopica* (1547) of Heliodorus and some of Plutarch's *Lives*. He attended the Council of Trent, and on his return became tutor to Charles and Henry, the sons of Henry II. It is to the latter that the *Vies de Plutarque* (1559) are dedicated. In 1570 he was created bishop of Auxerre. The *Œuvres Morales de Plutarque* appeared in 1572. His other works include versions of Diodorus Siculus (1554), and of *Daphnis and Chloe* (1559). Reprints of his *Plutarch:* 1783 7 (22 vols.); 1801-6 (25 vols.); 1818 21 (25 vols.). See A. de Blignières' *Essais sur Amyot* (1851); Sainte-Beuve's *Causeries du Lundi*, vol. iv.

Amyraut, or AMYRALDUS, MOSES (1596-1664), Protestant theologian. A pupil of Calvin, he wrote *Traité de la Prédestination* (1634), *Traité des Religions* (1631), and many other books. He made the University of Saumur the principal school of Protestantism in France. See Fraissinet's *Essai sur la Morale d'Amyraut* (1889).

Amyris, a genus of tropical plants with fragrant resinous juice—*e.g.* myrrh, frankincense.

Anabaptists, a Christian sect which appeared in Germany at the time of the reformation. They denied the validity of infant baptism, and preached a new social organization with absolute equality and community of goods—doctrines which they also extended to their domestic relations as well. The history of this sect was brief but eventful. They first came prominently forward in 1521 at Zwickau, in Saxony, under Thomas Münzer and others, who styled themselves the Prophets of Zwickau. Luther spoke strongly against them, urging the princes in whose states they appeared to su[illegible] them. Münzer travelled [illegible]h Bohemia, Thuringia, Switzerland, etc., preaching his theories with great success. In 1525 he adroitly fomented the deep dissatisfaction of the peasants of the south and middle of Germany, who were in revolt against their lords in what is known as the Peasants' war. The peasants were completely defeated at Frankenhausen (May 15, 1525), and Münzer and other leaders were executed; but the movement was continued by propagandists throughout Germany, Switzerland, and the Netherlands. The sect gained considerable power in Münster, Westphalia, where, under the leadership of Johann Bockhold, a tailor of Leyden, better known as John of Leyden, they secured possession of the town in 1533, and founded a new theocratic state. John of Leyden, who called himself prophet and king of the New Zion, ruled here absolutely, and made preparations for the conquest of the world. The town was besieged by several princes, and after an obstinate resistance was taken on June 24, 1535. John of Leyden, Knipperdolling, and other leaders were executed, and the movement gradually died out. See PEASANTS' WAR; also Hase's *Neue Propheten* (3rd ed. 1893); Cornelius's *Geschichte des Münsterschen Aufruhrs* (2 vols. 1855-60).

Anabasis of Cyrus, a historical account by Xenophon of the campaign of the younger Cyrus against Artaxerxes, and of his own famous retreat with the Ten Thousand.—The ANABASIS OF ALEXANDER, the story of Alexander the Great by Arrian.

Anabolism, as opposed to katabolism, the constructive or synthetic changes in protoplasm. See METABOLISM.

Anacharis. See CANADIAN PONDWEED.

Anacharsis, a noble Scythian who visited Greece about 590 B.C., and gained much admiration by his manner of life and acute observations on Greek society. He was acquainted with Solon. Letters attributed to him, but certainly forgeries, are extant. See Herodotus, bk. iv.; and compare Barthélemy's sociological novel, *Voyage du Jeune Anacharsis en Grèce* (1788).

Anachronism (Gr. *ana*, 'back;' *chronos*, 'time'), the reference of a circumstance, custom, or mode of speech to a wrong date. The exact significance of an anachronism depends on the intention of the writer in whom it is found. The English and Spanish dramatists are full of anachronisms, but as they make no pretence of preserving local colour or historic truth, these errors can scarcely be counted as artistic faults. Calderon, in his *Virgen del Sagrario,* introduces a bishop who is supposed to live three hundred years before the discovery of the New World, yet who quotes Herodotus as an authority on America; while it is not uncommon in Spanish religious plays to find Adam, the prophets, and Christ all on the stage at once. Shakespeare's own liberties in the same direction are well known. He transports all our modern customs and usages, the observance of May day, and the institution of nunneries, to the court of Duke Theseus (*Midsummer-Night's Dream*). So, too, in *Julius Cæsar* we have a reference to clocks striking the hour. These slips are of little consequence, however, for the avoidance of them is no part of the author's artistic theory. But when Agamemnon, in *Troilus and Cressida*, quotes Aristotle, the anachronism becomes a positive fault, because the poet is evidently trying to produce an effect by an appeal to the historic sense. In the case of historical novelists it is almost impossible to avoid an occasional transposition of events—as where Scott, for example, quotes in *Kenilworth* from the *Midsummer-Night's Dream*, in a scene dated several years before the writing of that drama. Such an error as this, however, is immaterial so long as the general effect is true to the spirit of the age, and is much less serious than the procedure of the modern French romantic dramatists, with Victor Hugo at their head, who have elevated historic truth of fact into an absolute law of the drama, but who do not scruple to commit the graver anachronism of attributing to their characters sentiments and ideas utterly foreign to the age they lived in. Anachronisms have in almost all ages been perpetrated by painters of sacred Christian subjects—Dutch, German, etc., peasants being depicted as disciples of Jesus.

Anacoluthon (Gr. *an*, 'not;' *akolouthos*, 'following'), a want of grammatical sequence, produced by a sudden change of construction in the middle of a sentence: *e.g.* 'Whoso desireth to live happily—let him make virtue his friend.'

Anaconda, a very large boa of aquatic habits. See BOA.

Anaconda, city of Montana, U.S.A., 65 m. S.W. of Helena. Its principal industry is mining and smelting copper. Pop. (1900) 9,453.

Anacreon of Teos (*c.* 560-478 B.C.), celebrated lyric poet; removed to Abdera in Thrace about 544 B.C.; afterwards lived with Polycrates, despot of Samos, until his death (522), and then with Hipparchus at Athens. He was a poet of pleasure, love, and wine. There are few genuine fragments; though a great body of poems, most of which are of much later date, bear his name. Moore's imitations give an idea of their spirit. Both they and the genuine fragments are included in Bergk's *Poetæ Lyrici Græci*, vol. iii. (1843). Short lyrical poems in praise of love or wine are called ANACREONTIC—*e.g.* the Anacreontic and Bacchanalian division of Herrick's *Hesperides* (1648).

Anacrotism, an irregularity of the pulse.

Anadiplosis (Gr.), the rhetorical figure of simple repetition—*e.g.* 'O earth, earth, earth,' etc.

Anadyomene, an epithet of APHRODITE.

Anadyr, riv. in E. Siberia, rises in Stanovoi Mts., flows through an uninhabited region, and after a course of 460 m. falls into the Gulf of Anadyr, in Bering Sea.

Anæmia (Gr. 'want of blood'), a deficiency or poverty of blood, mainly due to changes in the red blood corpuscles. (See BLOOD.) Symptoms are: pallor of skin and mucous membranes, weakness and lassitude, breathlessness, headache, dizziness, neuralgia, dyspepsia. The conjunctivæ are white, and there is often œdema of the lower eyelids and the feet and ankles. The heart is often dilated, with systolic murmurs, and a humming may be heard in the veins of the neck. There is generally little loss of weight; the patient is often plump. Anæmia often ensues on hæmophilia, scurvy, nose-bleeding, purpura, hæmorrhoids, menorrhagia, hæmoptysis, hæmatemesis, etc. Insufficient or indigestible food, internal parasites, the strain of lactation, bad hygienic conditions, cardiac diseases, and lung disease commonly cause secondary anæmia. Two of the commonest causes in young girls are constipation and insanitary or overcrowded bedrooms. But there are also anæmias called primary, probably due to disease of the blood-forming organs. Since secondary anæmia is only a symptom, its treatment depends on the disease which causes it. In its worst forms, anæmia, then called *pernicious*, is supposed to be primary. In all cases, treatment consists in physical and mental rest, healthy and cheerful surroundings, and careful attention to diet. Transfusion of blood is resorted to in dangerous cases. Arsenic is the most reliable drug, generally given in Fowler's solution. Intestinal antiseptics, such as salol, naphthol, and salicylate of bismuth, are useful. The administration of bone marrow has proved beneficial in some cases. See CHLOROSIS; also Bramwell's *Anæmia* (1899), and W. Hunter's *Pernicious Anæmia* (1901).

Anæsthesia (Gr. 'want of sensation'), the local or general absence of sensation, whether due to disease (morbid anæsthesia) or to artificial means (anæsthetics). For the morbid condition, see SENSATION. General anæsthetics act on the central nervous system; local anæsthetics act on nerve-endings, leaving the central system usually unaffected. For the former, see CHLOROFORM, ETHER, NITROUS OXIDE ('laughing gas'), and ETHYL CHLORIDE; HYPNOTISM also is important in this respect. For local anæsthetics, see COCAINE, EUCAINE, and HOLOCAINE. Laudanum and similar anodynes are not properly anæsthetics. The hypodermic injection of water produces a certain amount of local anæsthesia; and a tight ligature has the same effect. Suprarenal extract has lately been recommended as a local anæsthetic, hypodermically injected, or applied to mucous membranes.

Anagni, tn., prov. Rome, Italy, 46 m. by rail S.E. of Rome, has been an episcopal see since the 5th century. Large portions of the ancient walls remain. The cathedral dates from the 11th century. Pop. (1901) 9,612.

Anagoge, or ANAGOGY (Gr. 'a leaping up'), a raising of the mind to celestial things; a mystical interpretation of the plain narrative of Scripture, as when Gregory the Great, in his *Commentary on Job*, explains the apostle Peter's warming himself at a fire of coals during Christ's trial as being typical of the coldness of heart which would lead him presently to deny Christ. See ALLEGORY.

Anagram (Gr. *ana*, 'back;' *gramma*, 'a letter'), a new word or phrase formed from an old one by the transposition of its letters. In the middle ages a mysterious power of divination was supposed to reside in the anagram; and thus, from the letters of Pilate's question, *Quid est veritas?* (What is truth?), the monkish anagrammatists produced the answer, *Est vir qui adest* (It is the man before you). The anagram is often employed in the manufacture of pseudonyms. The name Voltaire, for example, is formed from the letters of 'Arouet l(e) j(eune);' and Barry Cornwall is an imperfect anagram formed from Bryan Waller Procter. Out of Horatio Nelson Dr. Burney fashioned *Honor est a Nilo*. Addison classes the anagram and the acrostic together as species of 'false wit,' adding trenchantly, 'It is impossible to decide whether the inventor of the one or the other were the greater blockhead' (*Spectator*, No. 60). See Wheatley, *On Anagrams* (1862); and Dobson's *Literary Frivolities* (1880).

Anahuac, the great central table-land of Mexico extending from the valley of Mexico to El Pasco, on the Rio Grande del Norte. The name ('amid the waters') referred originally to the coast-lands of Mexico; but since the end of the 16th century has been applied to the central tableland, because of the numerous lakes in the valley of Mexico. With a uniform elevation of 7,500 ft., the plateau has an absolute incline from the capital to El Pasco (1,225 m.) of only 3,632 ft. The plateau is cut by *barrancas* or cañons formed by streams.

Anakim, or SONS OF ANAK, a race of giants mentioned in Scripture (Josh. 11:21 *f.*; Num. 13:33) who occupied the mountains about Hebron, and were also found to the north, near the Mediterranean. They were conquered by Joshua and Caleb.

Analecta, or ANALECT (Gr. 'things gathered'), a literary collection or anthology.

Analeptic, a term applied to those drugs or other means which are used to restore strength after disease.

Analogy. (**1.**) In logic, a form of proof and instrument of investigation. If two objects, X and Y, resemble each other in a number of characteristics *abcd*, and X has the further characteristic *e*, then it is a matter of more or less probable inference that Y has this characteristic also: such an inference is called inference by analogy. The presence of *e* in Y is inferred from the presumed connection of *e* with the common characters, or common structure, *abcd*. But inasmuch as this connection is not shown to be necessary, but only presumed on the strength of its actual occurrence in X, the analogical inference is only probable, and, if the conjunction of *e* with *abcd* be only accidental, may be mistaken. If, for example, I hear one Liberal candidate supporting a certain measure, and infer that the Liberal candidate in another constituency will support the same measure, I may be mistaken, if the measure in question is one upon which the Liberal party are not agreed. I was arguing from the common character of Liberalism predicated of both candidates; but the connection between Liberalism and the particular measure in question was not made out, but only presumed. It is sometimes said that the value of an analogical inference depends on the proportion of the known resemblances between X and Y to the known differences between them, and, again, to the total number of their respective qualities. But any such quasi-numerical statements are misleading. The real point is the degree of probability attaching to the connection of *e* with *abcd*. Thus, if in the above illustration it could be shown that the political measure in question was logically connected with other measures in the Liberal programme, the force of the analogy would be greatly strengthened; though even then the argument would be only probable, since politics is not ruled exclusively by logic. In a sphere of abstract necessity, such as mathematics, analogical proof has no place. See J. S. Mill's *System of Logic*, bk. iii. ch. 20; and Bosanquet's *Logic*, bk. ii. ch. 3 (1888). (**2.**) In biology, analogy is morphological conception, distinguished from homology. When two organs fulfil the same function, they are said to be analogous, whether they are or are not structurally similar. For example, the wings of butterfly and bird are analogous organs; but they are not homologous, for their development and structure are strikingly different.

Analysis. (**1.**) In logic. A clear distinction must be kept between the analysis which consists in resolving a datum into its elements, and the analysis which is a logical method for finding the premises by which a conclusion can be established. Examples of the former kind are the chemical analysis of a given substance into its elements, the grammatical analysis of a sentence into its several parts, and the logical analysis of an inference into premises and conclusion. Analysis as a logical method is most easily illustrated from geometry. If we are required to prove a theorem A, we may begin by supposing it true, and try to deduce some consequence B which, if true, implies in turn the truth of A, and similarly proceed from B to C. When we have thus arrived at some proposition (say D) which we know to be true, the analytic process is complete, and we can then deduce the truth of A *synthetically* from the known truth of D, through the intermediate steps C and B. The logical process of induction by hypothesis (see INDUCTION) is essentially similar. (**2.**) In mathematics, analysis denotes the algebraical as contrasted with the geometrical treatment of the properties of figures. (**3.**) In chemistry, analysis is the process of separating a compound body into its constituents. Proximate analysis is the separation of one or more compounds from a mixture. Milk contains water, fat, sugar, casein, and mineral salts: a separation of these from each other is a proximate analysis. Ultimate analysis is the further separation of these compounds into their elements. Analysis may be *qualitative* or *quantitative*. In the former we determine the various ingredients or elements, in the latter their exact proportions. The qualitative analysis of inorganic substances is based on the fact that every element will, under suitable conditions, give a reaction which is characteristic. Quantitative methods are based on the laws of definite proportions (see ATOMIC THEORY), and on the fact that all chemical compounds, however produced, have a fixed and definite composition. In qualitative analysis there are *dry* reactions, performed on the solid at a high temperature, and *wet* reactions, where the substance is in solution. Compounds which have reactions in common are grouped together, and by systematic methods all the ingredients of a complex mixture can be detected. Quantitative analysis is divided into many branches. Gravimetric methods are those in which the reaction forms an insoluble compound. By filtration, washing, and ignition these compounds are obtained pure, and are weighed. In volumetric methods solutions of known strength are used, the end of the reaction being made known by the use of an indicator, such as litmus, etc. In commercial analysis only those substances which give value to the product are determined: in manures, the phosphoric acid, nitrogen, and potash; in bleaching powder, the available chlorine; in coal, its calorific value. The microscope, spectroscope, and polariscope are used in special cases; and some substances are decomposed, and one or more of the ingredients estimated, by the use of the electric current. Assaying, gas analysis, water analysis, and organic analysis are all branches of the same subject, and involve special theoretical and practical training. See ASSAYING; and Fresenius's *Qualitative Analysis* (1897), also his *Quantitative Analysis* (1876); Sutton's *Volumetric Analysis* (1896); Hempel's *Gas Analysis* (1902); Blyth's *Foods: Composition and Analysis* (4th ed. 1896); Allen's *Commercial Organic Analysis* (2 vols. 1896-1901); Phillip's *Manual of Assaying and Metallurgy;* Lewkowitsch's *Chemical Analysis of Oils, Fats, and Waxes.*

Analyst, PUBLIC, an official appointed by the local authority of a borough or county to analyze samples of food and drugs under the conditions of the Food and Drugs Acts, 1875 and 1899. After appointment by the local authority, the analyst has to satisfy the Local Government Board as to his qualifications; they confirm the appointment, and the analyst can only be dismissed from office by the same authority. The qualification now generally accepted is the Fellowship of the Institute of Chemistry (F.I.C.), which must include the extra certificate in therapeutics, pharmacology, and microscopy. For his duties under the Act, see ADULTERATION. The analyst has to send in a quarterly report to the local authority as to the work he has performed during the quarter, and once a year a summarized report has to be transmitted to the Local Government Board. A special provision of the act allows the analyst's certificate to be taken as evidence without his presence in court, but the defence may call him as a witness.

Analytical and SYNTHETICAL JUDGMENTS, in logic, a Kantian distinction which has been the subject of much controversy. The analytical or explicative judgment is one in which the predicate merely states explicitly some attribute already contained in the definition or notion of the subject—*e.g.* 'All bodies are extended;' whereas the synthetical or ampliative judgment adds an attribute not so contained—*e.g.* 'All bodies are heavy.'

Anam. See ANNAM.

Anamalai, or ANNAMALLY ('Elephant Mts.'), is the part of the Sahyadri range, or Western Ghâts, which lies in the Coimbatore dist., Madras Presidency, and the Travancore State, India. The lower range (2,000 ft.) is well wooded with teak, blackwood, and bamboo. The higher range (6,000 to 8,000 ft.) consists of open grassy hills. Here is the peak Anamudi (8,850 ft.), the highest in S. India. The climate is healthy and the scenery grand. Tea and coffee plantations are scattered over the hills. The elephant, bison, and ibex are numerous. The hill tribes are keen hunters, and are called Kaders ('lords of the hills') and Malassers.

Anambas Islands, a group of small islands in the Dutch E. Indies, between Borneo and the Malay Peninsula, with an area of 200 sq. m. and 3,000 inhabitants. They belong to the residency of Riouw, and include the harbour of Clermont-Tonnerre.

Ananas. See PINE-APPLE.

Ananchytes (*Echinuscorys*), 'irregular' or heart-shaped sea urchin, a common and characteristic fossil of the Upper Chalk. Its upper surface is strongly convex; its under side is flattened, with the mouth near the anterior edge.

Ananias. (1.) The husband of Sapphira (Acts 5 : 1-10). The pair, while pretending to surrender to the church treasury the *whole* proceeds of a possession which they had sold, retained a part—*i.e.* were guilty of falsehood and hypocrisy. Being rebuked by Peter, both fell down dead. See Neander's *Planting of Christianity*, i. p. 27 *ff.* (2.) A disciple at Damascus, who baptized Saul, and introduced him to the church (Acts 9 : 10-18). He is said to have been one of the Seventy, and to have died a martyr. (3.) The high priest before whom Paul was brought by Claudius Lysias, and to whom the apostle applied the term, 'thou whited wall.' He was the son of Nebedaios, and was murdered at the siege of Jerusalem. See Schürer's *Hist. of the Jewish People in the Time of Christ*, I. ii. 188 *f.*, II. i. 200 *ff.*

Ananyev, or ANANIEV, tn., Kherson gov., near the Black Sea, Russia. Grain is cultivated. Pop. (1897) 16,713.

Anapa, a Russian port in the N. Caucasus, on the Black Sea. The roadstead is 27 ft. deep. Originally a Turkish fortress, it was three times (1791, 1807, 1828) captured by the Russians, who destroyed its works in 1855. Pop. (1897) 6,676.

Anapæst, a reversed dactyl; a metrical foot consisting of two short or unaccented (˘) syllables, followed by one long or accented (¯) syllable. Tyrtæus used the anapæstic measure in his war songs; in later Greek the term became almost synonymous with satire. Mr. Swinburne has employed the anapæst very extensively and with excellent effect in English—*e.g.* 'Ye are góds, and, behóld, ye shall díe, and the wáves be upón you at lást' (*Hymn to Proserpine*).

Anarchism, a political theory and propaganda demanding or awaiting the abolition of all institutions and instruments of government. Theoretically, it is diametrically opposed to socialism, and it is to be equally distinguished from communism; but the development of their theory shows that anarchists are 'really more socialist than are socialists themselves, because they are disposed to want not only common property and common production, but common enjoyment of products as well.' Anarchism aims at the unfettered self-government of the individual. Although William Godwin was the first in modern times to preach subversive doctrines—*An Enquiry concerning Political Justice* (1793)—the first articulate teacher of anarchism was Proudhon. Founding his argument upon the Scriptures and the writings of Adam Smith and Hegel, he desired that the political function should be reabsorbed in the industrial, and anticipated that in that case 'social order would ensue spontaneously out of the simple operation of transactions and exchanges'—*Dû Principe Fédératif* (1863), p. 29. Anarchists are generally antitheist, and condemn power and authority of every kind—landlords, employers, functionaries, even the law itself. 'The best government,' they say, 'is the worst.' Russian thinkers, such as Bakunin and Kropotkin, urged by the poverty and oppression of the workers, and applying the economic quasi-communism and the social anarchy of the Russian *mir* to more complex societies, have been fervent apostles of the movement. The leading American exponent of theoretical anarchism has been Benjamin R. Tucker. The doctrine is chiefly known, however, as the source of the execrable 'propaganda of deed,' by which frequent murders have been done, now upon a crowned head, and again, at random, upon the only less hated *bourgeoisie*. Most European countries have since 1883 passed severe repressive measures, but Britain, the refuge of foreign anarchists, has hitherto depended upon ordinary law and the police supervision of suspects. In Paris, Ravachol (1892), Vaillant (1893), and Henry (1894) have been executed for bomb outrages against unoffending citizens; and there has been a series of assassinations of rulers: (1) of President Carnot, by Caserio, at Lyons, on June 24, 1894; (2) Canovas del Castillo, on Aug. 8, 1897; (3) Empress Elizabeth of Austria, by Lucchoni, at Geneva, on Sept. 10, 1898; (4) King Humbert of Italy, by Bresci, at Monza, on July 29, 1900; (5) President M'Kinley, by Czolgosz, at Cleveland, on Sept. 6, 1901. See Rae's *Contemporary Socialism*, cap. 8 (1891); Garin's *L'Anarchie* (1885); Lombroso's *Anarchists: a Study in Criminal Psychology and Sociology* (Turin, 1894); Spencer's *The Individual and the State* (1885); Zenker's *Anarchism* (trans. 1898); Kropotkin's *Anarchy* (1897) and *Memoirs of a Revolutionist* (1900); Most's newspaper, *Die Freiheit* (New York), *passim.*

Anasarca, a general diffusion of serous fluid into the subcutaneous connective tissues. See DROPSY.

Anastasius I. (d. 401), Pope, held the supreme office from 398. He was a strenuous opponent of the Manichæan heresy and of the doctrines of Origen. There were three other Popes of this name—*viz.* ANASTASIUS II. (496-8), ANASTASIUS III. (911-13), ANASTASIUS IV. (1153-4).

Anastasius I. (430-518 A.D.), Emperor of Constantinople. His reign was troubled with Hun and Slav invasions. He was an active and enlightened prince, but provoked papal censure by his patronage of Eutychian and Manichæan heresies.

Anastasius II., Emperor of Constantinople, was raised to the throne on the deposition of Philippicus (713), but deposed (715) in favour of Theodosius. With the assistance of Bulgaria he attempted to regain the empire, but was taken by the Emperor Leo and put to death (719).

Anastasius, ST., or ASTRIC (954-1044), the 'Apostle of the Hungarians,' a monk of Rouen who was made bishop of Coloeza by Duke Stephen of Hungary, for whom he obtained from the Pope the title of king.

Anastasius Grün, pen-name of the German poet, Count von Auersperg.

Anastomosis, the communication or inosculation of blood-vessels. When one such is tied, the circulation is kept up by others, forming what is described as a 'collateral' circulation. Anastomosis is particularly free round joints.

Anata (anc. *Anathoth*), vil., Palestine, 3 m. N.E. of Jerusalem. In Bible times one of the cities of refuge, in the tribe of Benjamin; birthplace of Jehu (1 Chron. 12:3) and of Jeremiah (Jer. 1:1; 11:21-23, etc.).

Anathema (Gr. 'that which is set up'), at first an offering hung up in a temple to a god; later it implied the devotion of a sacrificial victim, or, by analogy, of a person, to destruction (Rom. 9:3; Gal. 1:8, 9). For its ecclesiastical sense, see EXCOMMUNICATION.

Anatolia. See ASIA MINOR.

Anatolian Railway, the chief railway in Asia Minor. It starts at Haidar Pasha, on the Bosporus over against Constantinople, and extends through Ismid and Angora to Kaisarieh. The first section, Haidar Pasha to Ismid (58 m.), was opened in 1870; the second section, from Ismid to Angora (301 m.), in 1892; the third section, from Angora to Kaisarieh (264 m.), was sanctioned in 1893; and a further concession, to Bagdad and Basra, was granted in 1899. A branch line was opened from Eski-shehr (between Ismid and Angora) to Konieh (276 m.) in 1896. See BAGDAD RAILWAY.

Anatomical Preparations. The various methods of preserving skins and of reproducing external anatomical features are dealt with in the article TAXIDERMY. As regards the deeper parts, it is often desirable, for teaching and other purposes, to have a more permanent preparation than an ordinary dissection. In the case of the skeleton this may easily be secured. Boiling bones will remove nearly all their organic material, leaving only the earthy constituents. The bones may then be riveted or jointed with wire in their relative positions. The soft parts may be preserved in glass jars containing spirit of wine, weak formalin solution, or other transparent preservative fluid; or they may be dried, sterilized, and varnished. Both methods are open to objection. In the former, specimens become decolourized, and lose their characteristic fresh appearance. They cannot be handled, and they fail to impress the student so vividly as a recent dissection. Dried specimens soon decay, unless kept in glass cases sealed against air and moisture. Plaster of Paris casts (see PLASTER CASTING) may be taken; but it cannot be said that plaster lends itself to the representation of soft tissues, no matter how well it be painted. Much more useful and realistic is the result of casting in glycero-gelatin. In this process a mixture of 'No. 1' gelatin and clear glycerin, in the proportion of 1 oz. by weight of gelatin to 1 oz. by measure of glycerin, is employed. The gelatin is soaked in water till soft. It is then slowly dried until just pliable, and melted in a water bath along with the glycerin. While still hot, it may be made opaque by the addition of a thick paint of oxide of zinc rubbed up with glycerin. Other pigments, such as calamine or vermilion, may be added to colour it as desired. All the ingredients must be thoroughly mixed. The cost is about 1s. 6d. per lb.

A plaster mould of the specimen is first taken. After this has been thoroughly dried by slow heat, hot glycero-gelatin is poured into it, the mould meanwhile being gently rocked to get rid of air bubbles. The fluid runs into the concavities, and must be ladled up over the higher parts, to which it gradually adheres as it cools, so that the whole surface is almost evenly coated over. While still in the mould it should be covered with lint or cotton-wool, and plaster of Paris is then spread over the lint. The plaster must fit the hollows and elevations of the back of the cast, and must be smoothed down on the surface which is uppermost during the casting. When it has set it is temporarily removed, and the glycero-gelatin is stripped gently out of the mould. This is now an elastic cast of the original, and when fitted to its plaster backing is ready for paint. When it is desired to represent a moist surface, oil-colours should be used; when a dry appearance is wished for, several coats of water-colour must be applied. Finally, an edging of velveteen or similar material hides the ragged edges, and throws the cast into relief. With a little practice and but slight artistic skill this method produces results almost startling in their fidelity to nature.

Anatomy (Gr. 'cutting up'), the knowledge of animal structure obtained by dissection. The science of structure, both in the animal and in the vegetable kingdom, is properly called morphology, and the word anatomy is usually restricted to the more special investigations, particularly of the human subject. *Comparative* anatomy is the morphological comparison of different classes of animals, revealing points of difference in structure, homologies of apparently different organs, and the supposed phylogenetic relationships of the various groups. *Descriptive* anatomy is the minute account, for purposes of surgical and medical practice, of the organs of the body and their physical relations. *Morbid* anatomy is the study of the structural changes consequent on disease. *Teratology* is the investigation of monstrosities and lesser abnormalities in the individual. *Physiological* anatomy relates to the structure of organs in respect of their several functions or uses. *Regional* or *surgical* anatomy refers to the relative positions of parts from the operative point of view. *Microscopic* anatomy is an inconvenient name for histology, or the science of the minute structure of tissues. *Surface* anatomy is the location of internal parts by means of external landmarks.

The study of human anatomy has been greatly impeded by prejudices with regard to the desecration of the dead. Aristotle was the founder of morphology, but neglected the human subject. The first dissections of the human subject are believed to have been made by Herophilus and Erasistratus, of the school of Alexandria. Celsus, and to a greater degree Galen, advanced anatomy. The study did not enter upon its modern career until the time of Vesalius. The further development of anatomy is one with the history of medicine.

Anatomy is the first special subject entered upon by the modern medical student, after he has been grounded in biology, physics, and chemistry. He is occupied with it for two years, and does well to dissect every part of the body twice. For that purpose the body is divided into (1) arm, (2) leg, (3) head and neck, (4) thorax, and (5) abdomen. The arteries are injected with a red paste containing a powerful antiseptic. Morbid anatomy is demonstrated in the post-mortem rooms of infirmaries, and surgical anatomy is taught by operations on living patients and the recent subject. The instruments used in dissection are scalpel and forceps. There are many good text-books on anatomy: see especially Quain's (new ed. 1896), and for the dissecting room Cunningham's; also Symington's *Topographical Anatomy of the Child* (1887). Well-organized statistical work is now carried on with reference to the occurrence of abnormal deviations in human structure. The Anatomy Acts, 1832 and 1871, require that schools of anatomy and teachers of the subject should be licensed. The acts are administered by the Home Office and four inspectors—*viz.* for London, England, Scotland, and Ireland. The unclaimed bodies of persons dying in hospitals and workhouses are secured for the purposes of tuition and research.

Anaxagoras (500-428 B.C.), one of the greatest early Greek philosophers; was born at Clazomenæ, went to Athens in 480, where he became intimate with Pericles; was fined five talents and banished for impiety (*c.* 430)—he asserted that 'the sun was a red-hot mass larger than the Peloponnesus;' retired to Lampsacus, where he died. His predecessors had sought to derive all the world from some one material substance; but Anaxagoras postulated a creative Intelligence (*Nous*), before whose operation the world was chaos. See Zeller's *Presocratic Philos.* (Eng. trans.); Burnet's *Early Greek Philos.* (1892).

Anaxarchus (4th century B.C.), a Greek philosopher of the Eleatic school; born in Abdera; was the favourite of Alexander the Great, whom he accompanied on his Asiatic expedition.

Anaximander OF MILETUS (610-547 B.C.), successor of Thales, the earliest Greek philosopher. He described the original element (*archē*) from which the phenomenal world developed as 'the infinite' (*apeiron*). His theories were materialistic in form. He introduced the gnomon, and was the first map-maker among the Greeks. See Zeller's *Presocratic Philos.* (Eng. trans.); Burnet's *Early Greek Philos.* (1892).

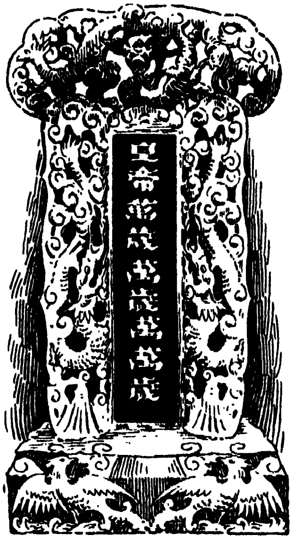
Anaximenes (*c.* 570-480 B.C.), third of the Ionic school of Greek philosophy, pupil of Anaximander and master of Anaxagoras; found the *archē*, or eternal and original element of the world, in air, of which all substances were formed by compression or expansion—even the soul, he said, was composed of air. See Zeller's *Presocratic Philos.*; Burnet's *Early Greek Philos.* (1892).

Anaximenes OF LAMPSACUS, Greek historian and rhetorician, tutor of Alexander the Great; wrote a history of Philip and of Alexander, and a history of Greece.

Ancachs, a Peruvian dep. on the Pacific slope. Valuable mineral deposits. Cap. Huaraz. Area, 16,562 sq. m. Pop. (1896) 428,703.

Ancelot, JACQUES ARSÈNE POLYCARPE FRANÇOIS (1794-1854), French dramatist and academician; wrote *Louis IX.* (1819), for which he was pensioned by Louis XVIII.; *Fiesque* (1824), adapted from Schiller's *Fiesco; Elisabeth d'Angleterre* (1829); and *Maria Padilla* (1838). His non-dramatic works include *Les Familières: Epîtres* (1842) and *Poésies* (1853).

Ancenis, tn., dep. Loire-Inférieure, France, 24 m. N.E. of Nantes, on the riv. Loire. Trade in cattle, spirits, and timber. Pop. (1901) 5,199.



Chinese Ancestral Tablet
(*in honour of Luo She, a Widow*).

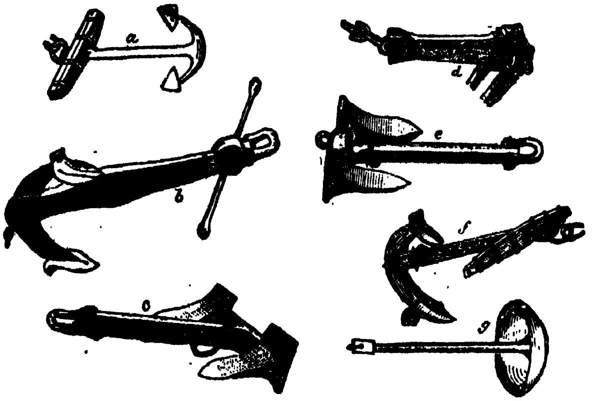
Ancestor-Worship, which is still the basis of the Chinese and Annamese religions, and with which totemism is in some measure allied, is of very ancient origin, and so widespread that it may be traced throughout the world. 'The most special representatives of ancestor-worship in Europe,' observes Professor Tylor, 'were perhaps the ancient Romans, whose word *manes* has become the recognized name for ancestral deities in modern civilized language. They embodied them as images, set them up as household patrons, gratified them with offerings and solemn homage, and, counting them as or among the infernal gods, inscribed on tombs D.M., *Diis Manibus.*' The 'ancestral tablets' which are found in the family room in modern Chinese houses are also supposed to contain the spirits of the family ancestors; and on every solemn occasion incense and candles are burned in front of the tablets, before which the worshippers kneel. Among many races, the soul of an ancestor has been held to become incarnated in a certain animal, which animal is accordingly set apart as sacred, although the reverence ostensibly accorded to it is actually due to the indwelling ancestral spirit. (See ANIMAL-WORSHIP.) To distinguish between the worship of a long-dead ancestor and the reverence paid to a supernatural deity is sometimes a difficult matter; and, indeed, according to the school of Euhemerus, all the gods of the classic Pantheon are nothing more than deified ancestors. Herbert Spencer regards ancestor-worship as the most primitive form of religion. See his *Principles of Sociology* (1877-96).

Anchises, king of Dardanus on Mount Ida, to whom Aphrodite bore the illustrious Æneas. He was blinded by Zeus for revealing the child's maternity. After the fall of Troy his son took him on his wanderings, until the old man died in Sicily. A shrine was built to him at Egesta. Homer's *Iliad*, the Homeric *Hymn to Aphrodite*, and Virgil's *Æneid* give his story.

Anchitherium, a small extinct ungulate, supposed to be one of the primitive ancestors of the horse; inhabited Europe and N. America in the Miocene period. It had three toes on each foot; each toe reached the ground; the lateral metacarpals, represented in the horse by splint bones, were well developed.

Anchor, the iron or steel instrument by which ships hold fast to the bottom of the sea. A common anchor has a 'shank,' 'stock,' 'ring,' and two 'arms,' at the extremities of which are 'flukes' or 'palms.' A ship 'rides' at anchor when it is secured at its moorings. To 'weigh' anchor is to heave it up, in order to get the ship under way. To 'cat' the anchor is to hoist it up to the cathead. To 'fish' an anchor means to draw up its flukes to the top of the bows by a machine called a fish, in order to stow it after it has been 'catted.' All large ships carry several anchors. A first-class battleship usually has eight. In 1852 an Admiralty committee examined several new types of anchor, and among those most favourably reported upon were Honiball's (or Porter's), Lenox's, Mitcheson's, Rodger's, and Trotman's. Later developments have been introduced by Rodger, Martin, Smith, Inglefield, Hall, and many others. Many of the patent anchors have movable instead of rigid arms; others are stockless, and so constructed that the ring and shank can be drawn right into a ship's hawse-hole, thus doing away with the necessity for catting and fishing. Anchors of various forms are also used for keeping buoys and moorings in position. Of these the mushroom and the screw anchor are well-known types.

Anchorage. (1.) A sheltered position in which vessels may anchor. In its legal sense the word denotes the duty levied upon ships for coming to or lying in certain roads or anchoring grounds. Such payment is due, in the first instance, to the crown only, no subject having any rights below and beyond high-water mark. It is admitted as a general principle that vessels driven in by stress of weather are exempt from anchorage dues. Similar to anchorage are shore dues, which, under a special grant, are in the hands of a subject who has rights over a particular port or haven. (2.) Also applied to the terminal structure (natural rock or heavy masonry) to which the cables of a suspension bridge are made fast.



Anchors.

a, Common Admiralty pattern; *b*, Trotman's; *c*, Smith's stockless; *d*, Martin's; *e*, Inglefield's; *f*, Porter's; *g*, Mushroom anchor.

Anchor Ice, or GROUND ICE, ice formed (rarely) at the bottom of rivers. The current is too great for the formation of ice at the surface, but the water, retarded in the bed of the river, is congealed. When much ice has been formed round a stone, it lifts it to the surface; in the Baltic even iron chains and anchors have floated in this way. See *Symons's Meteorol. Mag.*, vol. xxiv. p. 40; *Report of Thames Commissioners* (1866).

Anchorite, a recluse or hermit; one who seeks to live in solitude, and with as little intercourse as possible with his fellow-[illegible] The term is specifically [illegible]d to the Christian ascetics [illegible]e 3rd century, who established themselves in caves and lonely places in Egypt and in the adjacent deserts. St. Antony was the most illustrious.

Anchor Line, a steamship line founded by Messrs. Handyside and Henderson, now Henderson Bros., of Glasgow and Liverpool. Its chief trade is between Glasgow and New York (since 1856); but it now maintains in addition a service between the United Kingdom and Bombay and Calcutta, and the chief Mediterranean ports. It owns a fleet of thirty-seven steamers, amounting to 164,996 tons. In 1899 the line was made a joint-stock company.

Anchovy (*Engraulis encrasicholus*), a small fish belonging to the same family as the herring (Clupeidæ), found in abundance in the Mediterranean. It is there the object of an important fishery, and, after preservation in salt, is exported to all parts of the world. The species is widely distributed, and numerous other anchovies occur in different parts of the world, both in temperate and in tropical seas. The adult fish measures from five to seven inches. There is usually a broad silvery band at the sides of the body, by which it can be easily recognized. Anchovies are taken in drift-nets and seines. There is also a fishery in the Zuider Zee. See PILCHARD.

Anchovy Pear, the fruit of a tree of the myrtle order, native of the W. Indies. The leaves, from two to four feet long and about one foot broad, are the largest of all dicotyledonous leaves. The fruit is edible, with a flavour like that of mango; it is often pickled.

Ancient Demesne. English manors which are mentioned in Domesday as belonging to Edward the Confessor or William I. were considered to belong in a peculiar way to the royal inheritance, and were known as ancient demesne. Tenure in ancient demesne has many peculiarities, and exists either (*a*) by the custom of the manor, a sort of customary freehold, or (*b*) freehold. See Challis's *Law of Real Property.*

Ancient Lights. See LIGHT and AIR.

Ancient Mariner, poem by S. T. Coleridge, published in *Lyrical Ballads* (1798). The idea appears to have been taken from Captain G. Shelvocke's *Voyage Round the World* (1757).

Ancillon, CHARLES (1659-1715), diplomatist and historian; born at Metz, where he practised law. Settling in Berlin, he was appointed a judge of the French refugees (1699), and superintendent of the French school. His works include *Histoire de l'Établissement des Français Réfugiés dans le Brandebourg* (1690), which determined many Protestants to settle in Brandenburg; *L'Irrévocabilité de l'Edit de Nantes* (1688); *La France intéressée à rétablir l'Edit de Nantes* (1690); and *Histoire de Soliman II.* (1706).

Ancillon, JOHANN PETER FRIEDRICH (1767-1837), Prussian statesman and author; born at Berlin; filled (1792) the chair of history in the military academy at Berlin; was elected (1803) a member of the Academy of Sciences, and appointed historiographer royal; rose to be (1832) Minister of Foreign Affairs. In 1810 the education of the Crown Prince (afterwards King Friedrich Wilhelm IV.) was entrusted to him. He wrote on philosophy, history, and politics—e.g. *Révolutions du Système politique de l'Europe depuis le XV^e Siècle* (4 vols. 1803).

Ancona. (1.) Province, Italy, in the Marches, between the Central Apennines and the Adriatic, with an area of 756 sq. m.; pop. (1901) 302,460. The people grow grain and fruit, breed silkworms, manufacture silk, paper, iron, sugar, flour, lime, bricks, and leather, and mine sulphur. Chief towns, Ancona, Jesi, and Senigallia. The railway from Bologna to Brindisi skirts the shore. (2.) Town and episc. see, cap. of above province, situated on the Adriatic, is the only good port between Venice and Brindisi. The harbour is enclosed by two fine piers, one of which was built by Trajan in 115 A.D. Extensions to the moles were agreed upon in 1903. The town is strongly fortified, and has a naval arsenal. Sulphur, silk, and eggs are exported. Iron and other mineral works, and factories of sugar, soap, and tallow, represent the chief industries. Pop. (1901) 55,408. Founded by Greeks from Syracuse (380 B.C.), Ancona was destroyed successively by the Goths and the Longobards; later, it asserted its position as an independent republic, until it fell into the hands of Pope Clement VII. in 1632. In 1849 the Austrians captured it; and again in 1860 its papal defender, General Lamoricière, was compelled to capitulate to the Piedmontese.

Ancona, Alessandro d' (1835), Italian man of letters and philologist; born at Pisa. He became one of the chief intermediaries between the Tuscan Liberals and Cavour. In 1859 he edited the newly-founded journal, *La Nazione;* but having in the following year been elected to the chair of Italian literature in the University of Pisa, he devoted himself until 1900 to academic teaching and literary work. He has edited a number of early and rare Italian texts—Dante's *Vita Nuova* (2nd ed. 1884); the *Antiche Rime Volgari* (1875-88), together with Comparetti; a *Manuale della Lett. Ital.* (1892-5), together with Bacci; edition of Campanella (1854); has written studies on the Italian drama—*Sacre Rappresentazioni dei Secoli* XIV., XV., *e* XVI. (1872); *Origini del Teatro in Italia* (2nd ed. 1891); and has treated of several subjects connected with Italian literature—*I Precursori di Dante* (1874); *La Poesia Popolare Italiana* (1878). Two collections of *Studii* appeared in 1880 and 1884.

Ancre, Baron de Lussigny, Marquis d' (d. 1617), whose real name was Concino Concini, a Florentine adventurer, accompanied Maria de' Medici to France in 1600, and rose to be marshal and chief minister of state, and acquired vast wealth. He was assassinated in April 1617 at the instigation of Louis XIII. His corpse was treated with great indignity, and his wife was afterwards burned at the stake as a sorceress.

Ancren Riwle, or The Rule of Nuns, a manual of religious instruction written about 1210 for a small society of three pious ladies and their lay sisters, established at Tarente (Tarrant-Kaines or Kingston) in Dorsetshire. The book treats of devotional services, of the regulation of outward behaviour, of avoiding temptation, of confession, penance, and charity, and of social and domestic duties. The authorship has been attributed to Richard Poor, a native of Tarente, who was successively bishop of Chichester, Salisbury, and Durham, and who rebuilt the monastery of nuns founded by Ralph de Kahaines, son of one of William the First's barons. Bishop Poor died at Tarente in 1237, and was buried in the cathedral church of Salisbury. See *Ancren Riwle,* ed. Morton (Camden Society, 1853).

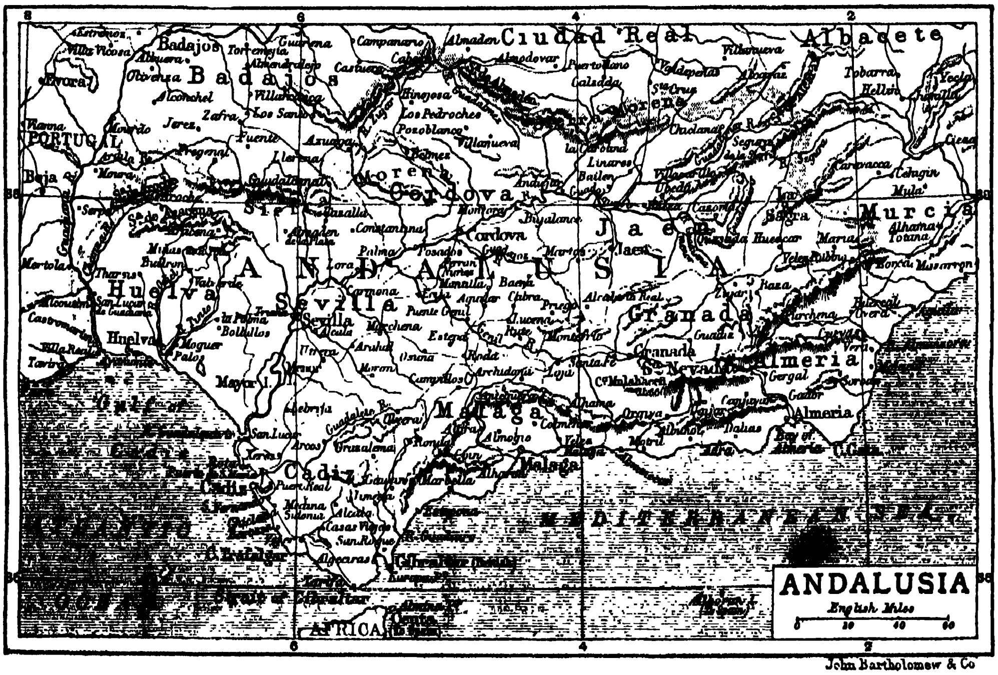
Ancrum, vil. and par., Roxburghshire, Scotland, 3½ m. N.N.W. of Jedburgh; 2 m. from Ancrum Moor, where (Feb. 17, 1545) 5,000 English under Sir Ralph Evers and Sir Brian Latoun were defeated by the Scots under the Earl of Angus and Scott of Buccleuch. The exploits of the Scottish maiden Lilliard (Lillyard) in this battle are commemorated by an inscribed monument.

Ancus Marcius, fourth king of Rome, said to have reigned 640-616 B.C., and to have conquered many Latin towns and transplanted their inhabitants to Rome. He is also the reputed founder of Ostia.

Ancyra, anc. city of Galatia, Asia Minor; remembered chiefly for the fact that, when Augustus set up a record of the chief events of his life at Rome, its citizens had a copy of the inscription made, which still exists. The inscription (*Monumentum Ancyranum*) is in Greek and Latin, and has been edited by Mommsen (1883). See (modern) Angora.

Andagoya, Pascual de (1495-1548), Spanish colonial administrator and geographer, was the first to obtain information with regard to the empire of the Incas. He became governor of New Castile in 1540, and founded the city of Buenaventura. His account of his travels (trans. by Sir C. Markham) was published by the Hakluyt Society (1865).

Andalusia, or Andalucia (corruption of *Vandalusia,* so called from the Vandal invasion), the largest of the ancient divisions of the s. of Spain, comprises the provinces of Almeria, Cadiz, Cordova, Granada, Huelva, Jaën, Malaga, and Seville, and is physically divided into Upper and Lower Andalusia. Its chief towns are Cordova, Seville, and Cadiz. It is one of the most fertile portions of Spain. It is drained by the Guadalquivir. Some of the highest mountains are above the snow-line, and from these to the low-lying valleys, which are extremely hot in summer, all varieties of climate are found. There are numerous gypsies (*gitanos*) scattered throughout the province, and a few descendants

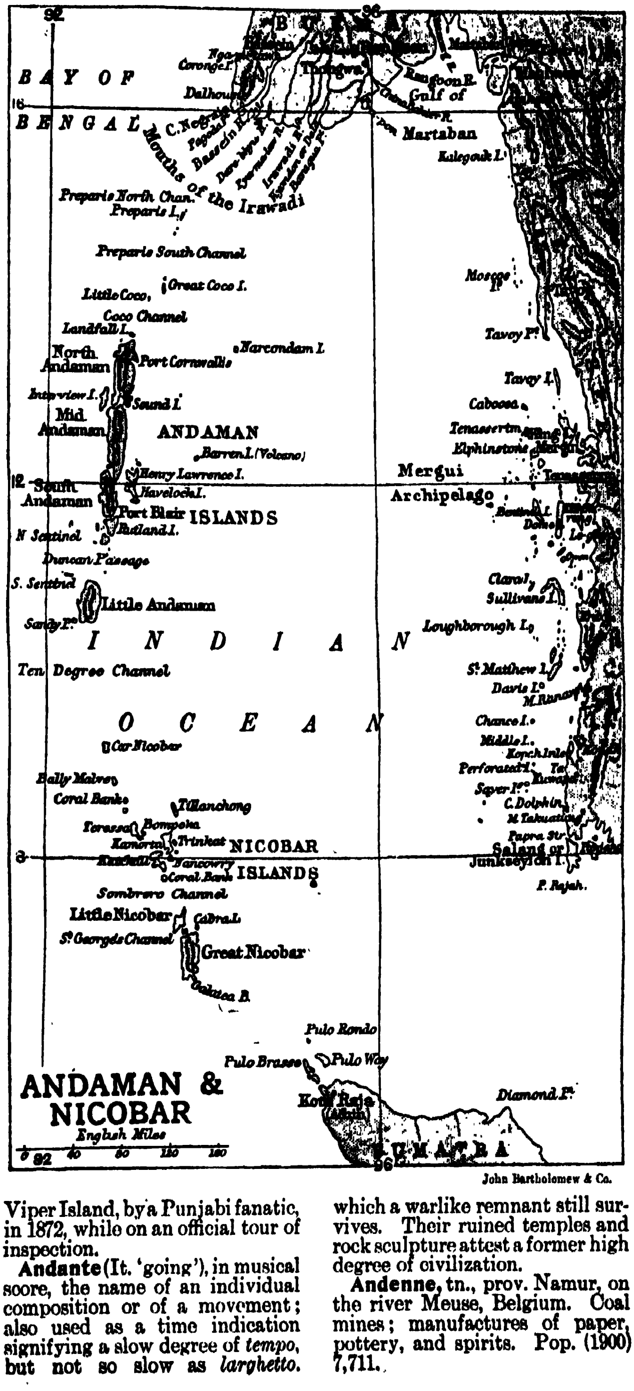


John Bartholomew & Co

of the Moors still survive. The attire of the people is very picturesque, and the women are renowned for their grace and beauty. This province was visited in antiquity by the Phœnicians, who founded the colonies of Hispalis (Seville), Gades (Cadiz), etc.; afterwards by the Carthaginians; and after the second Punic war it became a Roman province. Here were born the poet Lucan, the emperor Trajan, the philosopher Seneca. In the 5th century it was invaded by the Alans, Vandals, and Visigoths, who conquered the whole of Spain. In 711 it was subdued by the Moors, after the battle of Xeres de la Frontera. Here they founded the caliphate of Cordova, which reached the height of its power under the Ommiades. During this period Andalusia was a flourishing and thickly-populated province. Cordova was one of the chief centres in Europe for the arts and sciences. But after the extinction of the Ommiades (1031) it was divided between Seville, Cordova, and Jaën, which were conquered (1238-48) by Ferdinand III. of Castile. Area, 33,663 sq. m. Pop. (1900) 3,562,606. See SPAIN.

Andalusite, a mineral consisting of silicate of alumina, crystallizing in gray or pink rhombic prisms. It is a characteristic ingredient of metamorphic rocks, and is often found in argillaceous slates into which a granite has been injected in a greatly-heated condition, altering the surrounding masses, and developing new minerals in them. Andalusite is rarely transparent and well coloured, but fine specimens come from Brazil, and are polished and used as gems.

Andaman and Nicobar, two groups of British islands in the Bay of Bengal, about 400 m. E. of India. The area is estimated at 1,750 sq. m. Total pop. (1901) of Andamans, 24,499; of Nicobars, about 6,700. The capital, Port Blair, on S. Andaman, has a fine, well-sheltered harbour. Only a small proportion of the aborigines (Andamanese) have become at all civilized, and on many of the islands, especially the Nicobars, the inhabitants are still hostile to strangers. Their average height is 4 ft. 10½ in.; their skulls are mesocephalic. See E. Horace Man's *Aborigines of the Andaman Is.* (1885); A. de Quatrefages' *Les Pygmées* (Prof. Starr's Eng. trans. 1895); Dr. Mouatt's *Andaman Islanders* (1863); C. Boden Kloss's *In the Andamans and Nicobars* (1903); and *The Indian Antiquary* (vols. xxviii. and xxx.). In 1858 the Indian government established a penal settlement for 'life' convicts at Port Blair. In 1900 these numbered over 11,000. Tea, coffee, cocoa, sugar-cane, rice, and oil seeds are grown, and a trade in timber is being developed. The islands are mentioned by Arab geographers in the 9th century, by Marco Polo in the 13th, and by Conti in the 15th. Lord Mayo, viceroy of India, was assassinated at Hopetown, on Viper Island, by a Punjabi fanatic, in 1872, while on an official tour of inspection.



John Bartholomew & Co.

Andante (It. 'going'), in musical score, the name of an individual composition or of a movement; also used as a time indication signifying a slow degree of *tempo*, but not so slow as *larghetto*. ANDANTINO, being a diminutive of andante, ought to indicate a slower degree of *tempo;* but the term is sometimes used to signify a degree of movement less slow than andante.

Andaqui, a confederacy of Indian tribes in S. Colombia, of which a warlike remnant still survives. Their ruined temples and rock sculpture attest a former high degree of civilization.

Andenne, tn., prov. Namur, on the river Meuse, Belgium. Coal mines; manufactures of paper, pottery, and spirits. Pop. (1900) 7,711.

Anderlecht, tn., Belgium, prov. Brabant, 2 m. S.W. of Brussels. Large cotton mills. Pop. (1900) 47,929.

Anderlues, tn., Belgium, prov. Hainault, 8 m. W. of Charleroi. Pop. (1900) 9,086.

Andermatt, vil. in upper valley of the Reuss, canton Uri, Switzerland; alt. 4,738 ft.; on road over Furka, Oberalp, and St. Gothard passes; 3½ m. from Goeschenen. Pop. (1900) 818.

Andernach (anc. *Antunnacum*), tn., prov. Rhineland, Prussia, on l. bk. of the Rhine, 11 m. N.W. of Coblenz; has Roman and mediæval remains. Cigars and malt manufactured; trade in emery and lava. Pop. (1900) 7,889.

Hans Christian Andersen.

Andersen, HANS CHRISTIAN (1805-75), Danish author, son of a shoemaker at Odense, was sent to school and university by generous patrons. He then undertook, at the expense of the state, several continental tours, resulting in his brilliant travel-books—viz. *Skyggebilder* (1831); *En Digter; Bazar* (1842), after a tour to Greece; *I Sverrig* (1849), after his visit to Sweden; *I Spanien* (1863), a book about Spain. His first novels, all of which have been translated into English, were *Improvisatoren* (1835), *O.T.* (1835), and *Kun en Spillemand* (1837). The first portion of the immortal *Fairy Tales* (*Eventyr*) came out in 1835, the second series appeared in 1838-42, the third in 1845; and so they continued to appear, at irregular intervals, until the last *Eventyr* were published in 1871-2, by which time they had won a world-wide reputation. Andersen's numerous plays and poems are inferior to his *Tales*. His autobiography, *Mit Livs Eventyr* (1855-77), is of great interest, and perhaps the most naïve and subjective biography ever written. Other works are *Billedbog uden Billeder* (1840); *Ahasuerus* (1847); *De to Baronesser* (1847); *At vaere eller ikke vaere* (1857). Several English editions of the *Fairy Tales* have been published. See R. N. Bain's *H. C. Andersen: a Biography* (1895).

Anderson, city, Madison co., Indiana, U.S.A., on White R., about 40 m. N.E. of Indianapolis. Pop. (1900) 20,178.

Anderson, ADAM (?1692-1765), Scottish political economist, for over forty years clerk in the South Sea House; published *Hist. and Chron. Deduction of the Origin of Commerce, containing a Hist. of the Great Commercial Interests of the Brit. Empire* (1762). See *Gent. Mag.*, liii. 41-2.

Anderson, ALEXANDER (1775-1870), American wood engraver. His illustrations to Bell's *Anatomy* (70 plates) and to Shakespeare's works (80 plates) are his principal works. See *Life* by Burr (1893).

Anderson, ELIZABETH GARRETT (1836), physician, wife of J. G. S. Anderson of the Orient S.S. Line; was born in London; studied medicine at the Middlesex Hospital (1860), but was refused admission to the examinations of the Colleges of Physicians and Surgeons; licensed to practise by the Society of Apothecaries (1865); received the degree of M.D. from the University of Paris (1870); one of the visiting physicians of the E. London Hospital for Women and Children (1870); elected to the first School Board for London (1870); appointed senior visiting physician to the New Hospital for Women (1872-90); lecturer on medicine at the London School of Medicine for Women (1876-98), an institution which owes its existence to her public-spirited efforts; president of the East Anglian Branch of the British Medical Association (1896-7). She has laboured indefatigably to open the medical profession to women.

Anderson, SIR GEORGE WILLIAM (1791-1857), Indian official and administrator; governor of Mauritius (1849), but transferred to Ceylon (1850). He was the author of important judicial and other reforms in both places.

Anderson, JAMES (1662-1728), Scottish genealogist and antiquary, an Edinburgh lawyer, who wrote (1705) *An Historical Essay showing that the Crown and Kingdom of Scotland is Imperial and Independent*, and edited the public records of Scotland, published by Ruddiman in 1739 under the title of *Diplomatum et Numismatum Scotiæ Thesaurus*.

Anderson, JAMES (1739-1808), farmer and political economist; born near Edinburgh; was the inventor of the 'Scottish plough.' In his *Recreations in Agriculture* (a paper in monthly parts from 1797-1802) and his *Inquiry into the Nature of the Corn Laws* (1777) he anticipated Ricardo's theory of rent.

Anderson, JOHN (1726-96), founder of Anderson's College, Glasgow (1797), was professor of Oriental languages (1756) and of natural philosophy (1760) at Glasgow University, where he taught a class of physics for working men. His invention of an air-brake gun, refused by the British government, was presented to the National Convention, Paris. His *Institutes of Physics* (1786) was for some time a standard text-book.

Anderson, JOHN (1805-55), Scottish missionary, born in Galloway; was sent by the Church of Scotland as its first missionary to Madras (1837), but at the 'disruption' joined the Free Church. His first mission school became the nucleus of the institution now known as the Madras Christian College. He died at Madras. See Braidwood's *True Yokefellows in the Mission Field* (1862).

Anderson, JOSEPH (1832), keeper (since 1870) of the National Museum of Antiquities, Edinburgh. He edited the *Orkneyinga Saga* (1873). His other works include *The Oliphants in Scotland* (1879), *Drummond's Ancient Scottish Weapons* (1881), and papers in the *Proc. of the Soc. of Antiq., Scotland*. Rhind lecturer in 1879-82 (*Scotland in Early Christian and in Pagan Times*, 4 vols. 1881-6), and again in 1892 (*Early Christian Monuments in Scotland*).

Anderson, MISS MARY (1859), American actress, of English origin on her father's side and of German on her mother's, was born at Sacramento in California. In 1875 she made her first appearance as Juliet at Louisville. Her success led to a regular engagement. Julia in *The Hunchback* (a favourite rôle) and Pauline in *The Lady of Lyons* were among her parts. In 1882, after she had become famous in New York, Miss Anderson began her English career at the Lyceum. Her most notable impersonations were Perdita and Hermione, Galatea, Pauline, and Juliet. Her statuesque beauty and her exquisite voice gave her for some years an almost unique position on the English stage. In 1889 she retired from the stage, to marry Mr. Antonio F. de Navarro. In 1896 she published a volume of reminiscences, entitled *A Few Memories*.

Anderson, ROBERT (1770-1833), Cumbrian poet, whose works are valuable for their picture of old country customs. His best poems are, *The Impatient Lass*, *King Roger*, *Will and Kate*, and *Lucy Gray*. See *Works*, with Life prefixed (1820); *Songs and Ballad Cumberland*, ed. by Sidney pin (1874).

Anderson, WILLIAM (1842-1900), surgeon, professor of anatomy and surgery at Tokyo (1873-

1880), formed a large collection of Chinese and Japanese paintings and engravings, afterwards bequeathed to the British Museum. He was the author of *The Pictorial Arts of Japan* (1886); *Japanese Wood Engraving* (1895); *Catalogue of Collection of Japanese and Chinese Pictures in the British Museum* (1886).

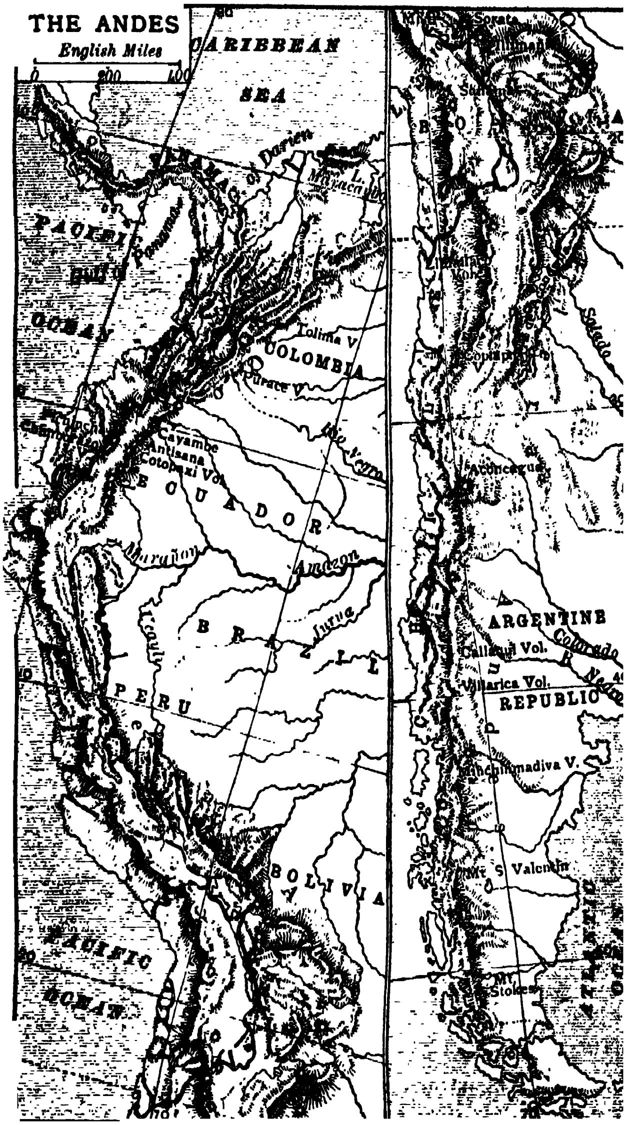
Anderson, Sir William (1835-98), engineer; born in St. Petersburg; director-general of ordnance factories in Britain. Author of *Conversion of Heat into Work* (1887).

Anderson's College, Glasgow, was founded in 1797 by Prof. John Anderson, and has devoted itself chiefly to the teaching of medicine and the sciences. In 1886 the non-medical sections were merged in the Glasgow and West of Scotland Medical College; and in 1889 Anderson's College Medical School was incorporated.

Anderssen, Adolf (1818-79), famous chess-player, born in Breslau, where he became (1847) master at the Lyceum. In 1851 he won the first prize at the international chess tournament held in London during the first International Exhibition. He won other international contests in London (1862) and Baden (1870). He published many valuable books about chess.

Andersson, Karl Johan (1827-67), Swedish African explorer, who investigated the land of the Damaras and Ovampos (1850-4), and the Okavango R. (1859). He died while on an expedition to the Kunene R. See his *Lake Ngami, or Discoveries in S. Africa* (1856), and *The Okavango R.* (1861). Life in his *Notes of Travel in S. Africa* (1875), ed. by Lloyd.

Andes, a mountain system stretching along the W. side of the continent of S. America, from the mountains and plateaus of Costa Rica to Tierra del Fuego, and perhaps connected by the Burdwood Bank with the volcanoes of Graham Land. In its middle section it is divided into two main chains—that on the E. being known generally as the Andes, and that on the W. as the Cordillera. Its total length is considerably over 4,000 m., and its greatest development in Peru and Bolivia, where, between the transverse ridges of Vilcanota (lat. 14° 30′ S.) and of Lipez (lat. 22° 30′ S.), it expands to a breadth of 500 m., enclosing between its E. and W. Cordilleras plateaus 12,000 to 14,000 ft. above sea-level. North of the Vilcanota range the E. Cordillera has been eroded by affluents of the Ucayali, and to the W. of this great basin is a confused group of ranges, among which runs the Alto Marañon, or Upper Amazon. The W. Cordillera, between lat. 23° and 7° 45′ S., descends in a bold escarpment to the Pacific littoral, but it gradually decreases in height northwards. On entering Ecuador the Andes consist of a single broad chain, which bifurcates in the province of Loja; and thence to the borders of Colombia the system is again composed of two cordilleras, united by transverse ridges, and including lofty basins 8,000 to 10,000 ft. above sea-level. These cordilleras are continued in the Western and Central Cordilleras of Colombia, which include between them the great longitudinal valley of the Cauca R. The last-named range is the loftier, containing many peaks over 16,000 ft. in altitude. The long valley of the Atrato separates the W. Cordillera from a coast range, the Sierra de Baudo, with an average elevation of 3,000 ft., which is continued across the Isthmus of Panama. The E. Cordillera of Colombia, or Cordillera of Bogota, a third division, branches off near the frontier of Ecuador. At first only a low watershed between the basin of the Magdalena and those of the Amazon and Orinoco, it rises to over 15,000 ft. in the peak Suma Paz, and runs N.W. to Pamplona, whence it is continued by the Cordillera de Merida in Venezuela.



Near Santa Cruz de la Sierra, in Bolivia, the Eastern Cordillera makes a great bend to the S.S.W.;

crossing the Upper Pilcomayo, and appearing as the Sierra de la Huerta in the Argentine province of San Juan, it terminates in the hills of Pencoso in San Luis. In the Famatina peak (Argentine province of Rioja) it rises to a height of 20,680 ft. Another (central) range of isolated peaks and volcanic cones rises in lat. 17° 30′, E. of Oruro in Bolivia, and divides the great plateau of Titicaca and Poopo into two sections. The Andes preserve their plateau character down to Aconcagua (about 32° 30′ S.), enclosing the great dreary Puna (high plain) of Atacama; thence to 41° 30′ S. lat. they consist of a single chain. South of Lake Nahuel-huapi they no longer constitute the watershed, but are crossed by numerous rivers rising from an elevation to the E., from which in some cases the water runs to both oceans; and finally they pass through the islands of the Tierra del Fuego archipelago to Cape Horn.

The Andes are built up of Archæan, Palæozoic, and Cretaceous rocks, with some Jurassic strata and porphyritic rocks in the W. range. They appear to have been folded in Tertiary times, the Cretaceous rocks being involved in the folds. Probably the W. Cordillera is more recent than the E. Cordillera. Many volcanoes are still active. Andesite lavas fill the basins of Ecuador, where the grandest group of volcanoes in the whole chain is found, among which are Cotopaxi (19,613 ft.), Sangay (17,460 ft.), and others; these lavas also compose the large mass of Aconcagua, which rises to 23,080 ft., the highest point of the S. American continent. Many of the highest peaks are covered with perpetual snow, and glaciers are still found in the S.

In Peru the W. Cordillera forms a formidable barrier to traffic, while farther S., between lat. 23° and 32° S., there is no pass lower than 12,000 ft. In lat. 32° 33′ is the Uspallata Pass, or La Cumbre (11,500 ft.), now crossed by the railway (alt. 12,340 ft.) from Buenos Ayres, in Argentina, to Valparaiso; and at 36° the Planchon (10,000 ft.). In Ecuador and S. Colombia the passes are of about the same height. The Guayaquil and Quito Railway crosses the Andes at an altitude of 10,800 ft. at 2° S. lat. This railroad connects the Port of Guayaquil with Quito, the capital of Ecuador, and after climbing the Andes extends on the plateau for about 200 m., tapping the agricultural and mineral wealth of Ecuador and S. Colombia. Besides the peaks already mentioned, Illimani (22,200 ft.) and Illampu, or Sorata, E. of Lake Titicaca, are among the most prominent—the latter, according to Sir Martin Conway's estimate, exceeding 23,000 ft., and therefore rivalling Aconcagua. Chimborazo, in Ecuador, rises to 20,475 ft. above sea-level, and Tupungato, S. of Aconcagua, to 21,550 ft. Other railways across the Andes are the line (highest alt. 15,660 ft.) which connects Oruro in Bolivia with Antofagasta in Chile; another, farther S., connects La Concepcion in Chile with various places in Argentina, crossing in about 37° S. lat.; another climbs up (alt. 14,660 ft.) from Mollendo to Lake Titicaca; yet another in Peru, from Lima up towards Ayacucho. See Hettner's '*Die Anden des W. Colombien*' (in *Petermann's Mitt.*, 1893); Whymper's *Travels amongst the Great Andes of the Equator* (1892); Wolff's *Geografia y Geologia del Ecuador* (1892); Forbes's 'The Geology of Bolivia and Southern Peru' (in *Q. Jour. of the Geol. Soc.*, vol. xvii.); Hettner, in *Verhandl. der Gesell. für Erdkunde zu Berlin*, vol. xvi.; Conway's *The Bolivian Andes* (1901); Fitzgerald's *The Highest Andes* (1899); Steffen's 'On Recent Explorations in the Patagonian Andes south of 41° S. Lat.' (*S.G.M.*, vol. xiii.); Moreno's 'Explorations in Patagonia' (*Geog. Jour.*, July–Dec. 1899); Church's 'S. America: an Outline of its Physical Geog.' (*Geog. Jour.*, Jan.–June 1901).

Andes, Los. (**1.**) A territory of Argentina, consisting of the part of the Puna de Atacama assigned to Argentina by arbitration in 1899. Area, 21,990 sq. m.; pop. (1900) 1,149. (**2.**) A district of the republic of Venezuela, 14,720 sq. m. in area, and pop. (1894) 363,388. (**3.**) Town, Chile, prov. of Aconcagua, 18 m. S.E. of San Felipe. Pop. 4,500.

Andesite, a crystalline igneous rock, occurring mostly in lava flows, but sometimes in dykes and veins. It consists principally of plagioclase felspar, and is often porphyritic, showing large crystals of felspar scattered through a fine-grained ground mass, usually of small felspar crystals, but often containing much glassy matter. In addition to felspar other minerals are present, as mica (biotite), hornblende, augite, and hypersthene; these give their names to the four principal varieties of andesite. The augite and hypersthene varieties especially are dark brown or black, and often become brown or red on weathering, from oxidation of the iron they contain. Andesite rocks are perhaps the commonest lavas in the world. In Scotland they compose most of the Cheviots, Ochils, Pentlands, and Sidlaws; in England they form much of the Lake District. They are common in Wales and Ireland, Hungary, and N. America, and include most of the recent volcanic rocks of the Andes, whence their name.

Andijan, tn., prov. Fergana, Russian Central Asia, on the l. bk. of the Syr Daria, 160 m. E. of Tashkend; alt. 1,500 ft.; terminus of branch of the Transcaspian Ry. (completed 1899); was the scene of a Mohammedan outbreak (1898). It is famous for its gardens, and grows and manufactures cotton. Pop. (1897) 46,680.

Andira, a genus of papilionaceous plants, mostly tropical American trees. The bark of *A. inermis* and *A. retusa* contains purgative and emetic substances; the pith of *A. araroba* provides the 'Goa powder,' or chrysarobinum, used as a remedy for certain skin diseases.

Andirons, or FIRE-DOGS, the supports on which are laid the logs of wood burned in open hearths.

Andkhui, or ANDKHOI, tn., Afghanistan, about 80 m. W. of Balkh, on trade route between Afghanistan and Bokhara. Pop. about 15,000. Formerly subject to Bokhara, it was devastated by Mohammed Khan in 1840, after which it came under Afghan control. Its climate is such that the Persians call it 'hell on earth.'

Andocides (439–389 B.C.), one of the ten Attic orators; a man of influential position at Athens, and of oligarchical sympathies. In 415 B.C. he was accused of being concerned in the mutilation of the Hermæ; he turned informer, but had to leave Athens. He was banished three times afterwards, and died in exile. Three genuine speeches of great historical importance are extant: the best editions are (text only) Blass (1881) and Lipsius (1890); (with notes) Hickie's *De Mysteriis* (1885), and Marchant's *De Reditu* (1889). See Jebb's *Attic Orators* (1876).

Andorra (Ar. *Al Darra*, 'a wooded place'), a small independent republic on the Spanish side of the Pyrenees, between the French dep. of Ariège and the Spanish prov. of Lerida, with an area of 175 sq. m. When Louis le Débonnaire besieged Urgel, the inhabitants of Andorra assisted him against the Saracens (805 A.D.); Louis, therefore, gave them self-government, reserving certain rights, which were subsequently transferred to the Counts of Foix, and passed by inheritance to the Bourbons. The tithes and other dues were granted to the bishop of Urgel. On the N. side bridle-paths lead into France, by which the valley of the Ariège and the town of Ax-les-Thermes are reached. The country lies high, from 3,000 ft. to peaks of 10,000 ft. There is still a large quantity of timber, which is an important source of revenue to the inhabitants. The arable land is rich, but limited in extent. Cultivation is pushed up the mountain sides; rye and barley, tobacco, vines, and vegetables are grown. Pines, firs, oaks, poplars, and beeches, scented boxwood, the rose, anemone, narcissus, clematis, crocus, and cowslip are among the flora. The country is rich in iron and lead, but the mines are very little worked, and the cost of transport would be a great hindrance to their development, for there is no carriage road into the republic. There are hot mineral springs at Las Escaldas and elsewhere. The chief wealth consists of herds of cattle, mules, sheep, goats, and pigs. Horse-breeding is an important industry, and an extensive contraband trade is carried on with France and Spain. The Andorrans, about 6,000 in number, are of Spanish race, Catholics in religion, and speak a dialect of Catalan. They are poor, orderly, and industrious. They are governed by a council of 24 members, elected by the six parishes. Each of the suzerains is represented by a *viguier* (vicar). The bishop's *viguier* holds office for three years, and the French *viguier* for life. The *viguiers* and the judge of appeals constitute the supreme court. The only tax is the *quistia*, an annual tribute of £38 to the French government, and about half that sum, together with certain tithes in kind, to the bishop of Urgel. The capital is Andorra la Vella (Old Andorra), a small town of 800 inhabitants, 11 m. from Urgel. See Deverell's *Valley of Andorra* (1886); Smith's 'Andorra' (*S.G.M.*, 1895); Osona's *La Republica d'Andorra* (1896); and Spender's *Through the High Pyrenees* (1898).

Andover, munic. bor. and mrkt. tn., Hampshire, England, 27 m. N.W. of Southampton; has iron works and manufacture of agricultural implements. There are traces of ancient earthworks in the vicinity. Pop. (1901) 6,509.

Andrada e Sylva, BONIFACIO JOSÉ DE (1763-1838), one of the founders of Brazilian independence, was born at Santos, near Rio Janeiro. In 1819, he took a prominent part in the declaration of independence, and held the portfolios of the interior and of foreign affairs. His democratic tendencies led to his exile to France (1823-9). On the abdication of Pedro I. (1831) he undertook the education of the Prince Imperial (Pedro II.). He was the author of *Poesias d'America Elysea* (1825).

Andrassy, GYULA, COUNT (1823-90), Hungarian statesman; born at Zemplin, which he represented in the Presburg Diet (1847-8). During the 'year of revolution' he espoused the popular cause, and was exiled, spending the years 1849-57 in France and England. Under the amnesty of 1857 he returned to his native land, and was elected a member of the Diet in 1860, where he supported the policy of Deák, and became (1867) premier and minister of national defence. The civil and political emancipation of the Jews, and the reorganization of the Honved or national militia, were the principal acts of his administration. In November 1871 he became foreign minister for Austria and chancellor of Austria-Hungary. In the diplomatic transactions which preceded the Russo-Turkish war, and in the negotiations which led to the Berlin Conference, he took a prominent part; and the 'Andrassy Note' of 1876 was one of numerous efforts made to avoid war. At the Berlin Congress (June 1878) he succeeded in obtaining, for Austria, the occupation of Bosnia and Herzegovina. After the conclusion of the Austro-German treaty of alliance, he resigned, and remained in retirement for the rest of his life. See Kakay's *Count Julius Andrassy* (1879).

André, or ANDREAS, BERNARD (c. 1500), poet and historian, born at Toulouse; came to England with Henry VII., by whom he was made poet laureate. He wrote a life of the king in Latin and some poems in French. See Gairdner's *Memorials of Henry VII.*

André, JOHN (1751-80), major in the British army, was born in London, where his father, a Swiss, had settled as a merchant. In 1774 he joined the British army in America. In 1780, when the American general, Benedict Arnold, in command of the works at West Point, made overtures to surrender to the British, André was chosen to negotiate with him; but he was apprehended as a spy, and after being tried by a military board convoked by Washington, was hanged at Tappantown, Oct. 2, 1780. The British army went into mourning for him, and in 1821 his remains were brought to England and deposited in Westminster Abbey, where a monument was raised to his memory. See the *Life* by Sargent (1861); Lossing's *Two Spies* (1886).

André, LOUIS JOSEPH NICOLAS, born at Nuits (Côte d'Or), Mar. 3, 1838; distinguished himself in the Franco-German war; became director of the firing course, head of the Polytechnic (military) School, general of division, and, in succession to General de Gallifet, Minister of War. An energetic republican, he resolutely opposed the clerical and so-called nationalist intrigues which for the past twenty-five years had made headway in the army, and in November 1904 was the subject of bitter attacks in the French Chamber. The charge against him was that of countenancing delation in the military academies, and in reference to the promotion of officers, republicans being preferred and clericals kept back. On November 4, André defended himself in a speech of two hours' length, and feeling rose so high that a nationalist deputy struck him twice in the face. He resigned on November 15, and was succeeded by M. Berteaux.

Andrea d'Agnolo (1487-1531), called ANDREA DEL SARTO, 'the tailor,' from his father's trade (his monogram of two inverted A's led to the misnomer Vannucchi), also ANDREA SENZA ERRORI, 'the faultless,' an Italian painter, was the chief Florentine colourist of the 16th century. His delicate colouring is conspicuous in the *Madonna di San Francesco* in the Uffizi Gallery at Florence (1517). His pupil, Vasari, relates that Andrea was a pupil of Piero di Cosimo, the housemate of Francia Bigio; that he studied the frescoes of Masaccio and Ghirlandaio, the frescoes of Michael Angelo and Leonardo da Vinci; and that he learned light and shade from Fra Bartolommeo. In 1518 he went to France to paint the fine *Charity* (Louvre) and the *Pietà* (Vienna) for Francis I. The following year, his wife—the beautiful model for his Madonnas—induced him to return to Florence and break his engagement to the king; but the story of the embezzlement of money given him by Francis to purchase pictures is questioned since the discovery of the king's accounts. His wife's influence on his art was baneful. When her extravagance had reduced him to indigence she deserted him, and finally he died of the plague. A full conception of his power can be obtained only by a study of the fine series of frescoes in Florence, in Santissima Annunziata, in the convent of St. Salvi, and especially the monochrome series in the cloister of the Scalzo, painted in 1514. His pictures are in the large European galleries; the National Gallery, London, has two examples. See Crowe and Cavalcaselle's *Painting in Italy* (1864-66); Guinness's *Andrea del Sarto* (1899); Swinburne's *Essays and Studies* (1875); Browning's poem 'Andrea del Sarto' in *Men and Women* (1855).

Andrea, JOHANN VALENTIN (1586-1654), poet and theological writer, was born at Herrenberg in Würtemberg. He travelled through Germany, Italy, and France as tutor to certain young noblemen, and became one of the most learned men of his age. His numerous writings in Latin and German are directed against the hair-splitting pedantry of the erudite and the clergy (*Turbo*, 1616). He pictured a state based on Christian principles (*Christianopolis*, 1619), after satirizing the present condition of society (*Menippus*, 1618; *Geistliche Kurzweil*, 1619, a collection of poems). See Herder's *A.'s Dichtungen* (1786); his own *Autobiography* (1849); and Glökler's *Life* of him (1886).

Andreæ, LAURENTIUS (1480-1552), Swedish reformer, lived for some time at Rome and at Leipzig. As archdeacon of Strengnäs, he won Gustavus I. to the principles of the reformation. He subsequently became chancellor, and superintended the translation of the Scriptures into Swedish, published in 1526. Having enraged the king by resisting the secularization of the church, he was charged with failing to disclose his knowledge of a conspiracy against him, and was condemned to death (1540), but was reprieved, and sentenced instead to pay a heavy fine.

Andreas, a fine old English poem, ascribed by some to Cynewulf. The poem describes the delivery of St. Matthew out of the hands of the Mermedonian cannibals by St. Andrew, who is first martyred, then miraculously healed, and finally converts his murderers. It is based ultimately on a Greek 'Acts of Andrew and Matthew.' Its sea-pieces are unsurpassed even in Old English poetry. See text with glossary (Arnold); also Stopford Brooke's *Eng. Lit. to the Norman Conquest* (1898).

Andrée, SALOMON AUGUST (1854-97), Swedish aeronaut and explorer, born at Grenna; was for some time head engineer at the Swedish patent office. After making several balloon journeys, he decided to attempt to reach the North Pole by such means. On July 11, 1897, he started from Dane's Island, Spitzbergen, with two companions, Strindberg and Fraenkel, in a balloon of 5,000 cubic metres. Several of the buoys which were carried have since been found, two with despatches dated July 11; but a message sent by carrier-pigeon, and dated two days later, was the last authentic news of the explorers. See Lachambre's *Andrée and his Balloon* (1898), and *Century Mag.*, New Series, vol. xxxiii.

Andreini, GIOVANNI BATTISTA (1578-1650), Italian poet of the early 17th century, from whose drama of *Adamo* (Milan, 1613) Milton seems to have taken suggestions for *Paradise Lost.*

Andréossy, ANTOINE FRANÇOIS, COMTE D' (1761-1828), French general and diplomatist; born at Castelnaudary in Languedoc; served with Bonaparte in Egypt as chief of brigade; returned with him to France, and supported him at the revolution of 18th Brumaire; was successively ambassador at London, Vienna, and Constantinople; was elected to the Academy in 1826; became deputy for Aude in 1827. He published military memoirs and scientific works, including *Hist. du Canal du Midi* (1800), *Constantinople et le Bosphore de Thrace pendant 1812-14 et 1826* (1828).

Andrew, the first called of Christ's disciples, was the brother of Peter. He belonged to Bethsaida, and had been a follower of John the Baptist. Tradition has it that he preached in Scythia, Macedonia, etc., and that he was crucified at Patræ, in Achaia, on an X-shaped cross. The festival of St. Andrew in the Greek and Roman Churches falls on Nov. 30. He is the patron saint of Scotland, and is held in high regard in Russia as having evangelized that country. See Malan's *Conflicts of the Holy Apostles* (1871).

The ST. ANDREW'S CROSS is a diagonal cross of saltire, white on a blue ground, which formed the Scottish national flag from an early date. On the union with England (1707) it was incorporated with the cross of St. George, and on the union with Ireland with the cross of St. Patrick. (See FLAG.)

The Russian ORDER OF ST. ANDREW was founded (1698) by Peter the Great. The badge consists of the Russian double eagle in black enamel, bearing on its breast a St. Andrew's cross, and surmounted by an imperial crown. It has a blue ribbon, and is worn on state occasions suspended from a collar of shields and ovals. It is one of the highest orders in the Russian empire, and is bestowed only on members of the imperial family, on princes, and on generals who already hold other important orders. The Scottish Order of the Thistle is also called St. Andrew.

Andrew, kings of Hungary. (1.) ANDREW I. (1046-58), succeeded Peter the German, and engaged in war with Germany till 1052. He attempted to introduce Christianity into his kingdom, but was dethroned and killed by his brother Bela in 1058. (2.) ANDREW II., reigned 1205-35, conducted a crusade to the Holy Land at the instigation of the Pope in 1217. On his return in 1222, he issued his Golden Bull, which became the basis of the rights of the Hungarian nobles. (3.) ANDREW III. (1290-1301) succeeded to the throne after the murder of Ladislaus III., but was opposed by the Duke of Austria and by the Pope, who claimed Hungary as a fief of the church, and put forward Charles Martel, son of Charles II., king of Naples, as his nominee. Andrew defeated them both in 1291. The son of Charles Martel later seized a portion of Hungary, and held it till the death of Andrew in 1301.

Andrew, JOHN ALBION (1818-67), American statesman; practised law in Boston; became a prominent anti-slavery advocate, and was elected to the Massachusetts legislature (1858); two years later was appointed delegate to the Republican National Convention at Chicago. He was republican governor of Massachusetts (1861-6), and distinguished himself as one of the most active 'war governors.'

Andrewes, LANCELOT (1555-1626), English scholar and divine; born at Barking; became master of Pembroke Hall, Cambridge; appointed dean of Westminster (1601); took part in the Hampton Court Conference and in the preparation of the Authorized Version of the Bible; and was successively bishop of Chichester (1605), Ely (1609), and Winchester (1618). His writings are preserved in the *Library of Anglo-Catholic Theology*, 1841-54. See Isaacson's *Exact Narrative of the Life and Death of Bishop Andrewes* (1650); A. T. Russell's *Life and Works of Lancelot Andrewes* (1863); R. W. Church's Essay in *Masters in English Theology* (1877); Alex. Whyte's *Lancelot Andrewes and his Private Devotions* (1896).

Andrews, ELISHA BENJAMIN (1844), chancellor of the University of Nebraska, U.S.A.; president of Denison University, Granville, Ohio (1875-9); professor of homiletics and pastoral theology at Newton Theological Institution (1879-82); professor of political economy in Brown University till 1888, and president there (1889-98); superintendent of schools, Chicago (1898-1900); represented the United States on the Monetary Conference at Brussels (1892), being a strong advocate of international bimetallism. He has published *Brief Institutes of Constitutional History, English and American* (1886); *Institutes of Economics* (1889); *History of the United States* (1894).

Andrews, JAMES PETTIT (1737-97), English antiquary and historian; wrote a *History of Great Britain, connected with the Chronology of Europe* (1794-5), each page of British history being faced by a page of contemporaneous European history; also a continuation of Henry's *Hist. of Great Britain* (1796).

Andrews, THOMAS (1813-85), chemist; born at Belfast; appointed president of the Northern College (1845), professor of chemistry in Queen's College (1845-79); published important researches into the heat evolved and absorbed in chemical combinations, and in connection with the liquefaction of gases. See his *Scientific Papers, with a Memoir*, by Tait and Crum Brown (1889).

Andrews, Thomas (1847), English engineer and metallurgical chemist, proprietor of Wortley Iron Works and Wortley Silkstone Colliery; has made extensive researches in metallurgy and physics, and on the influence of climatic and other conditions upon metals.

Andria, tn. and episc. see, prov. Bari, Italy, 8 m. from the Adriatic, and 34 m. by rail w. of Bari. Manufactures of majolica and olive oil. Pop. (1901) 49,967.

Andrieux, François Guillaume Jean Stanislas (1759-1833), French author of the first empire, professor (1814) in the Collège de France, and perpetual secretary (1829) of the Academy. He published several graceful and witty comedies—*e.g. Les Etourdis* (1788), *La Soirée d'Auteuil* (1804), and *La Comédienne* (1816). His place among the minor poets of his day is secured by his *contes*—*Le Meunier de Sans Souci* (1797), *La Promenade de Fénélon*, etc. See Taillandier's *Notice sur la Vie et les Ouvrages d'Andrieux* (1850); Sainte-Beuve's *Portraits Littéraires*, vol. i.; Legouvé's *Souvenirs* (1886).

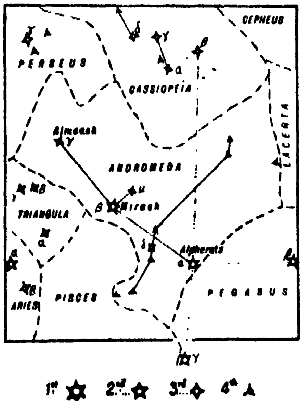
Andro, or Andros, most northerly isl. of the Cyclades, Grecian archipelago, s. of Eubœa. Cap. Andro, on e. coast. Silks and carpets. Pop. (1896) 18,809; area, 156 sq. m.

Androclus, or Androcles, a Roman slave who, according to Aulus Gellius, was thrown into the arena, where a lion, let loose upon him, appeared to recognize him, and licked his hands. Inquiry showed that Androclus had run away from his master in Africa, and when he had taken refuge in a cave, a lion entered in great pain and held out his paw to him. Androclus drew out the thorn which caused the pain, and for some time lived with the lion, but was captured and brought to Rome. He was set free, and used to lead his lion about Rome.

Andromache, daughter of Eetion, king of Cilician Thebes, and wife of Hector, to whom she bore Astyanax. No modern description of conjugal affection excels the picture given by Homer of the relations existing between her and her husband; and the passages in the *Iliad* which describe her parting with him, her grief at the sight of his fate, and her lament over his funeral, are unequalled for pathos in all literature. After the fall of Troy her son was cast from the walls and killed, and she became the captive of Neoptolemus, son of Achilles, and accompanied him to Greece. She afterwards married Helenus, brother of Hector, who ruled over Chaonia. The *Iliad* of Homer and the *Andromache* of Euripides give her story.

Andromache, a British second-class cruiser, launched 1890. The ship-name is associated with Rodney's victory off Les Saintes islands (1782), capture of an Algerine corsair (1797), San Sebastian (1813), capture of the *Trave* (1813), and China (1834-6).

Andromeda, daughter of Cepheus, king of Æthiopia, and Cassiopeia. As her mother boasted that in beauty Andromeda excelled the Nereids, Poseidon sent a sea monster to ravage the country. The oracle of Ammon prescribed that Andromeda should be given up to the monster to save her country; but Perseus turned it to stone with the Gorgon's head, and saved her, and afterwards married her. After death she was placed among the stars. The story is told in Ovid's *Metamorphoses*. See also C. Kingsley's *Heroes* (1856).



The Constellation Andromeda.

Andromeda, one of the Ptolemaic constellations, forming, with Cepheus, Cassiopeia, and Perseus, a group of prehistoric antiquity. Three stars of about the second magnitude—Alpheratz, Mirach, and Almaach—mark severally the head, the girdle, and the foot of the mythical heroine. Alpheratz, or α Andromedæ, β Cassiopeiæ, and γ Pegasi (Algenib), being aligned on the equinoctial colure, are called the 'Three Guides.' Almaach, or γ Andromedæ, is a triple star, composed of an orange primary, attended by a revolving pair tinted emerald and azure. In its vicinity is situated the radiant point of the Andromeda meteors, the last conspicuous shower of which occurred Nov. 23, 1892. The great nebula near γ Andromedæ was familiar to Al Sûfi in the 10th century, but the first telescopic view of it was obtained Dec. 15, 1612, by Simon Marius, who compared it to a candle shining through horn. A photograph taken by Dr. Roberts in 1888 disclosed it as a vast spiral structure. Close to its nucleus a temporary star rose to 6·5 magnitude in August 1885, then in six months faded to extinction. The nebula emits white light, giving a continuous spectrum, thought to be interrupted by bright and dark lines of undetermined origin. The spectrum, on the other hand, of the biannular nebula (N.G.C. 7662) is almost purely gaseous. Professor Keeler determined for this singular object in 1890 a motion of approach to the earth at the rate of seven miles a second.

Andromeda, a genus of the heath order; mostly shrubby plants. The only British species is *A. polifolia* (marsh Andromeda), found in peat bogs in Scotland and in the north of England, but rare. The pink flowers are pendulous, large, and heathlike. The whole plant is poisonous, and dangerous near pasturage.

Andronicus I., Comnenus (? 1112-85), Emperor of Constantinople; son of Isaac, and grandson of Alexius i. He was regent during the minority of Alexius ii., whom he assassinated. He seized the throne, but was killed in a popular insurrection, and Isaac Angelus was made emperor.

Andronicus II., Palæologus the Elder, Emperor of Constantinople (1283-1328), whose antagonism to the Roman Church brought about his excommunication in 1307 by Pope Clement v. He tried in vain to stop the advance of the Turks in Asia, and was dethroned by his nephew, Andronicus iii., in 1328. He died in 1332, in a monastery near Adrianople.

Andronicus III., Palæologus the Younger, Emperor of Constantinople (1328-41). During his reign the Turks conquered all his territories in Asia to the Bosporus; and in Europe, Stephen iii. (Urosh, king of Servia), and Stephen iv. (Dushan), his successor, conquered Bulgaria and the greater part of Macedonia.

Andronicus IV., Palæologus, Emperor of Constantinople (1377-9), eldest son of John v., Palæologus, dethroned his father in 1377, who, however, recovered the throne in 1379 with the aid of the Turks. He died in 1385.

Andronicus of Rhodes, a peripatetic philosopher, who lived at Rome about 58 b.c. He made known to the Romans the works of Aristotle; none of his own writings are extant.

Andronicus, Livius, the earliest Roman poet, was of Greek birth. He was the author of tragedies, comedies, and hymns, of which only fragments are extant; he also translated the *Odyssey* into Latin Saturnian verse.

Andronicus Cyrrhestes, the builder of the famous octagonal tower at Athens generally known as the Temple of the Winds.

Andros, Sir Edmund (1637-1714), governor of New York from 1674-81. In 1686 he was appointed governor of New England, and, on the revocation of the colonial charters, made himself very unpopular by his attempt (1687) to seize the charter of Connecticut. In 1689 the people of Boston sent him to England, where he was acquitted without formal trial. He was governor of Virginia (1692-8), and of Guernsey (1704-6). See Whitmore's *Memoir* (1868-74), and *Andros Tracts* (1868).

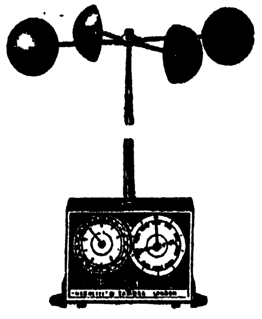
Androscoggin, a riv. in Maine and New Hampshire, U.S.A., rising in the White Mts., and flowing s.e. for 155 m. to its junction with the Kennebec a few miles above its mouth.

Androsphinx, a sphinx with a male instead of a female head—*e.g.* the great sphinx of Gizeh.

Andujar, tn., prov. Jaën, Spain, on the r. bk. of the Guadalquivir; stn. on ry. between Cordova and Madrid. Flour, oil, wax candles, and porous jars for cooling water are manufactured. An important fair is held in April and September. Six miles distant are the mineral baths of Marmolejo. Pop. (1900) 16,302.

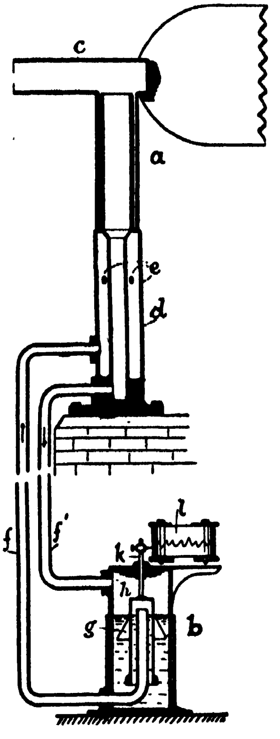
Anelectrotonus, the changes in the region of the anode while a constant electric current is passing through a nerve; irritability in that region is diminished.

Anemochord, a stringed instrument, invented by Schnell in 1789, in which the strings were made to vibrate by currents of air directed upon them. It was found suitable only for the slowest music. The same principle was developed by Herz in his *piano éolien* (1851).



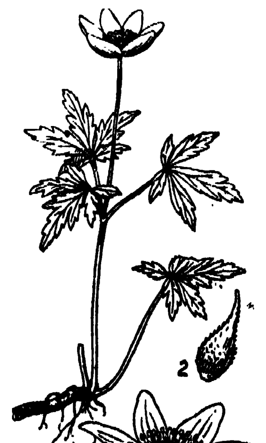
Cup Anemometer.

Anemometer, an instrument for measuring the pressure or velocity of the wind. The best-known form is the hemispherical cup anemometer invented (1846) by Robinson, consisting of four hemispherical cups which rotate horizontally with the wind, and a combination of wheels which record the number of revolutions in a given time. Robinson supposed that the cups revolved with about a third of the wind's velocity, and the instruments were scaled on that assumption; but it has been found that the ratio between the speed of the cups and that of the wind is as 1:2·3 (not as 1:3), and varies with the dimensions of the cups and arms, so that velocities hitherto published must be reduced by nearly thirty per cent. The Royal Meteorological Society appointed a committee to consider the subject of wind-force; and an anemometer was invented by W. H. Dines, which has superseded its predecessors. It consists of two separate portions—the head (*a*), which is exposed to the wind; and the recording apparatus (*b*), which may be placed in any convenient situation. The head consists of a vane (*c*), formed of a piece of tube with an open end, which is kept facing the wind; underneath the vane is another and larger tube (*d*), perforated by several holes (*e*) arranged in rings; and the action of the wind in blowing across these is to suck out the air from the inside. The two tubes are separately connected with pipes (*f, f'*) which communicate with the recording apparatus. The recorder consists of a float (*g*), which is placed in a closed vessel (*h*) containing water. A pipe (*f*) connects the vane with the inside of this float, so that every variation in wind-pressure at the mouth of the vane is transmitted, causing the float to rise or fall in the water. To the top of the float is attached a rod (*k*) which carries a pen, so that every oscillation is recorded graphically on a moving sheet of paper (*l*) uniformly unrolled by a clock. Osler's pressure anemometer consists of a plate, usually of 1 sq. ft. area, which is kept facing the wind, and is by it driven back upon a spring whose resistance is the measure of the wind's force. See *Quar. Jour. Met. Soc.*, vol. xv. p. 183, xvi. pp. 26, 205, 208, xviii. p. 165, xix. p. 16, xx. p. 180, and xxii. p. 237; and Marvin's *Anemometry* (1900).



Dines's Anemometer.

Anemone, the 'wind-flower' genus of Ranunculaceæ, includes many species widely spread throughout the temperate regions. The white wood anemone (*A. nemorosa*), often with a purple tint, is so abundant in certain marshy woods in spring that from a distance the ground under the trees seems sprinkled with snow. The leaves of the flower are coloured sepals, and the petals are always absent. The many-coloured spring anemones of florists and British gardens are supplied by Dutch and French growers; they are varieties of the poppy anemone (*P. coronaria*), introduced from the Mediterranean at the end of the 16th century. There are nearly one hundred distinct species of the anemone; the autumn-flowering species is the *A. japonica*. The hepatica, which appears with the snowdrop and crocus, is another species of anemone from N. America.



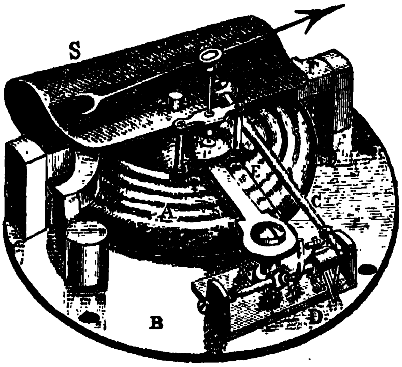
Anemone nemorosa.
1, Section of flower; 2, Carpel.

Anemone, Sea. See Sea Anemone.

Anemophilous Flowers. See Pollination.

Aneroid (Gr. 'non-liquid'), the barometer invented by Vidi of Paris (1843), consists of a metal box from which the air is exhausted, or 'vacuum chamber,' and a steel spring in the form of a doubled leaf. Alterations in atmospheric pressure bring about changes in the shape of this metal box, which are magnified by a system of levers turning a hand on a dial to indicate a higher or lower barometric pressure. The dial is graduated by comparison with a mercurial barometer, both instruments being placed under an air-pump for the purpose. The vacuum chamber, A, is made of two discs of corrugated German silver soldered together, and attached to the base plate, B; a strong spring, S, supported by the frame, F, and attached to the vacuum chamber, acts in opposition to the motion of the box, preventing its sides giving way under reduced atmospheric pressure. The lever, C, of iron and brass, is attached to the spring, and compensates for alterations in temperature. The bent lever at D connects it to a chain, E, which is wound round the arbour, O. The spiral spring, P, keeps the chain, which is coiled round the barrel, free from slackness while the pressure is diminishing, and the hand turns to the left over the graduated dial. When the pressure is increasing, the lever pulls upon the chain, and the hand moves to the right over the dial. The index is fixed to the arbour.

As these instruments are graduated experimentally, they have frequently to be compared with a mercurial barometer. Although very sensitive, they are liable to get out of order owing to rusting, or to alterations in the force of the springs, so that if an instrument has been long in use its scale alters. It is thus rarely used for accurate meteorological observations, but, owing to its lightness, is a handy instrument for the traveller. After subjection to a low pressure, as in a mountain ascent, an aneroid does not at once recover its readings for normal pressures. Whymper made a series of experiments on aneroids in the field and workshop under varying conditions, which are recorded in *How to Use the Aneroid Barometer* (1891). He finds that all aneroids lose upon the mercurial barometer when submitted to diminished pressure, and that when pressure is restored a portion of this loss is recovered. Even at a fixed station an aneroid, after having experienced diminished pressure, will not follow natural diurnal or hourly variations with reasonable accuracy. As regards the use of the instrument for the measurement of altitudes, he has found that large reductions will have to be made in the height of many positions which have been determined by the aneroid. As the indications do not depend on the force of gravity, but on the elasticity of a metallic spring, the readings do not need a correction for latitude. See BAROMETER.



Construction of the Aneroid Barometer.

Aneurin, a Welsh poet, who flourished during the 6th century, generally supposed to be the son of Caw ap Geraint, chief of the tribe of Gododin (Otadini), who inhabited the land between the walls of Septimius Severus and Antoninus Pius. The Gododins were routed by the Saxons at Cattraeth, on the Northumbrian coast (540), and of 360 chiefs present at the battle only three escaped, of whom Aneurin was one. He took refuge at the court of King Arthur, and wrote the *Gododin*, an epic poem, descriptive of the wars which terminated in the battle of Cattraeth. Of the poem only 900 lines are extant. It has been translated by E. Davies in his *Mythology and Rites of the Brit. Druids* (1809). See J. H. Parry's *Cambrian Plutarch* (1824); Sharon Turner's *Vindication of the Genuineness of the Ancient Brit. Poems* (1803); Stephens's ed. of the *Gododin* (1885).

Aneurism (Gr. 'a widening'), the local dilatation of an artery, varying greatly in size, and affecting the whole or part of the vessel's circumference. If the artery is dilated in a considerable part or the whole of its circumference, a spindle-shaped or fusiform aneurism is formed. Sometimes the dilatation forms a pouch, and is said to be sacculated; at other times the blood does not lie in a distinct sac, but between the coats of the artery, in what is called a dissecting aneurism. It sometimes arises from an injury (traumatic aneurism), but more frequently occurs spontaneously, and is often multiple. When an artery is wounded, the blood may make a receptacle outside the artery (spurious aneurism). Minute aneurisms (miliary: *milium*, 'millet seed') are, by their rupture, frequently the cause of cerebral hæmorrhage. A cure of aneurism is rarely effected. By acupuncture the internal surface of the artery may be so roughened as to promote the formation of thrombosis or clot. Occlusion of the artery, which may be brought about by ligaturing the vessel, encourages this. But the majority of aneurisms are beyond the reach of surgical interference, and usually they enlarge and end fatally. This may result from pressure on neighbouring parts, such as the heart, so that death may result from hyperæmia and œdema of the lungs, from venous engorgement, and so on. The aneurism sometimes ruptures. It sometimes presses on nerves, causing, first, irritation, and then loss of function. When an aneurism meets with a firm structure, such as bone, it erodes it. Drugs have little effect, but iodide of potassium has sometimes proved beneficial. Duncan of Edinburgh advocated electrolysis. The subcutaneous injection of a one per cent. solution of gelatin is now advocated, to encourage clot formation; but this treatment is still *sub judice*. Meanwhile the general aim is to lessen strain by lowering blood-pressure, moderate dieting, and a quiet life.

Angamos, BATTLE OF. A naval fight off Angamos Point, N. of Antofagasta (Chile), on Oct. 8, 1879, between the Peruvian ironclad *Huascar* and the Chilean ironclads *Blanco Encalada* and *Almirante Cochrane*, assisted by the corvette *Covadonga*. The battle lasted one and a half hours, when the Peruvians were forced to surrender. See Clowes's *Four Modern Naval Campaigns* (1902); Mackenna's *Guerra del Pacifico* (1880); Mason's *War on the Pacific Coast* (1883); Markham's *War between Chili and Peru* (1882); *Jour. of R.U.S.Inst.*, xxv.; B. Arana's *Hist. de la Guerre du Pacifique* (1881).

Angara, riv., Siberia, rises in Transbaikalia, enters Lake Baikal on the N. side, issues from it on its W. side (from this point it is also called the Upper Tunguska), flows N. through the town of Irkutsk, and then W., and after a course of 1,300 m. joins the Yenisei above the town of Yeniseisk. Dangerous for steam navigation because of rapids.

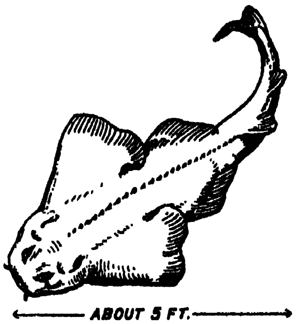
Angel. The word angel is formed from the Greek *aggelos* (pronounced *angelos*), which represents the Hebrew *mal'ak*, and though now restricted to superhuman beings, had originally the general meaning of 'messenger.' We find in Scripture quite a number of terms implying the existence of other supernatural beings besides God—*e.g.* 'sons of the gods' or 'sons of God' (Gen. 6 : 2), 'sons of the mighty' (Ps. 29 : 1), 'seraphim' (Isa. 6), 'watchers' (Dan. 4 : 13 *ff.*), 'host of Jehovah' (Josh. 5 : 14). But in the oldest parts of the early books of the Bible the name angel is applied neither to a mere messenger of the Deity nor to these superhuman beings, but rather to manifestations of God himself ('angel of God,' or 'of the Lord,' Gen. 31 : 11; Ex. 3 : 2)—*i.e.* actual theophanies; though, again, a distinction is sometimes made between the Supreme and His messenger (Gen. 16 : 11). As the conception of the Divine supremacy (over other gods) and transcendence (above the world) grew more definite, the angels came to be looked upon as beings intermediate between God and man—His servants who carry His messages and otherwise do His pleasure (Gen. 32 : 1; 2 Sam. 24 : 16; Ps. 34 : 7; Dan. 9 : 21). Next emerges the idea of rank among the angels: there are archangels, chief princes (Dan. 10 : 13; 12 : 1; Tobit 12 : 15), the seven spirits of God (Rev. 4 : 5); while the 'thrones, dominions, principalities, powers' of Col. 1 : 16 probably refer to this hierarchy. Further, a moral distinction among the angels becomes increasingly prominent. At first the ethical character of the divine messengers does not come into consideration, and the term 'evil' as applied to them in Ps. 78 : 49 and Judg. 9 : 23 does not refer to their character, but to the penal functions committed to them. Even Satan is reckoned among the sons of God (Job 1 : 6). But as the idea of Satan develops he becomes positively wicked in himself, the adversary not only of men but of God, the existence of moral and physical evil being frequently traced to him (1 Chr. 21 : 1; *cf.* 2 Sam. 24 : 1; Luke 13 : 16), and to the hierarchy of demons of which he is the head. In the apocalyptic literature we find the doctrine of a fall of angels, which seems to have left traces in the New Testament (Jude, ver. 6; 2 Pet. 2 : 4). By the early years of the Christian era belief in a good and an evil hierarchy of superhuman beings had become quite distinct. True, the Sadducees rejected the popular notions regarding them; but the common belief in their existence is countenanced by Jesus, though He does not appear to favour the view that they interfere with human life (see Matt. 18 : 10; *cf.* 16 : 27). Paul not only accepts the Old Testament statements regarding angels, but speaks of them as having to do with the present life of man (1 Cor. 4 : 9; 6 : 3; 11 : 10). In the Book of Revelation they are associated with elemental or cosmical forces (ch. 14 : 18; 16 : 3). The notion of a 'guardian angel' is found, not only in the 'princes' of the nations spoken of in Daniel, but may also be justified by such statements of Jesus as Matt. 18 : 30; Luke 15 : 7, 10; *cf.* Acts 12 : 15. The 'angels of the churches' in Rev. 1 : 20 *ff.* are probably bishops. Worship of angels is forbidden by Paul in Col. 2 : 18; the second Nicene Council decreed that though *latreia* (worship) was wrong, yet *douleia* (service) was permissible. It may not be out of place to warn the reader against a tendency to identify the 'angelophanies' in the Old Testament with the second Person of the Trinity; we must guard against foisting upon the early Hebrew consciousness ideas which emerged only in sub-apostolic times. See ARCHANGEL, CHERUBIM, SERAPHIM; 'Excursus on Angelology,' etc., by Fuller, in Speaker's *Apocrypha*, i. p. 171 *f.*; H. Schultz's *O.T. Theology*, ii. p. 214 *ff.* (1892).

In the Catholic Apostolic Church an angel, or bishop—the two offices being held to mean the same thing—presides over each congregation.

Angel-noble (*obverse*).

Angel, or ANGEL-NOBLE, a gold coin struck in England in 1465. A new issue of the angel took the added name of 'noble from the figure of Michael and the dragon borne on its obverse. The value varied from 6s. 8d. to 10s. The issue ceased in the reign of Charles I. See ANGELOT.

Angel-Fish, or MONK-FISH (*Rhina Squatina*), a shark which, in its depressed body and its habits, approaches the ray. It reaches a length of five feet, and is viviparous, producing some twenty young at a birth. It is found in both the E. and W. Hemispheres.



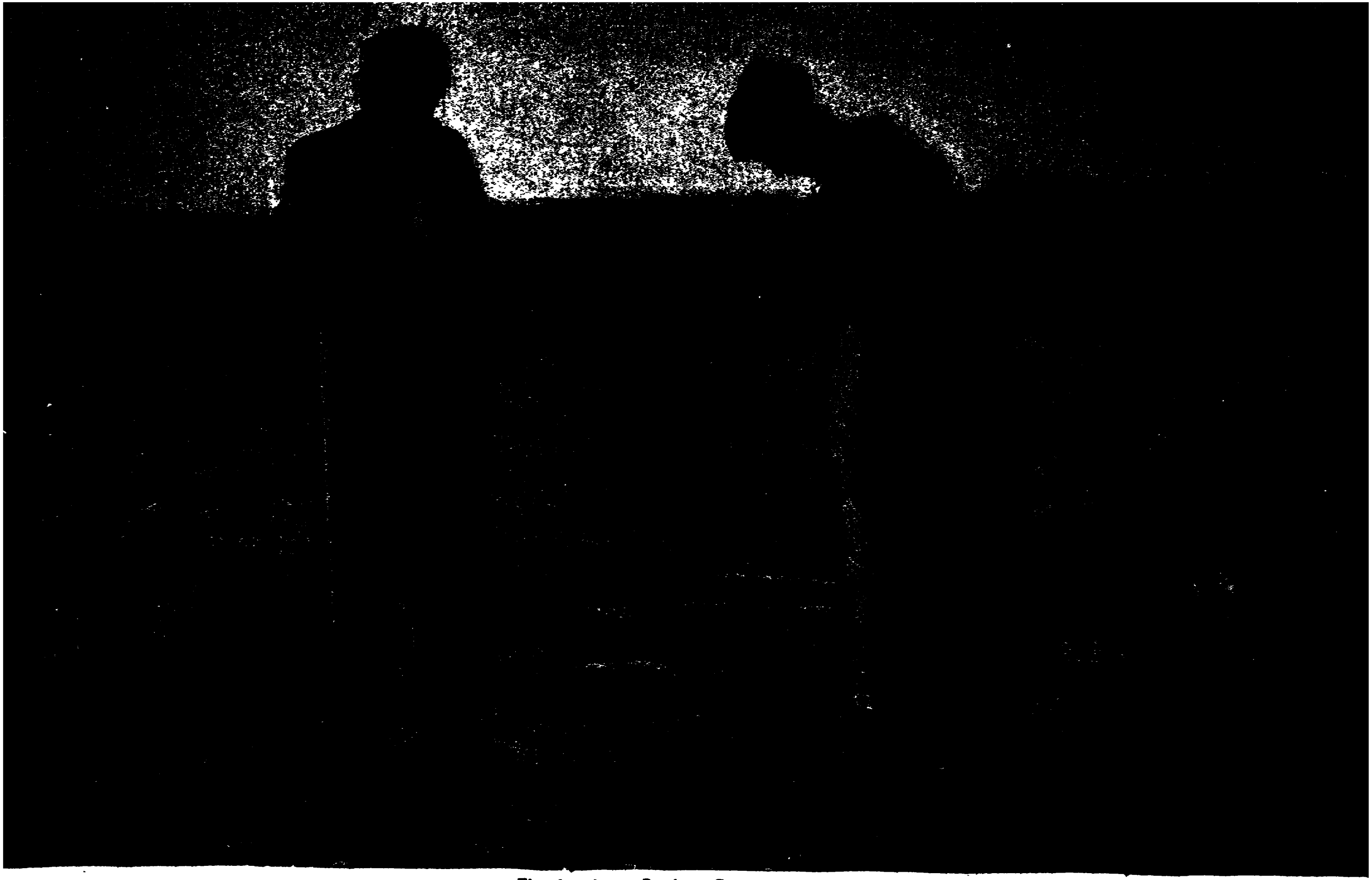
Angel-Fish.

Angeli, HEINRICH VON (1840), Hungarian painter, born in Oedenburg; studied in Vienna and Düsseldorf. In 1862 he settled in Vienna, where he soon gained a great reputation as a portrait painter. In 1870 he painted the portraits of the Emperor Francis Joseph and the German Crown Prince. He came also to England and painted the portrait of Queen Victoria, members of the royal family, and many members of the aristocracy. Among his historical pictures are, *Mary Stuart on her Way to the Scaffold* (1857) and *Louis XI. of France before St. Francis of Paola* (1859); and among his genre pictures, *Youthful Love* (1870) and *The Avenger of his Honour* (1869). Since 1877 he has been professor at the Vienna Academy.

Angelica Archangelica is a British plant of the Umbelliferæ, growing to a height of three or four feet, and sometimes cultivated in kitchen gardens. The leaf-stalks are candied and used for decorating creams, jellies, and trifles. The name is said to have been given to the plant from its supposed high medicinal qualities. It was formerly blanched and eaten like celery.

Angelica Tree, an Aralia belonging to the United States. The crushed bark smells like angelica, and is used as an emetic and a purgative.

Angelic Brothers, a sect of Dutch mystics founded by Johann George Gichtel (1638-1710), who professed to have attained perfection and to have abolished all carnal desires, like the angels in heaven.



The Angelus. By Jean François Millet.

Angelico, GIOVANNI (1387-1455), 'Il beato Fra Giovanni Angelico da Fiesole,' a celebrated Florentine painter, entered the Dominican order in 1408; in later life, through humility, he refused an archbishopric; after death he was beatified for his saintly life. He painted many frescoes and altar-pieces in Fiesole, Cortona, Orvieto, Rome, and Florence. One series of Vatican frescoes was destroyed, but in that in the chapel of Nicholas v., representing the lives of St. Sebastian and St. Lawrence, Angelico's powers attained their maturity of freedom and strength. His most notable work is the remarkable series of frescoes he executed in the cells, cloisters, and chapel of San. Marco, Florence (now a national museum), during his sojourn there (1436-45). These paintings have an extraordinary purity of feeling and devotional repose; rapt ecstasy is expressed in the slight figures, graceful in form and gesture, draped in simple folds, and painted with delicate transparent colours, highly ornamented with burnished gold, and shadowless. He believed in the inspiration of his work, prayed when he painted, and rarely retouched—a method that resulted in many technical weaknesses, but conserved the freshness of spontaneity. Among his chief works are, *The Adoration of the Magi*; *The Crucifixion*, in San Marco; *The Coronation of the Virgin*, in the Louvre; and *The Resurrection*, in the National Gallery, London. See L. Douglas's *Fra Angelico* (2nd ed. 1902); Crowe and Cavalcaselle's *Hist. of Painting in Italy from the 2nd to the 16th Century* (1864).

Angelic Salutation. See AVE MARIA.

Angeln, dist., prov. Schleswig-Holstein, Prussia, between the Schlei, Flensburg Fjord, and the Baltic, is the original seat of the Angles.

Angelo, MICHAEL. See MICHELANGELO.

Angelot, a French gold coin struck by Philip vi. in 1340. Its weight was from 97·22 to 87·96 grains. Henry vi. of England also issued a gold coin with this name, for use in his French dominions. It weighed about 35 grains. See ANGEL (coin).

Angelus à Sancto Francisco, the name assumed by RICHARD MASON (1601-78), a Franciscan of the Strict Observance. Born in England; joined the order (1624), and was successively definitor or consultor, guardian of the house of English Recollet friars at Douay (1628), professor of divinity there, confessor to the nuns of the order of St. Francis, missionary, president, and provincial of his brethren (1659-62). In 1675 he retired to St. Bonaventure's convent at Douay, where he died. His works, some of which are very rare, include *Regula et Testamentum S. Francisci* (1643); *The Rule of Penance of the Seraphical F. St. Francis, as approved and confirmed by Leo x.* (1644); *Apologia pro Scoto Anglo* (1656). See Wadding's *Scriptores Ord. Minorum* (1806); *The Rambler*, July 1850, vi. 14.

Angelus Bell, a bell rung thrice daily in Catholic countries, at the sound of which, by an ordinance of Pope John xxii. (1326), the faithful repeat three aves. It takes its name from the words, *Angelus Domini*, which preface the 'angelic salutation' to the Virgin Mary (Luke 1:28). Millet painted a picture with the title of *The Angelus* (1859), which has since become widely popular.

Angelus Silesius, JOHANNES (1624-77), whose real name was JOHANN SCHEFFLER, studied medicine and philosophy at Strassburg, Leyden, and Padua. In 1653 the writings of Jacob Boehme and other mystics led him to join the Roman Catholic Church. His *Cherubinischer Wandersmann* and his *Heilige Seelenlust oder geistliche Hirtenlieder der in ihren Jesus verliebten Psyche* appeared in 1657. The mysticism of Angelus Silesius has much in common with the philosophy of Schopenhauer. See Mahn's dissertation, *Die Mystik des Angelus Silesius* (1893); also the Biography by C. Oeltmann (1896). Some of his hymns (*Mir nach! spricht Christus, unser Held; Liebe, die du mich zum Bilde*) even find a place in Protestant hymn books.

Anger, a fundamental emotion arising in pain, characterized by aversion to the object causing pain, and by a tendency to destruction. In all its modes—instinctive aversion, resentment to injury or pain, rage, retaliation, aggressive infliction of pain on the offending sentient object, revenge, righteous indignation, pleasure of malevolence—anger is accompanied by excitement more or less diffused according as the feeling-attitude, the conative attitude, or the intellectual-attitude predominates. The excitement reaches a climax in rage, which, for the time, is indistinguishable from acute mania. Perhaps the most constant feature is the tendency to destruction; in the higher forms of anger the desire to inflict pain on a sentient object cannot be excluded. The indulgence of anger is more or less pleasurable. In righteous indignation injuries of others or of justice are accepted as personal, sympathy being thus involved. On the physical side anger is marked by sudden change of attitude and aspect, increase of pulse-rate, quickening or arrest of respiration, raising of eyebrows (in animals), frowning, contraction of pupils, blushing, increase of muscular tension, certain organic changes resulting in deranged functions of the viscera, including the glands, such as liver, mammæ, sweat glands, salivary glands, and the like. Monkeys redden with passion; dogs snarl, showing canine teeth; young infants scream, struggle, and blush over the face and scalp. Tears of rage may be distinguished from tears due to pain. The circulation may be suddenly interfered with, the face becoming livid, the individual sometimes dying of syncope, due to the sudden increase of blood-pressure. In so-called cold rage the face becomes temporarily pallid, owing to sudden stimulation of the vaso-constrictors. In aggressive anger the nervous discharge to muscles, and consequently the muscular output, are much above normal. In biological evolution anger is probably an emotional adaptation to defence against aggression (individual or tribal), and to securing of prey. Anger may be contrasted with fear, which is a depressing emotion. (See FEAR.) Biologically the physical manifestations of anger—*e.g.* growling, pouting, snarling—may be a means of instilling fear in others, or of masking fear in self. For detailed analysis of anger, see Bain's *The Emotions and the Will* (1875; 4th ed. 1899), p. 72 and ch. ix.; for physical manifestations, see Darwin's *Expression of the Emotions in Men and Animals*, ch. x. (1873); for critical analysis, see G. F. Stout's *Manual of Psychology*, vol. ii. pp. 284-310 (1899); for anger as illustrating theory of emotion, and evolutionary aspects, see W. James's *Principles of Psychology*, vol. ii. pp. 409, 460, 478 (1890); also H. M. Stanley's *Evolutionary Psychology of Feeling*, ch. x. (1895). See EMOTIONS.

Angermanland, a district of Sweden, forming part of prov. of Vesternorrland; is situated about the lower course of the Angerman R. (240 m. long), which enters the Gulf of Bothnia at Hernösand.

Angermünde, tn., dist. Potsdam, prov. Brandenburg, Prussia, 44 m. by rail N.E. of Berlin; an important railway junction, with distilleries, iron works, and manufactures of woollen and linen goods. Pop. (1900) 7,465.

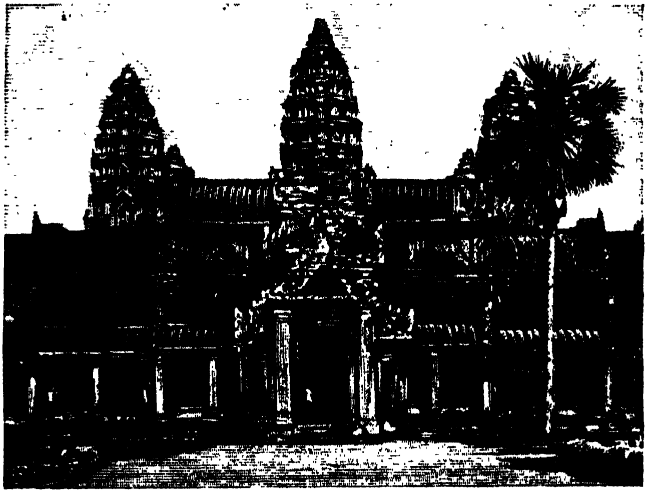
Angers (anc. *Andegavum*), tn. and episc. see, France, formerly cap. of Anjou, now of dep. Maine-et-Loire, on l. bk. of the navigable river Maine. The commercial centre for the white wines of Anjou, Angers has considerable trade in corn, beans, wool, hides, oil, horses, and cattle. The chief industries are textile manufactures, iron and copper wares, boots and shoes, and market-gardening. It is the seat of a university. Its Gothic cathedral was begun in the 12th century. A pre-Roman town, Angers was the capital of the Andegavi, and later received the name Juliomagus. It was united to the French crown in 1474. Pop. (1901) 82,398.

Angevine Line, the dynasty of English kings which began with Henry II. (1154) and ended with Richard III. (1485). It thus coincided with the Plantagenet, Lancaster, and Yorkist kings. The name comes from Anjou in France, Henry II. having been the son of the Count of Anjou. See Norgate, *England under the Angevine Kin* (1887).

Angilbert, St. (d. 814), poet, historian, and diplomatist; secretary and friend of Charlemagne, whose daughter, Bertha, he married. He filled high offices of state; was made abbot of Centula in Picardy (790); assisted at the coronation of Charlemagne at Rome (800). He has been called the Homer of his time. See *Vita S. Angilberti* (Mabillon, *Acta Sanctorum Ord. Sancti Benedicti*, iv. 123); Ceillier's *Histoire des Auteurs sacrés*, vol. xviii. (1729-58).

Angina, a medical term for tonsilitis or quinsy. — ANGINA PECTORIS, or 'breast-pang,' is a most distressing symptom of disease rather than a disease itself. It is a spasmodic pain, starting over the heart, and often spreading even to the finger-tips. The subject is generally over forty, a male, of gouty or neurotic tendency, often with obvious cardiac or arterial disease, such as dilatation or atheroma — atheroma of the coronary arteries, which supply the heart-substance with blood, is believed to be commonly present in these cases. The immediate or exciting cause is usually something that interferes with the heart's regular action —excitement, physical exertion, flatulence, or cold. At the onset of an attack the sufferer is held motionless, and afraid even to breathe. Absolute stillness, pallor, and a look of strong apprehension of danger, suddenly developed, are all characteristic. The attack may last only a few moments, after which the face flushes, the muscles relax, and the expression shows the great relief. On the other hand, the first attack may prove fatal by stoppage of the heart's action. In true angina the tendency is for attacks to recur, and to become more violent. *Treatment.* —Constitutional weaknesses must be treated between the attacks, and exciting causes—*i.e.* anything which puts additional strain upon the heart — must be avoided. During an attack nitrite of amyl and nitro-glycerin are the most powerful remedies, both acting by dilatation of the small blood-vessels, thus lessening blood-pressure, and therefore relieving the heart. Nitrite of amyl can be kept in glass capsules holding five minims or so, and a capsule crushed in a handkerchief will often give immediate relief if the vapour be inhaled. Nitro-glycerin can be used in tablet form, containing $\frac{1}{100}$th gr.—*False angina* is the term used for occasional slight attacks of a similar nature, not increasing in severity, and where there is no reason to suspect organic mischief.

Angiolieri, CECCO, Italian poet, of Siena (*c.* 1260-1315), a Bohemian poet who tells us that 'women, the tavern, and dice' are the only things that attract him. This statement is borne out by his sonnets, 120 of which have come down to us. The most remarkable feature of Cecco's poems is their boundless humour. See D'Ancona's *Studii di Critica e di Storia Letteraria* (1880), p. 105 *ff.*



Angkor Wat (Nakhon Wat).

(From a photograph by J. Thomson, F.R.G.S.)

Angioma, or NÆVUS, a tumour consisting of blood-vessels and connective tissue. There are two kinds:—(1.) *Capillary*, of capillary vessels, much dilated, and with little connective tissue to bind them; most common on the face, neck, and chest, where they appear as flat, very slightly raised, dark red patches. They are often seen of great size, as 'port-wine' marks, even covering one side of the face. Generally they are better left alone, but small ones can be treated with nitric acid. The inflammation of vaccination over one will cure it, and scarification is sometimes used for the 'port-wine' stains. (2.) *Cavernous* angioma, or venous nævus, consists of a number of spaces filled with dark venous blood, and communicating with both arteries and veins. These are always congenital, generally subcutaneous, and appear as soft, compressible, bluish swellings. No angioma is 'malignant' —*i.e.* dangerous to life—by its growth, or tending to reappear after removal; but a cavernous angioma of any size may cause dangerous hæmorrhage if it be ruptured, and so it is better got rid of. Treatment is (*a*) by the injection of a coagulating fluid, such as carbolic acid or perchloride of iron; (*b*) by a seton; (*c*) by ligature, (*d*) excision, or (*e*) electrolysis. The last is generally the preferable method.

Angiosperms, a sub-group of flowering plants, distinguished from gymnosperms by having the seeds developed within closed carpels which form ovaries, as in the pea-pod or poppy capsule. The majority of flowering plants are angiosperms.

Angkor, a ruined city of S.E. Asia, formerly cap. of Cambodia, but now in Siam. Its true name is Nagara Thom, corrupted into Angkor, and also into Nakhon Thom. Its walls, 30 ft. in height, enclose an area 2 m. square, and are pierced by five gates wrought with barbaric splendour. About 5 m. s. are the ruins, similarly enclosed, of an equally grandiose temple, Nakhon Wat (Angkor Wat), one of the greatest architectural curiosities in the world. See Delaporte's *Voyage au Cambodge* (1880); Fournereau's *Les Ruines d'Angkor* (1890); Tissandier's *Cambodje-Java* (1896).

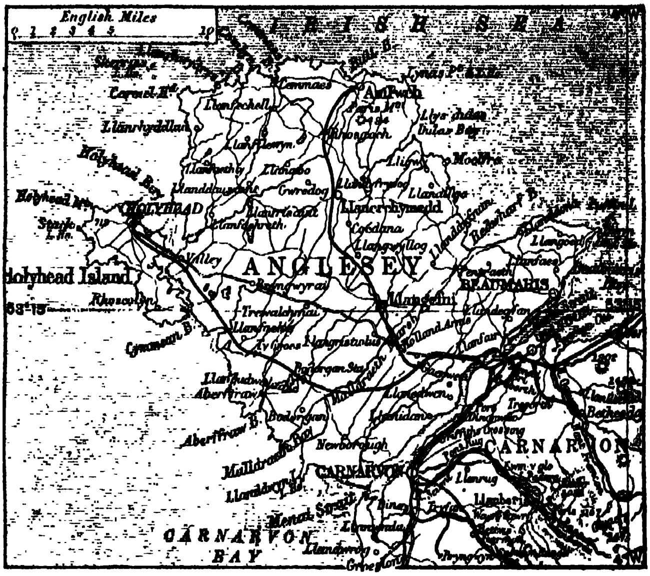
Angle (Lat. *angulus*, 'a corner') is, in geometry, the difference in direction of any two lines. This definition includes all cases; for when curved lines meet, the so-called curvilinear angle at the meeting-point is really the rectilinear angle between the tangents of the curves—*i.e.* their directions at the meeting-point. Angles are measured in degrees, or in grades, or in circular measure. The circumference of a circle is divided into 360 degrees, one-quarter of which, or 90°, subtends at the centre a right angle. An angle less than a right angle is acute, one greater is obtuse. If an angle be such as to make a portion of a plane figure concave to the outside instead of convex, it is called a re-entrant angle. The angle between two planes is called a dihedral angle. When three or more planes meet at a point a solid angle is formed. The complement of an angle is 90°, less the angle. The supplement is 180°, less the angle. The unit in circular measure, which is the only scientific measure, is the angle subtended at its centre by the arc of a circle equal to its radius. It is called the radian: 180° is equal to 3·14159 . . . radians.

Angle-iron, a rolled iron beam with an L-shaped cross-section.

Angler, or FISHING-FROG (*Lophius piscatorius*), a clumsy, flattened fish, not uncommon round the British coast, and in the European seas generally. It owes its popular names—which embrace the sea-devil, the wide gab, etc.—to its method of obtaining food, which consists in concealing the body in sand, or among weeds, etc., and causing the 'lure'—a threadlike structure on the head, with an expanded plate at the tip—to tremble gently in the water. Attracted, it is believed, by this movement, small fishes approach, and are snapped up by the huge mouth with its recurved teeth. The anglers are excessively voracious, and as they may reach a length of seven feet, are very destructive to fish.

The 'Fishing Frog' or Angler-Fish.

Anglesey, an island and co. of Wales, lies N.W. of the mainland, from which it is separated by the Menai Strait. Its length is 23 m., its breadth 21 m. West of Anglesey, and forming an integral part of the county, is the island of Holyhead. The greater part of the surface consists of a low plateau, with slight undulations, monotonous and bare of trees. Minerals include copper and zinc, coal (not now worked), stone and marble (including the beautiful green serpentine of Holyhead, known as Mona marble), ochre, fuller's earth, and potter's clay. The soil is generally fertile. The county is served by the N.W.R., which runs through to Holyhead, whence steamers ply to Dublin. It returns one member to Parliament, and has one municipal borough, Beaumaris. The island was a stronghold of the Druids previous to its subjugation by the Romans. Harassed in turn by English, Irish, and Danes, the conquest by Edward I. (1272) brought more settled times. See Llwyd's *Hist. of the Isle of Mona* (1833); Griffith's *Portfolio of the Cromlechs of Anglesey and Carnarvonshire* (1900); and his *Anglesey Flora* (1895). Area, 275 sq. m. Pop. (1901) 50,590.



Anglesey.

Anglesey, HENRY WILLIAM PAGET, FIRST MARQUIS OF (1768-1854), British general; eldest son of the Earl of Uxbridge; born in London; distinguished himself in Flanders (1794), in Holland (1799); and at Corunna, after Sir John Moore had been mortally wounded, he completely routed the enemy. For his brilliant leadership of the cavalry at Waterloo (1815), where he lost a leg, he was made Marquis of Anglesey. Under the administration of Wellington he was appointed (1828) lord-lieutenant of Ireland, but recalled because of his advocacy of Catholic emancipation. After the formation of Earl Grey's administration he entered on a second tenure of the same office (1830-3); but the O'Connell disturbances drove Anglesey to adopt coercive measures, which forced the government to resign. Ireland owes to him her Board of Education. He was appointed field-marshal (1846).—HENRY CECIL, fifth Marquis (1875-1905), succeeded to the title in 1898, and attained notoriety by his indulgence in amateur theatricals and by his bankruptcy.

Anglia, EAST, a settlement of the Angles, comprising the North Folk and the South Folk (Norfolk and Suffolk). The first historical king of the East Angles was Redwald (593-617). The realm afterwards became dependent on Mercia, until the supremacy of Wessex. For the Danish kingdom of E. Anglia see ENGLAND—*History*.

Anglican Church and **Anglican Orders.** See CHURCH, ANGLICAN.

Angling, in modern English, is a term restricted to the capture of fish by rod, line, and hook, but in its original application denoted simply the use of the hook, for which the obsolete English term is 'angle.' from the Anglo-Saxon *angel*. The hook must be attached to a line, and rendered attractive to predatory fish, either by concealing it in a natural bait, such as a worm, a small fish, or some other edible object, or by attaching to it a deceptive imitation of one of these objects made of feathers, silk, glittering metal, india-rubber, etc. In fresh water a rod has become an indispensable part of the angler's equipment, whereby the hook can be cast to such a distance from the angler as may prevent the fish taking alarm at his presence. There is abundant evidence to prove that fish in waters much frequented by anglers acquire extreme suspicion of the hook. Colonel Hawker, in a diary compiled in 1815-20, records the capture of prodigious numbers of trout, in the clear chalk streams of Hampshire, with flies and tackle which nobody would dream of exhibiting there now. Such fish have also the power of discriminating between living objects moving on the banks. Trout will feed freely among cattle; horses may gallop alongside the stream without disturbing them; but let a child show himself, and every fish will fly to shelter. Prehistoric fish-hooks made of boars' teeth, deer-horn, bone, wood, thorns, shell, copper, and bronze have been found in abundance in almost all parts of the world. Mr. C. Ran deals fully with these in an interesting publication by the Smithsonian Institute, *Prehistoric Fishing in Europe and N. America.* Ancient, however, as angling undoubtedly is, both as an industry and as a pastime, the 19th century had more than half run its course before the craft, in its higher branches, obtained favour from the wealthy as a high-class sport, and, in its humbler forms, began to rival the popularity of football and cricket among the industrial classes. The first-named result was brought about, no doubt, by such attractive writers as William Scrope, 'Christopher North' (Professor John Wilson), Sir Humphry Davy, Captain Lloyd, and Charles St. John. The rent of good angling for salmon and trout has attained a figure which would have seemed fabulous to a former generation. Upwards of £12,000 is paid in rent for salmon angling in the Aberdeenshire Dee alone. In Mr. Aflalo's volume on *The Cost of Sport* (1899) the cost of salmon waters rented in Scotland during the season 1898 is calculated at £5 for each salmon taken, to which must be added living expenses, travelling, wages, and outfit. In Norway every good or moderately good stretch of salmon river is rented by British anglers. The finest sport used to be had in that country for little more than the cost of travel, living, and wages; but at the present day rent alone amounts, in some instances, to £200 a mile of river. Fly-fishing for trout ranks second only to salmon fishing (some anglers assign it the first place), and the cost of the sport has gone up in proportion to its estimation. Streams within 80 or 100 miles of London command very high rents, £100 a mile being no unusual figure paid for beats on such famous rivers as the Test and Itchen of Hampshire. In America both salmon and trout fishing have suffered great deterioration—the former by the erection of dams in the rivers which arrest the passage of migratory fish from the sea, and the latter by indiscriminate fishing. But in both Canada and the United States efforts are being made to restore the productiveness of the fisheries; and in some districts, notably in the state of New York, the state legislature has assumed strict control over the modes and seasons of fishing, and has spent very large sums in artificially rearing fish and replenishing exhausted waters. In Great Britain and Ireland Parliament has enacted appropriate close times—in England, applying to all sporting fish; in Ireland, to all fish of the salmon kind (including fresh-water trout); in Scotland, to salmon and trout only. The sporting fish of British and Irish fresh waters are roughly distributed by anglers into two classes. The first class consists entirely of fish of the salmon family—*viz.* salmon, salmon or sea trout, common or fresh-water trout, char, and grayling. The second class includes what are termed 'coarse' fish—*viz.* pike, perch, ruff or pope, barbel, chub, dace, roach, rudd, bream, carp, tench, bleak, gudgeon, and eels. Attempts have been made, not very successfully, to supplement the first class by introducing into British waters the American brook trout (*Salvelinus fontinalis*), which is a char, and the Californian trout (*Salmo irideus*); and the second class by introducing the American black bass (*Micropterus dolomieu* and *salmoides*), and the European zander or pike-perch (*Lucioperca sandra*), all of which are fish of high excellence for the table, and afford excellent sport on the rod and line. Coal, iron, and manufacturing industries have proved utterly destructive to many British rivers; but great efforts are being made by local authorities to control and remedy pollution from these sources, and have already attained good results, especially in the Thames and the Clyde. The anglers of Nottingham, Sheffield, Leeds, Galashiels, Glasgow, and other busy places, must be numbered literally by tens of thousands, of whom the majority are members of angling clubs. Coarse fish, except pike and perch, exist in few Scottish waters; in these, trout form the natural quarry of the humblest anglers. Until 1902 the legislature had provided no seasonal protection for these fine sporting fish, but the Fresh-water Fish (Scotland) Act, 1902, now provides an annual close time from October 15 to February 28.

Fly-fishing.—The most esteemed branch of angling is that with the artificial fly, which has been brought of late to a high degree of refinement. The salmon fly varies in size from half an inch to four inches in length, and has become a fabric of wonderful complexity. Exaggerated importance is attached by some experienced anglers to niceties of shade of colour, shape, and material; but inasmuch as the fly must pass between the salmon which it is intended to attract and the light, the fish probably cannot distinguish one colour from another, and therefore size (neither too large to alarm, nor too small to escape notice) and lifelike motion are the all-important conditions in the lure. In support of this view, it may be mentioned that in many rivers where, twenty-five years ago, none but sober grays, browns, and blacks were recommended by local fishermen, the brightest silks and feathers are now habitually used. In no river is this the case more than in the Tweed, of which Scrope records that, sixty years ago, in a season when salmon were scarce, his boatman attributed their absence to the recent introduction of gaudy Irish flies, which, he declared, had frightened the salmon back to the sea. The salmon fly is not an imitation of any definite creature, but in fly-fishing for trout and grayling the closest imitation of special insects is desirable. Especially is this so in the modern art of dry fly-fishing, wherein, instead of casting two or three flies at random, and drawing them along below the surface, the angler selects a particular trout which he observes on the feed, and casts over it a single fly dressed to resemble the flies prevailing on the water at the time. The lure is thrown with extreme delicacy a few feet higher up the stream than the fish, and is then allowed to float down dry over its head. This mode of fishing, which had its origin in the crystal clear rivers rising in the chalk downs of S. England, is esteemed by sportsmen as the *ne plus ultra* of their craft. Among the most trustworthy of the numerous modern treatises upon fly-fishing may be noted the following:—Francis Francis's *Book on Angling* (6th ed. 1885); Maxwell's *Salmon and Sea Trout* (the Angler's Library, 1899); *Salmon and Trout* (Badminton Library); Dewar's *Book of the Dry Fly* (1897); Gathorne Hardy's *The Salmon* (Fur, Fin, and Feather Series, 1893); Sir E. Grey's *Fly-fishing* (Haddon Hall Library, 1899); etc.

Spinning ranks next in repute to fly-fishing, and may be practised with either natural or artificial baits. Of artificial spinners the variety is almost infinite, ranging from artistic imitations of fish, such as the well-known 'phantom,' down to the equally well-known 'spoon.' Anything which fulfils the conditions of glitter and movement proves attractive to predatory fish. The best results, however, especially where fish are accustomed to see many lures, is usually obtained from natural baits, such as dace, gudgeon, sprats, or minnows. These can now be had from any good tacklemaker at a very reasonable price, preserved in a solution of formaldehyde. One of these, fitted upon the admirable tackle known as the Archer flight, will spin for hours, unless torn by the attacks of fish, owing to the hardening effect of the preservative. Whatever the reason may be, the spinning movement certainly increases the attraction of the lure. The British fish usually caught with the spinning bait are salmon and sea trout, trout, pike, perch, and several kinds of sea fish. It is the only known means of taking the great trout in the deep Highland lochs. These fish, formerly classed as a distinct species under the title of *Salmo ferox*, are now regarded as the common *S. fario*, abnormally developed by abundant space and feeding to as much as 25 or 30 lbs. in weight. If it be intended to catch pike, gimp must be substituted for gut in the attachment of the flight of hooks to the line, for the teeth of the pike will sever what suffices for the capture of other fish. Trolling is another mode of angling for pike with a dead fish, which the pike is allowed time to swallow before he is struck.

In *live-baiting*—a very deadly means of taking large pike and Thames trout—a live fish, generally a roach, dace, minnow, or bleak, is attached to hooks arranged as 'snap-tackle.' A float is used or dispensed with according to the nature of the water and its bottom. Special information upon spinning, trolling, and live-baiting may be found in Pennell's *Book of the Pike* (1866), John Bickerdyke's *Pike and Perch* (the Angler's Library, 1900), etc.

Bottom-fishing is usually practised only for coarse fish. It is true that many salmon are taken with the worm, and also with the boiled prawn; but fastidious sportsmen regard these baits as unworthy of the king of fishes, not to be resorted to except in water so deep as to be unsuitable for fly-fishing. Worm-fishing for trout in water discoloured by floods is reckoned sheer killing, not true sport; but in clear water it is a delicate, difficult, yet withal a deadly method. Bottom-fishing proper is practised with a float, and some of its exponents on the Thames or Trent attain a wonderful pitch of dexterity. In the system known as 'long-corking,' the float, by means of a light-running reel and special line, is allowed to carry the bait to a distance of sixty or seventy yards from the angler. Useful directions about modes, seasons, and places will be found in Francis's *Book on Angling*, and in John Bickerdyke's *Book of the All-round Angler* (1888).

Tackle.—The salmon fisher's outfit is far more costly than the trout fisher's; the latter is about the same in expense as the pike fisher's; that of the bottom-fisher requires only a very moderate outlay. The rod for salmon fly-fishing varies from 15 to 18 ft. or more in length, and is now usually made of greenheart, in three joints. A more expensive but not more effective article is composed of 'split cane'—strips of the outer skin of certain kinds of bamboo glued together round a steel core. Fly-rods for trout are similar to those used for salmon, but usually run from 9 to 12 ft. in length. Spinning-rods are much stiffer than fly-rods, and ought not to be longer than 11 or 12 ft. The bottom-fisher from the bank generally favours a light bamboo 18 or 20 ft. long, but the punt-fisher uses a much shorter rod. While the bank-fisher for roach and dace may dispense with a reel altogether, he who fishes for salmon in the heavy rivers of Norway or Canada ought not to go forth with less than 200 yds. of line upon a winch of trustworthy make and material. Gut, a translucent thread drawn from the entrails of the silkworm when it is on the point of spinning, is the most precarious article on which the angler, especially the fly-fisher, has to rely. It is perishable, very susceptible to disintegration under sunlight, and far from uniform in manufacture from season to season. More fish are lost from the hook by fracture of the gut than from all other misadventures whatsoever.

Foreign Angling.—In America, besides the Atlantic salmon so well known in Europe, there is a great variety of salmonoid fish which afford sport to anglers. The place of the European pike is taken by his congeners, the pickerel and muskellunge; while a percoid fish, the black bass, of which there are two chief species, takes fly, minnow, and bait, and affords excellent sport, being pronounced by those who fish for him to be the gamest fish that swims in proportion to his size. Several species of very large fish are angled for off certain parts of the American coast, whereof the tarpon (*Megalops thrissoides*), a giant of the herring family, has become best known. It frequents the Gulf of Mexico, and is frequently taken, with rod and line, of the weight of 200 lbs. 'Roughly speaking,' says Mr. Otis Mygatt, 'the average size caught by sportsmen is about 6 ft. in length and 100 lbs. in weight.' The chief drawbacks to the sport are, first, the bony nature of the mouth—tarpon are usually fished for with a gorge bait; and, second, the flesh of this magnificent fish is worthless. In India the most notable sporting fish is the mahseer (*Barbus tor*), a member of the carp family, which is found in many rivers in India, China, and Burma. Small mahseer rise readily to a salmon fly, but large ones, running from 50 to 150 lbs., must be angled for with spinning tackle, a large spoon being the favourite bait. This fish is very powerful on the line, but is worthless on the table. The rohn (*Labeo rohita*) has been caught in N. India, on the rod, up to 54 lbs. in weight. It is taken by bottom-fishing, and is excellent when cooked. Among the other sporting fish of India are kalbans (*Labeo calbasa*), running up to 20 lbs.; mirgha (*Cirrhina mirgala*), of similar size; white carp (*Cirrhina cirrhosa*), of half the size; catla (*Catla Buchanani*), good eating, and taken with the rod up to 100 lbs.; Carnatic carp (*Barbus carnaticus*), attaining a weight of 25 lbs., and rising well to the artificial fly; and chital (*Notopterus chitala*), which takes a spinning bait, and runs to 80 lbs. in weight.

Literature.—Among the earliest of English printed books was Dame Juliana Berners' or Barnes's *Treatyses pertenynge to Hawkynge, Huntynge, and Fysshynge with an Angle*, which issued from the press of Wynkyn de Worde in 1486. It is doubtful whether Dame Juliana wrote the chapters on angling; whoever did so displays in the following passage an exemplary devotion to the craft: 'The angler maye have no colde nor no dysease nor angre, but yf he be causer himself. For he maye not use at the moost but a lyne or an hoke, of whyche he maye have store plentee of his owne makynge......Soo thenne his losse is not grevous, and other greyffes maye he not have, savynge but yf ony fisshe breke away after that he is take on the hoke, or elles that he catche nought: whyche ben not grevous...... And yf the angler take fysshe, surely thenne is there noo man merier than he is in his spyryte.' A hundred years later, in 1590, *A Booke of Fishing with Hook and Line, and of all Instruments thereto belonging*, was brought out by Leonard Mascall;

followed in 1613 by John Denny's *Secrets of Angling* in verse. Barker's *Art of Angling* (1651) preceded by two years the most famous work on fishing ever published, *The Compleat Angler* of Izaak Walton, which established its author for all time as *vates sacer* of the craft. The sixth edition appeared in 1676, with added treatises by Venables and Cotton; the hundredth edition—a sumptuous affair in 2 vols. quarto, ably edited by R. B. Marston—was published in 1888. As an all-round angler Izaak Walton might easily be put to shame; he was an effective bottom-fisher, but it is doubtful whether he ever practised the higher art of fly-fishing, and he had never seen a reel. Many of his precepts are drawn from earlier writers, from Dame Juliana Berners to his contemporary Barker. The merit and undying charm of his *Compleat Angler* must be sought in the simple reflections of riverside, meadow, and leafy woods, of tempting taverns and embowered farm-porches. Through all his pages echoes the tinkle of gentle streams, the music of summer birds, the hum of sunlit flies. The only unkindly critic whom Walton has ever encountered was a contemporary of his own, a Cromwellian trooper named Richard Francks, who, under the pseudonym of Philanthropus, wrote *Northern Memoirs calculated for the Meridian of Scotland, to which is added the Contemplative and Practical Angler*. The manuscript was finished in 1658, but Francks found no publisher till 1694. He was an infinitely better angler and naturalist than Walton, whom he girded at as a plagiarist. He was, however, far inferior to the other in literary charm. Nevertheless, his work, of which a second edition was published in 1821, with a prefatory note by Sir Walter Scott, is exceedingly entertaining, and full of interest to anglers. Thirty years after Walton published the *Compleat Angler*, Robert Nobbes issued an excellent treatise on pike fishing—*The Compleat Troller* (1682). In 1883, Westwood and Satchell, in their *Bibliotheca Piscatoria*, enumerated 3,158 editions and reprints of 2,148 works on fish and fishing. Since that time the output has shown no symptom of slackening. Among the more notable contributions to literature by anglers may be mentioned Colonel T. Thornton's *Sporting Tour through the Northern Parts of England and Great Part of the Highlands of Scotland* (1804; new ed. 1896). Sir Humphry Davy spoiled a good book in his *Salmonia, or Days of Fly-fishing* (1828), by casting it into Waltonian dialogue; Professor John Wilson (Christopher North) infused much angling lore into his *Noctes Ambrosianæ*, which ran in *Blackwood's Magazine*, 1822-35. William Scrope's *Days and Nights of Salmon Fishing* (1843-85-97) ranks as a classic, and may be bracketed with Captain Lloyd's *Field Sports of the North* (1830-85) and *Scandinavian Adventures* (1854). Thomas Todd Stoddart was one of Christopher North's *alumni*; his *Angler's Companion to the Rivers and Lochs of Scotland* (1847-53-92) may still be studied with profit, while some of his *Angling Songs* (1889) are spirited and popular. In 1857 a prophet and reformer appeared on the banks of the Tweed in the person of W. C. Stewart, whose doctrines, as expounded in the *Practical Angler* (6th ed. 1874), gave rise to keen and prolonged controversy, and eventually prevailed over the older systems. A *Book on Angling*, by Francis Francis (1867; 6th ed. 1885), is a happy combination of gossip and instruction. Among living writers, the works of 'John Bickerdyke,' J. J. Manley, Abel Chapman, Sir Edward Grey, G. M. Kelson, C. Pennell, W. Senior, Sir Herbert Maxwell, Hon. Gathorne Hardy, G. B. Dewar, Major Traherne, and F. M. Halford may be named as among the best.

Anglo-Israelitish Theory. See LOST TRIBES.

Anglo-Japanese Treaty, signed by Great Britain and Japan, Jan. 30, 1902, by which the two powers agree to safeguard their common interests in China and Korea. In the event of one of them being at war with a foreign power, the other shall maintain a strict neutrality, but shall assist her ally if a second foreign power shall join the first; neither power shall enter into agreements without consent of the other, and each shall confide fully in the other if common interests are endangered. The treaty is in force for five years.

Anglomania, the fancy of Germans, French, or other foreigners for imitating English social customs, dress, etc. There was a craze for English literature in Germany in the second half of the 18th century; a mild Anglomania arose in France just before the revolution; and a similar affectation, which may be seen to-day in certain classes in the United States, is frequently satirized. Conversely, ANGLOPHOBIA is fear, or rather hatred, of Britain. There were outbursts in France after the Fashoda incident (1898), and in Germany and Holland at the time of the Boer war of 1899-1901. Russian hatred of Great Britain was very marked during the Russo-Japanese war, many Russians believing that Japan was the mere cat's-paw of Britain.

Anglo-Saxon Chronicle. See CHRONICLE.

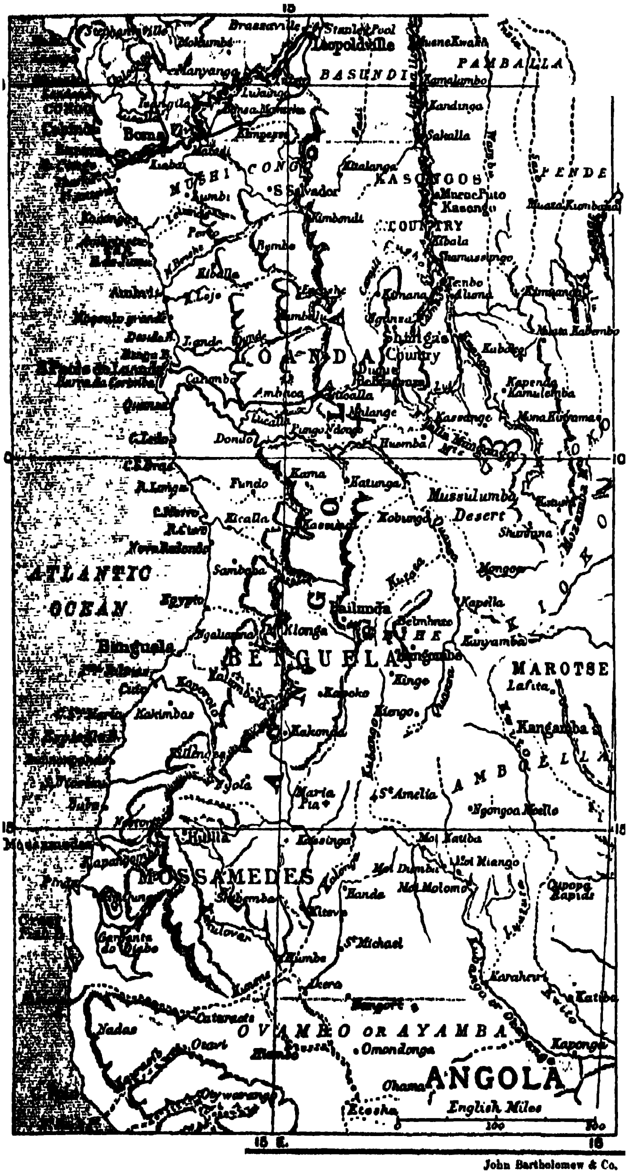
Anglo-Saxon Language, Literature, and Race. See ENGLISH.

Angmagsalik, most northerly important Eskimo settlement on the E. coast of Greenland (67° N. lat.), although a small village was found in 74° 6′ N. lat. by the Sabine Clavering Expedition in 1823.

Angola is the general name for the whole Portuguese territory between the Congo State on the N.E., the Barotse kingdom in British Central Africa on the E., and German S.W. Africa on the S. Angola, including Cabinda, N. of the Congo, has an area of 484,000 sq. m., and a coast-line of fully 1,000 m. The principal rivers are the Coanza (520 m. long, and navigable for 200 m. up), Kunene, and Kubango. The surface is mountainous in the W., where some of the peaks reach an altitude of 8,000 ft. The climate varies much: near the coast the damp soil and mangrove swamps render it unhealthy; inland the plateaus have a much cooler and drier atmosphere. The rainfall varies much, but is generally very small. The most healthy season is the *cacimbo*—June, July, and August. The natural resources of Angola are chiefly vegetable. Iron was once worked, malachite abounds, and auriferous deposits have been observed. The flora is that common to the tropical zone of Africa. India-rubber, coffee, cotton, sugar, tobacco, copal gum, ground-nuts, and a small quantity of ivory, are exported. Railways extend from Loanda to Malange, and from Benguela towards Caconda. The annual value of the imports averages £1,500,000; exports, £1,250,000. Pop. estimated at one to four millions of natives and 12,500 whites. The capital is Loanda, or São Paolo de Loanda. Besides it, Benguela and Mossamedes are the chief ports. Angola sends two deputies to the Portuguese Parliament, the colonies being considered an integral part of the mother country. *Map, p. 244.* See Vasconcellos's *As Colonias Portuguezas* (1896); Monteiro's *Angola and the River Congo* (1875); Delannoy's *Angola* (*Bull. de la Soc. R. Belge de Géographie* (1895 and 1896).

Angoniland, a plateau, of an average elevation of 4,000 ft., between Lake Nyasa, Zambezi R., and Loangwa R., in Barotseland, N.E. Rhodesia. The Angoni are said to have a Zulu origin, and to be descendants of a tribe which crossed the Zambezi about 1825. Their chief wealth consists in cattle, sheep, and goats. Physically they are a fine race. Late in the year 1904 the chiefs accepted British protection.

Angora, or ENGURI, tn. and archiepisc. see on Angora R., Asia Minor, 215 m. E.S.E. of Constantinople; is the market for Angora goat hair (mohair). It is the ancient *Ancyra*. Near Angora the Ottoman sultan Bayazid I. was defeated and captured by Tamerlane in 1402. Pop. over 30,000.



John Bartholomew & Co.

Angora Wool, the silky produce of the Angora goat, is woven into shawls, serges, and so forth at Angora, in Asia Minor. It is known in commerce as mohair. See GOAT.

Angostura. See CIUDAD BOLIVAR.

Angostura Bark, the bark of *Galipea cusparia* of S. America, is one of the aromatic bitters. It contains an alkaloid and a volatile oil. Angostura bitters contain angostura, canella, cinchona, lemon, and other aromatics. See BITTERS.

Angoulême, tn. and episc. see, cap. of dep. Charente, formerly cap. of Angoumois, on the l. bk. of the Charente, France, 277 m. s.s.w. of Paris, on Paris-Bordeaux Ry. The restored cathedral is a fine example of the Romanesque Byzantine style (12th century). Angoulême is the centre for the cognac trade, and there are many paper-mills and stone quarries. Birthplace of Marguerite of Navarre (1492), of Ravaillac (1578), and of Guez de Balzac (1597). Pop. (1901) 37,650.

Angoulême, CHARLES DE VALOIS, DUC D' (1573-1650), illegitimate son of Charles IX. and Marie Touchet; made grand prior of France (1590); known as Comte d'Auvergne from 1590 to 1619. For intrigues with the Marquise de Verneuil he was condemned to death (1604), but was imprisoned, and liberated (1616). He distinguished himself at Arques and Ivry, was present at the sieges of Soissons (1617) and La Rochelle (1628), and fought in Languedoc, Germany, and Flanders. Created Duc d'Angoulême (1619).

Angoulême, LOUIS ANTOINE DE BOURBON, DUC D' (1775-1844), eldest son of Charles X. of France; retired with his father to Turin at the outbreak of the revolution (1789). After conducting unsuccessful military operations in Germany, he rejoined the other exiles at Holyrood, Scotland. At Mitau he married (1799) his cousin Marie Thérèse, only daughter of Louis XVI. and Marie Antoinette. He then withdrew with Louis XVIII. to England; but on the reinstatement of Louis he returned to France, and was made general-lieutenant of the army. In 1823 he led the French expedition into Spain and stormed Cadiz. With his father he signed (1830) an abdication of the throne in favour of the Duc de Bordeaux.

Angoxa, or ANGOCHE, tn. and maritime dist. of Portuguese E. Africa; exports ground-nuts and rubber. The Angoxa R. is navigable for 150 m. up from the town, which stands on the estuary.

Angra do Heroismo, fortified port and cap. of both Azores and Terceira Is., Azores; harbour unsafe in S. gales. Exports wine and grain. Pop. (1900) 10,843; of the district of same name (1900) 33,322.

Angra Pequena, a bay with good anchorage and a small settlement on the coast of German S.W. Africa, nearly midway between the mouth of the Orange R. and Walfish Bay. It was the first colony Germany acquired (June 1883).

Angri, tn., Salerno, Italy, 19 m. S.E. of Naples. Manufactures cotton and silk. Pop. (1901) 11,281.

Angström, ANDERS JONAS (1814-74), Swedish physicist, who made valuable researches on heat, magnetism, and spectroscopy. His principal work, *Recherches sur le Spectre Solaire* (1869), formed an important supplement to the theory of Kirchhoff.

Anguilla or SNAKE I., one of the most northerly of the Lesser Antilles, British W. Indies; produces cattle, ponies, and phosphates. Pop. (1901) 3,890.

Anguisciola, SOPHONISBE (1535–1625), Italian painter, was born in Cremona, and early acquired renown as a good portrait painter. In 1559 she went to Madrid to paint the royal family. Some of her portraits, which are now rare, are in private hands in Florence, Genoa, and in the collection of the Earl of Yarborough. Her own portrait (1554) is in the Uffizzi Gallery at Florence, as also in the museum at Vienna; and the portrait of her three sisters (1555), one of her masterpieces, is in the National Gallery in Berlin. Van Dyck says that he learned more from her than from any other painter.

Angul, a hilly district in Orissa, Bengal, India; contains large coalfields and iron mines. Area, 881 sq. m. Pop., Angul and Khondmals, (1901) 191,911.

Angular Motion is the motion of a line, fixed at one end, in one plane, relatively to a stationary line passing through the centre of rotation—*e.g.* the movement of the hand of a clock relatively to any fixed line on the face of the clock. Thus we are able also to speak of *angular velocity* and *angular acceleration.* See DYNAMICS.

Angus, an ancient district of Scotland nearly coincident with the present Forfarshire.

Anhalt, a sovereign duchy of the German empire, consisting of two portions, separated and nearly surrounded by the Prussian province of Saxony. The larger (E.) portion is crossed by the Elbe and Saale, and belongs to the N. German Plain; the smaller (W.) portion runs up among the N. foothills (2,020 ft.) of the Harz Mts. Total area, 885 sq. m. Pop. (1900) 316,085, most of whom are Protestants. Agriculture is the principal occupation, 61½ per cent. of the surface being cultivated. Chief industries are the manufacture of sugar, and brewing and distilling. Cap. Dessau. The duchy has one vote in the Imperial Federal Council, and sends two representatives to the Imperial Diet.

Anharmonic Ratio, or CROSS RATIO. If a line AB is divided at two points C and D, the ratio of the two ratios AC : CB and AD : DB is called an anharmonic ratio. When the ratio is unity, AC : CB = AD : DB, and the line is divided harmonically. The anharmonic ratio is of fundamental importance in projective geometry.

An-hui. See NGAN-HUI.

Anhydride, an oxide of an element or organic radical, capable of combining with water to form an acid. Nearly all the nonmetallic elements, as well as several of the metallic elements, form anhydrides. Thus, sulphuric anhydride, SO_3, with water, makes sulphuric acid.

Anhydrite, a mineral consisting of sulphate of lime, and differing from gypsum in that the latter contains two molecules of combined water. It crystallizes in the rhombic system with a hardness of 3½, and a perfect cleavage yielding cuboidal fragments. Its colour is white, gray, or pale blue.

Anhydrous means not containing water, either combined as water of crystallization or hydration, or free. Hydrates are dry and apparently free from water, while substances containing uncombined water are moist.

Ani, the ruins of the ancient Armenian capital, in Erivan, Transcaucasia. Ashat III. transferred his capital from Bagrad in 961, and under his son Zampad and grandson Kashka I. Ani became a great city of 100,000 inhabitants and about a thousand churches and monasteries. In later times it fell into the hands of the Seljuk Turks and of the Georgians (1125–1209); in 1240 it was deserted; and an earthquake in 1319 completed its destruction. See Brosset's *Les Ruines d'Ani* (1860); Krahmer's '*Die altarmenische Hauptstadt Ani,*' in *Globus,* vol. lxviii.

Aniche, tn., dep. Nord, France, 10 m. E. of Douay. Coal-mining. Pop. (1901) 7,434.

Anie, PIC D', sacred mt. of the Basques, in W. Pyrenees; 8,215 ft.

Anil, a leguminous plant found in the W. Indies, from which indigo is made.

Aniline (amido-benzene, $C_6H_5NH_2$) is an aromatic base occurring in coal tar and similar products of the distillation of nitrogenous bodies. It was first obtained in this way from indigo, but is now prepared exclusively from the benzene of coal tar. The benzene is treated with sulphuric and nitric acids, and the resulting nitro-benzene reduced to aniline by distillation with iron borings and steam in the presence of ferrous chloride. The oil obtained is separated and rectified, and consists of aniline itself along with higher homologues, chiefly toluidines. Aniline is an oily liquid that is colourless when pure, but turns brown on keeping. It has a peculiar smell, is slightly soluble in water, though more so in alcohol and benzene, and boils at 183° C. Aniline burns with a smoky flame; and though neutral to litmus, acts as a powerful base, uniting with acids to form well-crystallized salts—*e.g.* the 'aniline salt' of commerce is aniline hydrochloride, $C_6H_5NH_2$ HCl. Bleaching powder gives a purple colour when added to aniline solution, and potassium bichromate and sulphuric acid a red followed by blue. Aniline is poisonous, causing collapse if absorbed through the skin, as on saturation of the clothes with it, and workmen engaged in its manufacture suffer from headache and nausea if they inhale its vapour. 'Aniline dyes' are not simple derivatives of aniline, and in many cases are not prepared from it at all; the name arising from the fact that one of the earlier and commonest of these compounds, magenta, or rosaniline hydrochloride, $(C_6H_4NH_2)_2C.C_6H_3(CH_3)NH.HCl$, is obtained by the oxidation of a mixture of aniline and toluidine, and that other colours result by the introduction of different alkyls in the amido groups. (See DYEING.) The rapid increase in the manufacture of these dyes, especially in Germany, where chemists of the highest standing and scientific skill are engaged in the factories, is as significant as are their beautiful shades in almost endless variety, their low price, and the ease with which they may be used. In many cases they cannot, however, be recommended, because under the influence of sunlight they rapidly fade. They are much used as staining reagents in microscopy. See Benedikt's *Chemistry of Coal-tar Colours,* and Bloxam and Blount's *Chemistry for Manufactures.*

Animalcula, a term popularly applied to all minute forms of animal life—*e.g.* Protozoa, Rotifera, and Tardigrada.

Animal Heat, the heat constantly being generated in the body, the ultimate source of which is the oxygen consumed in the food and inhaled in breathing. The normal temperature varies throughout the animal kingdom, and bears a fairly close relationship to the activity or sluggishness of the animal, and also to surrounding conditions and circumstances of the individual. In man the normal temperature is 98·4° F., in birds, 100°-112° F., while in fish and reptiles it differs little from the air or water they inhabit. In some diseases (*e.g.* fevers) the temperature of the human body may rise to 110° or 112° F., while in others (*e.g.* cholera) it may fall to 90° F.; but such extremes continued for any length of time prove fatal to the organism.

Animal Kingdom, one of the three great divisions—the other two being plants and minerals—into which natural objects were at one time classified. Modern research has shown the close connection between simple plants and simple animals, and thus destroyed the basis of this primitive classification.

The prime difference between animal and plant is the difference of diet. A green plant can in sunshine form its own carbohydrates (starch, sugar, etc.), and, if supplied with water and salts, can build up protoplasm under these conditions. An animal must have its carbohydrates ready made, and is incapable of existing unless also supplied with proteids in some form—*i.e.* while a plant requires only simple food which it absorbs in solution, an animal requires complex food, usually taken in solid form. But some simple forms contain the green colouring matter chlorophyll, and are capable of feeding like plants.

Again: most animals get rid of nitrogenous waste products, which plants do not. They are usually more definite in form than plants; and their component cells are not surrounded by cellulose, as those of plants are. Cellulose does, however, occur in tunicates, or sea-squirts. As a rule, animals exhibit much greater histological differentiation than do plants. The older statement that animals move about and plants do not, can no longer be accepted in view of the fact that some animals are sedentary, and that certain microscopic plants and the swarm-spores of some higher plants move about as freely as animals do.

Animals, like plants, are composed of protoplasm, or living matter, and, like them, exhibit the five prime organic functions. They are contractile, or capable of movement; they are sensitive; they nourish themselves; they breathe; they excrete. In addition, they are periodically capable of growth and reproduction. From inorganic substances—the minerals of the old classification—both animals and plants differ in their power of growing at the expense of substances different from themselves, and in the fact that, although they are undergoing constant change, they remain apparently the same for long periods.

The following are the chief groups of the animal kingdom:—

A. Vertebrata: animals with (*a*) a dorsal tubular nervous system; (*b*) a dorsal axis, known as the notochord, which in the higher forms is replaced at an early stage by the backbone; (*c*) gill slits, or their equivalents, the visceral clefts, which are openings from the mouth cavity to the exterior:—(1) Mammals; (2) Birds; (3) Reptiles; (4) Amphibia; (5) Fishes; (6) Cyclostomata, or round-mouths; (7) Amphioxus; (8) Tunicates, or sea-squirts.

B. Invertebrata: animals with ventral nervous system, with no backbone or notochord, and no gill slits:—(1) Molluscs, or shell-fish; (2) Arthropods (crustacea, insects, arachnids, etc.); (3) Echinoderms (star-fish, sea urchins, etc.); (4) Annelids, or segmented worms; (5) Unsegmented worms; (6) Cœlentera, or hollow-bodied animals; (7) Sponges; (8) Protozoa. For bibliography, see BIOLOGY and ZOOLOGY.

Animal Magnetism. See HYPNOTISM.

Animal-Power, the amount of work done in traction, or in working a machine, by animals or men. The standard horse-power (H.P.), fixed by Watt at 33,000 ft.-lbs. per minute, is above what a good horse will do for a day of 10 hours. Walking at 2½ m. per hour on the level, he exerts a tractive force of 100 lbs., equivalent to 22,000 ft.-lbs. per minute; but as the speed increases the tractive force diminishes, being, indeed, inversely proportional to the speed, between ¾ and 4 m. per hour. The draught of an averagely good horse is reckoned, as above, at 100 lbs. for 10 hours, at 2½ m. per hour; for 9 hours, 111 lbs.; for 8 hours, 125; for 7 hours, 143; 6 hours, 167; 5 hours, 200 lbs. A man hauling along a level road at 1½ to 3 m. per hour is reckoned at one-sixth of a horse; he does 3,670 ft.-lbs. per minute for a 10 hours' day. In rowing, he does 4,000 ft.-lbs. for 10 hours; on treadmill, 3,100; turning a handle, 2,600. While the horse gives, as above, 22,000 ft.-lbs. per minute, the ox gives 12,000, the mule 10,000, and the ass 3,500. See Tranturine's *Engineer's Pocket-book.*

Animals, CRUELTY TO. See CRUELTY.

Animals, INTELLECTUAL CAPACITY OF. See INSTINCT.

Animal-Worship. The deification and worship of certain of the lower animals, a usage traceable in most ancient religions, and still practised by many living races, appears to owe its origin to various complex causes. Among savages in the lowest stage of culture, a dread of the ferocity and the superior strength of the tiger, bear, and alligator seems undoubtedly to have been the motive which led to the worship of these animals, with the view of propitiating them; and although in modern times we find that some races kill and eat the object of their reverence (as in the case of Northern Asiatics and Red Indians), this apparent inconsistency may be explained by assuming that their ideas on the subject are passing through a state of transition. Then, again, there are instances in which animals are held sacred, not out of fear for them, but because their bodies are believed to be the homes of the tribal deity or deities—an idea almost inseparable from that of demoniacal possession, and akin to the doctrine of metempsychosis. Animal-worship in this aspect survives among Polynesians, and in a still more distinct form among Hindus. 'The sacred cow is not merely to be spared; she is, as a deity, worshipped in annual ceremony, daily perambulated and bowed to by the pious Hindu. Hanuman, the monkey-god (whose living representative is the entellus monkey), has his temples and his idols, and in him Siva is incarnate, as Durga is in the jackal; the wise Ganesa wears the elephant's head; the divine king of birds, Garuda, is Vishnu's vehicle; the forms of fish, and boar, and tortoise were assumed in those avatar-legends of Vishnu which are at the intellectual level of the Red Indian myths they so curiously resemble' (Tylor's *Primitive Culture*). The religion of ancient Egypt was permeated with these ideas; and a similar origin is assignable to the worship by the Jews of the golden calf and the brazen serpent. Serpent-worship forms, indeed, a separate phase of this question; with which totemism, animism, and ancestor-worship are also involved. For in some cases a particular animal is held in reverence, not because the spirit of a deity dwells within it, but because it represents the tribal ancestor. Yet another variety of animal-worship was the reverence paid to dwarfs. Thus, the Malagasy of Madagascar deified the Vazimba, an extinct aboriginal race, 3 ft. 6 in. in stature. See Professor Windle's *Pygmies* (1894), p. xxxvi. The same idea is suggested by the dwarf god Ptah of ancient Egypt, from whom have been derived the Phœnician Patæki and Kobeiri. See R. G. Haliburton's *Dwarf Survivals* (1895).

Animism (Lat. *anima*, 'soul'), a term originally used to denote the theory of the German chemist Stahl, who early in the 18th century developed and modified the classical theory which identified the vital principle with the soul, attributing to it the functions of ordinary animal life in man, while the life of other creatures was assigned to mechanical laws. It was applied by Dr. Tylor, in his work on *Primitive Culture*, to express the doctrine which attributes a living soul, not merely to human beings, but also to the lower animals, and to inanimate objects and natural phenomena generally. Since the publication of Dr. Tylor's work it has been almost exclusively used in that sense, though some anthropological writers have employed it more loosely to include the simpler conception which, in the evolution of savage thought, probably preceded it—*viz.* that of all beings, animate and inanimate, as endowed with personality and conscious life. Savage man interprets all external phenomena in the terms of his own consciousness. When he begins to reason concerning himself, the phenomena of sleep, of dreams, of trance, and of death lead to the view that he is composed of two parts—the more obvious part, the body, and an inner or less substantial part, the soul or spirit. The latter is capable of being separated from the body temporarily during sleep or trance, when it goes forth on various adventures, which the owner remembers as dreams and visions; or in sickness, when its place is often occupied by other and less desirable spirits. In the latter case the great object of the savage medicine-man is to recover the soul; to drive out, if necessary, the invaders who have taken its place; and to induce it to re-enter the body, its proper abode. Death is the permanent separation of soul and body. This involves the decay and destruction of the body, but not of the soul, which is capable of existing apart. Separation, however, may continue for an indefinite time without causing death. A large class of folk-tales is based upon the belief that it is even for the advantage of the owner that his soul should be extracted and hidden away out of danger. This belief is carried into practice by some savages, as by the Alfures of Minahassa, in Celebes, on removal into a new house. Such removal is fraught with supernatural danger to the inmates. Consequently the priest collects beforehand all their souls into a bag, of which he takes charge, and afterwards, with the proper ceremonies, restores them to their owners.

The human soul is usually conceived as a miniature man or woman. But it is not necessarily human in form; it often appears as one of the lower animals—*e.g.* a beast, a snake, or even an insect. Again, it is often held to be the breath, the shadow (whence the word *shade* for a disembodied soul), or the image reflected in a pool of water or a mirror. It is originally not conceived as immaterial. This is a refinement of a later stage. The lower animals, trees, plants, and even inanimate objects, being all endowed with souls precisely analogous to those of men, they are not merely credited with human feelings and passions, but are often held to be transformed men. Personal identity in spite of entire change of form is thus an article of savage belief. This develops, in a higher plane of culture, into the philosophical doctrine of the transmigration of souls, which has played so large a part in more than one religion. Other savage speculations as to the future condition of the human soul have had an important influence on religion. The belief that the soul can exist apart from the body has led to one or other of three conclusions: (1.) It continues to mingle more or less continuously with the living, and to interfere in their affairs; hence the superstitions concerning ghosts and vampires, and the cult of the dead. (2.) It carries on an existence of the same sort as in the body, but of a thinner and less substantial form, in some region apart from mankind. (3.) It passes to a place where the good are rewarded, and the wicked punished, for deeds done in the body. The last of these three opinions, though its germs may be found in the lower culture, is, generally speaking, later in civilization than the first and the second. It has survived in all the higher religions.

The immortality of the soul is not, as a rule, a savage doctrine. The soul of a departed human being is conceived as alive so long as any memory of the man remains in those who have known him in this life, or have heard him spoken of. The Polynesians of the Harvey group believe, as reported by Gill, that, while the souls of those who die a violent death are immortal, the souls of those who die a natural death are cooked and eaten by certain demons, and by this means annihilated. Some savage peoples are of opinion that there is a series of spirit-worlds, which are successively inhabited by the soul, death in each of them resulting in transfer to another, until in the last of them death means definitive annihilation. For the Dyaks death in the spirit-world means either rebirth into this world or annihilation, according to accident, since the soul, on death in the spirit-world, enters into a fruit or a leaf, or some other edible substance. If then an animal or a human being eats the substance, the soul becomes reincarnated in the offspring of the eater; otherwise it perishes.

The difficulties of savage metaphysics have resulted, in many parts of the world, in the supposition that a human being has more than one soul. This hypothesis is found among peoples as widely different as the N. American Indians, the Melanesians, the Malagasy, the Negroes, and the Khonds. In the philosophy of more civilized races it appears among the Chinese, the Hindus, and the ancient Egyptians. There are even traces of it in Homer; while later Greek, Roman, and scholastic philosophers and the rabbinical writers made similar or even more subtle distinctions. The fates of these separate souls are not the same. When three or four souls are supposed to be united in one person, one of them frequently remains in or about the grave, another is born again into a fresh body, a third enters the spirit-world, and a fourth sometimes dies with the body. One of these souls is often identified with the shadow, another with the reflected image, a third is the dream-soul, and so on.

Another doctrine of the utmost importance appears to owe its origin to the belief that the soul can exist apart from the body—*viz.* that of the existence of spirits analogous to the human soul, which have never been permanently united to a body of any kind, but which exist independently of all corporeal ties. These spirits haunt the air, the earth, the heavens. Their power was regarded as of various degrees. They required to be appeased, conciliated, and bound by mutual ties of service and protection to mankind. As the ethical sense grew with advancing civilization, they began to be differentiated into favourable and hostile, good and evil. Many of the former thus developed into gods, the latter into devils. They were regarded as able to hold commerce with the human race, and even to enter into individuals, to inspire them and take entire possession of them. They were equally able to inhabit the lower animals, trees, and other natural objects. In polytheistic religions they are conjured by appropriate ceremonies into the idols intended to represent them. The highest development of animism is in dualism or monotheism; for, to sum up, animism is, as Dr. Tylor says, 'the groundwork of the philosophy of religion, from that of savages up to that of civilized men.' See E. B. Tylor's *Primitive Culture: Researches into the Development of Mythology, Philosophy, Religion, Art, and Custom* (1871; 3rd ed. 1891), of which chaps. xi.-xvii. still remain the principal authority. On the animism of particular peoples, see Canon H. Callaway's *Religious System of the Amazulu* (1870); Rev. W. Gill's *Myths and Songs from the South Pacific* (1876), especially ch. 2, 8-10; R. M. Dorman's *Origin of Primitive Superstitions, and their Development into the Worship of Spirits and the Doctrine of Spiritual Agency among the Aborigines of America* (1881); R. H. Codrington's *The Melanesians: Studies in their Anthropology and Folk-lore* (1891), especially ch. 7, 10, 13; Mary H. Kingsley's *Travels in West Africa* (1897), ch. 19-22, and *West African Studies* (1899), ch. 5-7; Erwin Rohde's *Psyche: Seelencult und Unsterblichkeitsglaube der Griechen* (2nd ed. 1898); J. J. M. de Groot's *The Religious System of China; its Ancient Forms, Evolution, History, and Present Aspect, Manners, Customs, and Social Institutions connected therewith* (4 vols., pub. Leyden, 1892-1901), especially vol. iv., on 'The Soul in Philosophy.'

Animuccia, Giovanni (*c.* 1500-71), composer, born at Florence; music master at St. Peter's, Rome (1555-71). His friend and confessor, San Filippo Neri, requested him to compose *Laudi Spirituali* (2 vols. 1565 and 1570), to be interspersed throughout his sermons; these hymns were the origin of the oratorio. His chief works are *Madrigali e Motetti a Quattro e Cinque Voci* (1548), and *Il Primo Libro di Messe* (1567). His brother Paolo (d. 1563) was also a musician and composer.

Anio, mod. Aniene, river of Italy, rises in the Hernician Hills (Monte Cantaro), flows s.w. past Subiaco and Tivoli, where it forms the famous five falls, and enters the Tiber 2 m. above Rome after a course of 70 m. Also known as the Teverone.

Anion, the portion of a compound that is liberated at the anode or positive pole when electrolysis takes place. See Ion; Electrolysis.

Anise Fruit, misnamed seed, is obtained from an umbelliferous plant of S. Europe, and is cultivated in Egypt, Spain, Germany, and elsewhere. 'Anise seed'—usually aniseed—is used in the preparation of liqueurs and by confectioners, is a mild stomachic, and relieves flatulence. The whole plant is aromatic. A cooling drink is made from the fruit in Italy. Star Anise is the fruit of an evergreen shrub of the magnolia order, a native of China, and star-shaped, having the properties of aniseed.

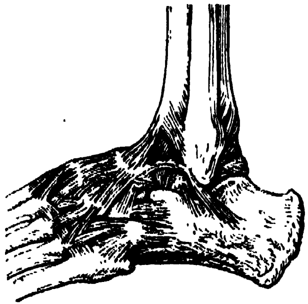
Anjer, seapt. on w. coast of Java, on Strait of Sunda, 60 m. w. of Batavia, a port of call for Batavia; was destroyed by Krakatoa eruption in 1883. Pop. 3,000.

Anjou, anc. prov. of France, round Angers, now the dep. Maine-et-Loire and part of the deps. Mayenne, Sarthe, and Indre-et-Loire. The 11th Count of Anjou, named Plantagenet, married (1128) the daughter of Henry I. of England, and was the father of Henry II. Anjou was reunited with the French crown in 1203. The title of Comte d'Anjou was revived in 1246, and bestowed by Louis upon his youngest brother Charles, who became the head of a new house of Anjou associated with the history of Naples and of Provence. After the death of 'le Roi René' in 1480, the nominal title of Duc d'Anjou was borne by the younger sons of the kings of France. See Marchegay and Salmon's *Chroniques d'Anjou* (1856-71).

Anker, an obsolete English liquid measure of from 9 to 10 gallons; still in use in Germany, Russia, and Denmark. The Scots anker contained 20 Scots pints.

Anklam, tn., dist. Stettin, prov. Pomerania, Prussia, 53 m. by rail N.W. of Stettin; is the seat of a military school. Pop. (1900) 14,617.

Ankle, The, is a hinge-joint, the bony surfaces of which are covered with cartilage, and are bound together by ligaments. The movements of the joint are mainly those of flexion and extension, but a certain amount of lateral motion is possible when the foot is extended. From its position the ankle is a frequent seat of sprains, fractures, and dislocations. *Treatment.*—Quick and firm bandaging is of great importance, to prevent swelling. Wrap the ankle in plenty of cotton-wool, and bandage, leaving the toes exposed, in order that their colour may indicate if the bandage becomes too tight. Numbness or discoloration of the toes shows that less pressure must be used; otherwise the ankle may be left untouched, and completely at rest, for three days, after which passive movement (*i.e.* the gentle movement of the joint by hand, not by its own muscles) may begin in many cases. If much swelling has taken place before the injury can be attended to, a hot fomentation will relieve the pain very much, and afterwards the bandage can be used, not to prevent swelling, but to keep the joint at rest. Passive movement and massage should both be used as early as possible after the swelling begins to subside, to aid absorption and prevent adhesions. Stiffness and weakness following a sprained ankle are best treated with cold douches and special movements—*e.g.* tiptoe exercises. Fractures occur in the immediate vicinity of the ankle joint. The commonest of these is 'Pott's fracture,' produced by forcible twisting of the foot, in which the fibula breaks about three inches above the external malleolus. Treatment consists in the reduction of the deformity, and putting the limb into a suitable splint. In dislocations the entire foot may be displaced in any direction. Compound dislocation of the ankle is always serious, and may necessitate amputation. See Joints.



The Ankle Joint.

Ankleshvar, tn., Broach dist., Bombay Presidency, India; cotton and paper mills. Pop. (1901) 10,225.

Ankober, or Ankobar, caravan centre, former cap. of Shoa, Abyssinia, 350 m. E. of Zeila, on the E. slope of the hills forming the Shoa plateau, at an altitude of 8,700 ft. Pop. over 7,000.

Ankole, or Ankori, a dist., Uganda Protectorate, British E. Africa, between Albert Edward Nyanza on the w. and the Victoria Nyanza on the E. A land of thorny scrub in the E., traversed by ranges of about 5,000 ft.; fertile and well cultivated in the w.; has iron ores. The inhabitants comprise the Wanzankori, the true aborigines, and the Wahumas, intruders from Gallaland. All speak a Bantu dialect closely related to that of Unyoro.

Ankylosis, the partial or complete rigidity of a joint, is due to morbid growth, often following a neglected dislocation or a fracture. Ankylosis may also follow on severe articular rheumatism.

Ankylostomiasis, a disease, leading to acute anæmia, caused by the bite of the parasitic nematoid worm *Ankylostoma*, common in Egypt and Brazil, and sometimes called the 'tunnel-worm' because of its frequency among the workers at the St. Gothard tunnel. An epidemic among the Kimberley miners is recorded. The treatment is by anthelmintics, followed by iron tonics.

Ann, or Annat, in Scots law, is the half-year's stipend due at the first vesting period after the death of a parish minister of the Church of Scotland, and is payable to his family or next of kin, or, failing them, to the Church of Scotland Ministers' Widows' Fund. As the right to ann vests in the next of kin, it is not assignable, nor can it be attached by the minister's creditors.

Anna, an Indian coin, the sixteenth of a rupee.

Annaberg, tn., prov. Zwickau, Saxony, on the N. slope of the Erzgebirge, 35 m. by rail s. of Chemnitz. It manufactures haberdashery and lace, buttons, and cardboard. There are silver, cobalt, and iron mines. Pop. (1900) 15,959.

Annabon, or Annobom, isl. in the Gulf of Guinea, W. Africa, belonging to Spain; is mountainous (2,800 ft.), well wooded, fertile, and healthy. Area, 6¼ sq. m. Pop. about 3,000.

Anna Comnena (1083-1148), Byzantine princess, historian, and patron of learning, daughter of Alexius I.; endeavoured unsuccessfully to induce her dying father to name her husband, Nicephorus Bryennius, as his successor. She afterwards formed a plot against the life of her brother; it was discovered, and Anna, with her husband, fled to Greece. The rest of her life was given to writing; she is remembered for her *Annæ Comnenæ*

Alexides (1069-1118), a biography of her father. The best edition is that of Schopen and Reifferscheid (1839-78); a German translation was published by Schiller in his *Historische Memoiren* (1790). See Oster's *Anna Comnena* (1868-71), and Chalandon's *Règne d'Alexis I.* (1900).

Anna Ivanovna, Empress of Russia (1693-1740), daughter of Ivan, half-brother of Peter the Great. On the death of Peter II. (1730) she succeeded to the throne, declared herself autocratic, and gave supreme power to her favourite, Biron, who ruled the empire with intolerable tyranny and oppression. At her death Anna left the throne to Ivan, son of her niece, Anna Carlovna.

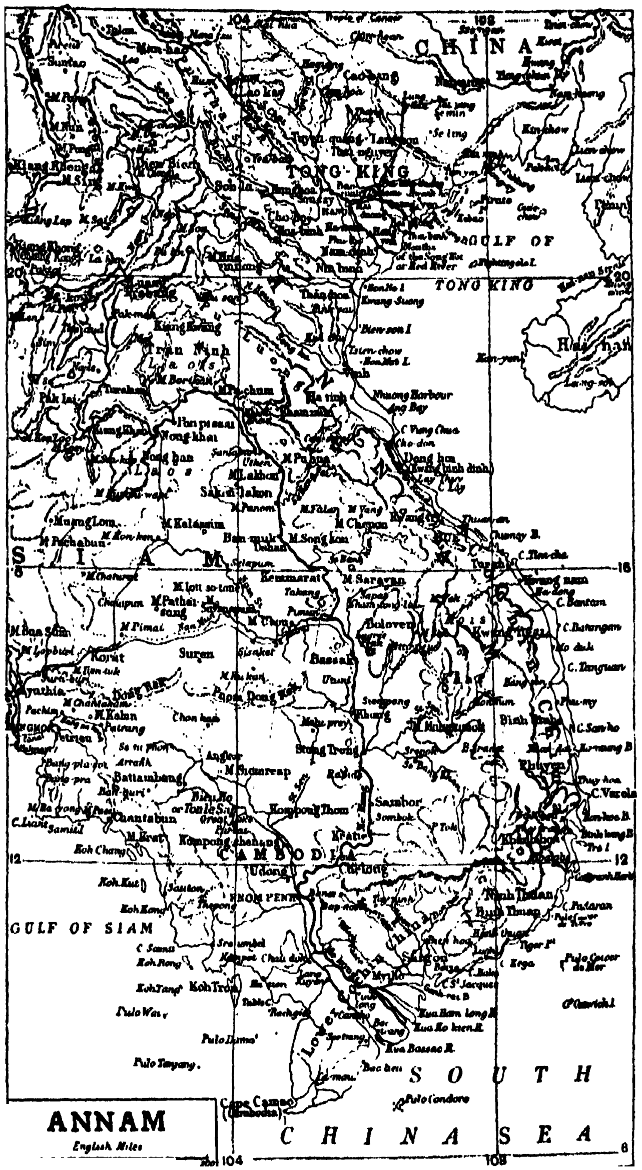
Annals. See RECORDS, PUBLIC.

Annam (properly ANNAN, from *Chin-Ngan-nan*, 'Southern Peace;' Annamese, *Dang Trang*, 'Inner Route'), a kingdom of Indo-China, formerly comprising the whole of Tongking and Cochin-China. Annam is now conterminous on the N. with Tongking; on the W. it is separated from Siam by the 'neutral zone' (18 m. broad), which follows the r. bk. of the Mekong R. southwards to Lower (French) Cochin-China, and its trib. Sebang; on the E. and S.E. the China Sea, with a coast-line of 800 m., forms the boundary. The area is 52,100 sq. m., and the pop. (1902) 6,400,000.

Between the Mekong valley and the China Sea the surface is occupied by a series of plateaus and ranges, the latter reaching altitudes of 5,000 to 8,000 ft. A ridge E. of Kieng-Kwang is crossed by a pass 4,200 ft. high between the Mekong valley and the coast. Another offshoot is pierced by the Déo-Ngang gorge, a point of great strategic importance. These plateaus lie in the Mekong catchment basin, while the outer slopes drain to the China Sea. The Coast Range forms the true water-parting between the Mekong and the Pacific Ocean. There are several sheltered harbours, the finest Nan-Thiet (between Kega and Vinay Points), Kana (under Cape Padaran), and the spacious Hon-Kohe inlet. Farther N. is Tourane Bay, at the mouth of the Hane R., a few miles S. of Hué Bay, the safest haven on the whole coast, and accessible to the largest vessels.

The climate is largely determined by the Coast Range, which shelters Annam from the moist S.W. monsoon, and intercepts the N.E. winds which prevail from September to January. This is the season of almost continuous rain, often accompanied by typhoons, and has an average temperature of about 60° F. In June, July, and August the temperature often rises to 85° or 95° F. during the day,

In Annam there are three vegetable zones: that of the seaboard, overgrown by the mangrove, pandanus, and calamus palm; that of the mountain slopes; and the intervening belt of alluvial lowlands, under rice, fruits, and other cultivated crops. The upland zone is, with that of the Malay Peninsula, by far the richest in Asia for the variety and abundance of its vegetable forms. Here the floras of Japan, of China, and the N. Himalayas are intermingled with the indigenous growths—notably ironwood, teak, eaglewood, dyewoods, lacquer, and other gummiferous plants; benzoin, cardamom, and many valuable drugs. Only 500,000 ac. are under rice, and great quantities of that food are imported from China and Cochin-China.



John Bartholomew & Co.

Of other economic plants, cotton, sugar-cane, tea, and cinnamon are cultivated.

The inhabitants of Annam belong almost exclusively to the S. division (Indo-Chinese) of the Mongol family. Socially they form two well-marked groups—the settled and somewhat civilized Annamese of the cultivated plains, and the rude, wild tribes called Moï. The masses are Buddhists; the lettered classes call themselves Confucianists. The Annamese are essentially an agricultural people. Cap. Hué. The chief ports of entry are Tourane and Faï-Foo. The great natural resources of the country remain undeveloped, owing to the total absence of railways; even roads are rare. The reduction of the maritime provinces of Cambodia (now French Cochin-China) took place about 1750. Tongking was reduced in 1775 by a usurper, but the son of the deposed king recovered it in 1798 with the aid of French troops. From this time relations with France became continuous. The murder of Bishop Diaz in 1857 called for active intervention, and in 1858 the capture of Tourane was followed by the complete rout of the Annamese army. Lower Cochin-China was ceded to France by the treaties of 1862 and 1867. A protectorate was proclaimed over Cambodia in 1863, and French interests were secured in Tongking by treaties concluded with Annam in 1874. Chinese interference was ended by the treaties of 1884 and 1886, extending the French protectorate over Annam itself.

See Luro, *Le Pays d'Annam* (1876; 2nd ed. 1898); Dutreuil de Rhins, *Le Royaume d'Annam et les Annamites* (2nd ed. 1889); Lemire, *Indo-Chine, Annam, et Tonkin* (1888); Aymonier, *Notes sur l'Annam* (1886); Bouinais and Paulus, *L'Indo-Chine Française Contemporaine* (1885); Launay (l'Abbé), *Histoire Ancienne et Moderne de l'Annam* (1888); J. L. de Lanessan, *L'Indo-Chine Française* (1889), and *La Colonisation Française en Indo-Chine* (1895); J. Barral, *La Colonisation Française au Tonkin et en Annam* (1899); Barthélemy (Comte de), *En Indo-Chine* (1899); E. Gallois, *A Travers les Indes* (1899), *Mission Pavie Indo-Chine, 1879-95* (1899); Orléans (Prince Henri d'), *Du Tonkin aux Indes* (1897).

Annan, seapt. and parl. burgh, Scotland, on Annan R., 15 m. S.E. of Dumfries; shipbuilding, distilling, fishing, tanning, and cotton manufacture. Pop. (1901) 5,805.

Annandale, Charles (1843), born in Kincardineshire, educated at Aberdeen University; has edited *The Imperial Dictionary* (1882); Blackie's *Modern Cyclopædia* (1890); *The Popular Cyclopædia; The Student's Dictionary* (1895); *Concise Dictionary; Burns's Works.*

Annandale, Thomas (1838), regius professor of clinical surgery in the University of Edinburgh since 1877, and senior surgeon to the Royal Infirmary. He has published many important books and papers on operative surgery.

Annapolis. (1.) City, cap. of Maryland, U.S.A., situated on Chesapeake Bay; contains the U.S. Naval Academy, and St. John's College (1789). Industry, oyster-tinning. Here the Convention of 1786 met to consider alterations of the Articles of Confederation. Pop. (1900) 8,525. (2.) Town, formerly Port Royal, on an arm of the Bay of Fundy; the first settlement in Nova Scotia (1604). It passed into the hands of the British in 1713, and remained the capital of the colony till Halifax was founded in 1749. Pop. (1901) 1,019.

Ann Arbor, city, Michigan, U.S.A., situated on the Huron R., 38 m. W. of Detroit; is the seat of the state university (1837). Pop. (1900) 14,509.

Annates. See First-fruits.

Annatto, or Arnotto, a colouring matter obtained from the seeds of an evergreen plant, *Bixa orellana*, from Brazil and Cayenne (French Guiana); is a red, soft solid, slightly soluble in water, but readily in alcohol or in alkaline solutions. It dyes silk, cotton, and wool fibres; but the colour is fugitive, and its principal use is to colour butter, cheese, varnishes, and lacquers. It is greatly adulterated, and as it is so largely used to colour articles of food, the detection of impurities is of importance. The more common adulterants are flour, chalk, gypsum, alkali, soap, turmeric, red ochre, red lead, copper sulphate, common salt. See Hassall's *Food Adulteration*.

Anne, St. (Anna), mother of the Virgin Mary; born in Bethlehem; was married to Joachim. Tradition represents Mary as the only child of this marriage, but Engisippus and others maintain that Anne was thrice married, and was the mother of a daughter Mary in each case, in order to reconcile tradition with the reference to the sister of Mary (John 19:25). A church was built in her honour in Constantinople by Justinian in 550, but it was not till 1584 that the observance of her festival was enjoined on the Roman Catholic Church. She is the model of married women, and of those who have the care of children. See Baring-Gould's and Butler's *Lives of the Saints* (1872-7).

Anne (1456-85), queen of Richard III. of England, younger daughter of the Earl of Warwick, the 'king-maker,' was betrothed to Edward, Prince of Wales (1470). After his death at Tewkesbury (1471), Richard of Gloucester, desiring to share the wealth of the Warwicks, compelled her to marry him (1473), and on his usurpation of the crown (1483) she became queen. See Strickland's *Queens of England* (1864-5).

Anne (1665-1714), Queen of Great Britain and Ireland, second daughter of James II., was born at St. James's Palace. Like her elder sister, Mary, she was brought up as a member of the Church of England, a circumstance which vitally affected her subsequent career. At eighteen she was married (July 28, 1683) to Prince George of Denmark, brother of King Christian V. The death of Mary, on Dec. 28, 1694, without leaving an heir, and thereafter the death of William on March 8, 1702, left the succession to the throne, in terms of the Declaration of Right, vested in Anne, who was accordingly crowned on April 23, 1702. The chief event of her reign was the union of the Parliaments of England and Scotland in 1707. Hardly less important were the Jacobite rebellion of 1715, and the war with France, the campaigns of Marlborough and Peterborough, the victories of Blenheim (1704), Ramillies (1706), Oudenarde (1708), and Malplaquet (1709), leading up to the treaty of Utrecht (1713). Her reign has been fitly styled the Augustan age of English literature. A woman of strong character, and possessed of many amiable qualities, she nevertheless offended the Whig party by her marked Toryism (see Godolphin, Harley, and Mrs. Masham), and her Scottish subjects by her narrow Anglicanism. See histories of the reign by Burton and Oldmixon, also Ashton's *Social Life in the Reign of Queen Anne.*

Anne of Austria (1601-66), daughter of Philip III. of Spain, married Louis XIII. of France (1615). On his death (1640) she became regent for her son, Louis XIV., until he was proclaimed king at thirteen (1651), though she entrusted the affairs of the kingdom to the strong hands of Mazarin. Her latter years were spent in retirement. See Freere's *Regency of Anne of Austria* (1866).

Anne of Bohemia (1366-94), daughter of the Emperor Charles IV. of Germany, sister of King Wenceslaus of Bohemia, and married to Richard II. of England (1382); was greatly beloved by her husband and people, and was known as 'Good Queen Anne.'

Anne of Cleves (1515-57), daughter of John, Duke of Cleves, and fourth queen of Henry VIII. of England. The marriage (Jan. 1540) was arranged by Thomas Cromwell. Henry's disappointment with Anne, after the glowing description which he had received, aided by Holbein's flattering portrait, was so great that in June of the same year he had the marriage annulled. Anne was granted Richmond Palace and £3,000 a year till her death. See Strickland's *Queens of England* (1864-5).

Anne of Denmark (1574-1619), daughter of Frederick II.; married (1589) James VI. of Scotland, but becoming alienated from him, soon ceased to take part in public affairs. After the Union (1603) she lived extravagantly at Hampton Court until her death. See Strickland's *Queens of England* (1864-5).

Annealing, the process of rendering glass or metal less brittle. When glass is rapidly cooled, it easily cracks and flies to pieces if exposed to variations of temperature or when scratched. After rapid cooling, the outer surface, which solidifies first, is in a state of strain differing from that of the inner layers; but slow cooling makes the mass homogeneous. Glass vessels are placed in an annealing oven, where, from a temperature approaching the fusion point, they cool very slowly. Many metals become brittle when hammered or drawn into wire, but after being heated to redness and slowly cooled they recover their former toughness. Tool steel is hardened by plunging it when hot into water or oil, the toughness being restored according to the degree to which it is reheated.

Anne Boleyn. See BOLEYN.

Annecy, tn. and episc. see, cap. of dep. Haute-Savoie, at the N.W. extremity of the lake of the same name, France, 22 m. S. of Geneva. Health resort (alt. 1,511 ft. above sea-level); industries, cotton, silk, leather, etc. Pop. (1901) 13,611.

Annelids, the segmented worms—*e.g.* the earthworm, lobworm, and leech. See WORMS.

Annen-Wullen, vil., Westphalia, Prussia, 6 m. S.W. of Dortmund. Coal mines, iron and glass works. Pop. (1900) 10,960.

Annexation. (1.) OF TERRITORY, the term applied by international jurists to the proclamation by which a nation expresses its intention to appropriate territory which has not hitherto belonged to it. Like all other unilateral acts, annexation is only effected when coupled with *de facto* power to annex. In practice it should always be accompanied by either conquest or an effective military occupation, and unless so accompanied it need not be recognized as binding either on other states or on the subjects of the territory annexed. (2.) In Scots law annexation means the uniting of lands to the crown, and declaring them to be inalienable. An act of 1455, followed by other acts, the latest of which is that of 1633, annexed the lands and revenues which were the patrimony of the Scottish crown, so that they cannot be alienated or feued without the consent of Parliament. They are under the management of the Commissioners of Woods and Forests, and are surrendered in exchange for the Civil List. After the reformation, church lands in Scotland were, with certain exceptions, annexed to the crown by an act of 1587. Annexation of lands *quoad sacra* means the union to another church of lands lying at a distance from the church to which they belong, so that the inhabitants may be under the care of the minister of that church, though as regards civil matters the lands remain part of the old parish.

Anniston, city, Calhoun co., Alabama, U.S.A., 60 m. N.E. of Birmingham. Pop. (1900) 9,695.

Anniviers, VAL D' (Ger. *Eivischthal*; incorrectly, *Einfischthal*), an Alpine glen in the Swiss canton of Valais. Its chief village is Sierre, above which are the summer resorts of St. Luc, Chandolin, and, at the head of the glen, Zinal.

Anno, or HANNO (1000-1075), archbishop of Cologne. He succeeded in gaining possession of the young German emperor, Henry IV., and in transferring the regency from the king's mother to himself.

Anno Domini, ANNO HEJIRÆ, ANNO MUNDI, ANNO URBIS CONDITÆ. See A.D., A.H., A.M., A.U.C.

Annonay, tn., dep. Ardèche, 50 m. S. of Lyons, France. It manufactures leather, paper, and cotton and silk goods. Pop. (1901) 17,490.

Annual Register, an English periodical, published annually in June (London), contains a review of events at home and abroad, a retrospect of literature, science, and art, an obituary, etc. It was first issued by Dodsley in 1758.

Annuals, plants which complete their life-history in one growing period. The seed germinates in spring; the plant flowers, fruits, and dies before the end of the year. By preventing an annual from flowering, it may in some cases be induced to continue its growth for a second season.

Annuals, popular illustrated books intended as Christmas gift-books, published during the early 19th century. Among the first were *Forget-me-not* (1823-48); *Friendship's Offering* (1824-44); and *Literary Souvenir* (1824-34), to which Scott, Wordsworth, Turner, Landseer, and others, contributed. After 1840 their popularity waned. The most important of modern annuals are the reference year-books, containing a varied assortment of current information on matters of immediate interest. Amongst the most useful of such publications are *The Statesman's Year-Book*, containing an account of the government, finance, population, commerce, and general statistics of every country in the world; *Hazell's Annual*, an alphabetically-arranged record of men and topics of the day; *Whitaker's Almanac*; and *Who's Who*, consisting of biographies of living celebrities supplied by themselves.

Annuity. An annuity may be defined as a periodical payment for a fixed number of years, or during the lifetime of some person, called the *nominee*, or, more generally, so long as some given condition is satisfied. The period during which the annuity is to be payable may be dependent upon the combination of any number of lives and terms of years, besides involving the chances of marriage, birth of issue, or any other contingency, and is technically called the *status* of the annuity. The payments may be made either yearly or at shorter intervals—*e.g.* half-yearly, quarterly, monthly, or weekly—but whatever the intervals be, the total sum payable in a complete year is spoken of as 'the annuity.'

An *annuity certain* is one where the status is a fixed number of years; and if the payment is to be continued for ever, it is called a *perpetuity*. When the annuity is not to commence until after a certain term, it is said to be *deferred* for that term. The first payment of a yearly annuity is usually made at the end of the first year; of a half-yearly annuity, at the end of the first six months; and if the annuity be payable at shorter intervals, at the end of the first such interval. When the first payment is to be made immediately, the annuity is called an *annuity due*. A life annuity may either cease with the last annual, half-yearly, or other periodical payment falling due before death, or it may include a proportional payment for the time between the last periodical payment and the date of death. In the former case the annuity is said to be *curtate*, and in the latter *complete* or *apportionable*. By Act of Parliament all life annuities (except premiums on policies of assurance) are apportionable, unless an express stipulation to the contrary be made in the deed creating the annuity. The most important examples of annuities certain are to be found in the terminable annuities of the National Debt, ground rents, and municipal loans; and the stocks of various governments, perpetual debenture stocks of railway and other companies, and feu-duties, are examples of perpetuities.

The magnitude of an annuity is generally the same from year to year; but varying annuities are sometimes met with, perhaps the best-known example being British consols, where the rate was reduced from 2¾ to 2½ per cent. in the year 1903. The values of all annuities certain can be found by the application of algebra to the theory of compound interest, but life annuities require in addition a knowledge of the probabilities of human life. The earliest attempt of which record has been kept to ascertain the value of a life annuity arose out of the Falcidian law of ancient Rome (40 B.C.), which provided that no person should bequeath more than three-fourths of his property to persons other than his heirs. Hence, whenever a testator gave an annuity under his will, it became necessary to value the annuity in order to ascertain whether the above law had been complied with. Up till about 230 A.D. the rule for finding the value was to take thirty years' purchase for all ages below thirty, and one year's purchase less for each year of age above thirty. This rule was improved upon by the Prefect Ulpianus, who constructed what is known as the Roman table of annuities.

This table was probably constructed from actual observations of some kind, but apparently the element of interest was left out of account altogether. After the lapse of about sixteen centuries this table was adopted by the Tuscan government, notwithstanding that many more accurate tables had been formed in the meantime. The following is the Roman table:—

AGE.	YEARS' PURCHASE.
Birth to 20	30
20 „ 25	28
25 „ 30	25
30 „ 35	22
35 „ 40	20
40 „ 41	19
41 „ 42	18
42 „ 43	17
43 „ 44	16
44 „ 45	15
45 „ 46	14
46 „ 47	13
47 „ 48	12
48 „ 49	11
49 „ 50	10
50 „ 55	9
55 „ 60	7
60 and upwards	5

The next recorded estimate was made by Johan de Wit, in a report to the States-General of Holland (1671) on the subject of life annuities. It had been the custom for towns to raise money by the sale of annuities, the price being then fourteen years' purchase, having risen from six years' purchase at the beginning of the century. De Wit showed that an annuity on a young and healthy life was certainly worth more than sixteen years' purchase. In a correspondence with Hudde there is indicated a hypothesis, suggested by the latter, that out of every eighty-six persons born one will die every year, so that the last dies between the ages of eighty-five and eighty-six. This celebrated hypothesis was independently suggested by De Moivre in 1725, and is known by his name. For the greater part of life it represents the law of mortality with moderate accuracy, but at very young and very old ages it is considerably in error. In 1693 Dr. Halley published a table of annuity values for every fifth age, computed at six per cent. interest, having deduced the probabilities of life from the births and deaths recorded in Breslau, and this was probably the first table of annuities calculated by a correct scientific process. About the same time the British government first began to raise money by the sale of annuities, which they granted at the rate of £14 for every £100 paid to them (about seven years' purchase), irrespective of the age of the nominee. The actual experience of these annuitants was afterwards investigated, and it was found that the prices ought to have ranged from seventeen years' purchase at age ten to four and a half years' purchase at age seventy-five. Annuities payable during the life of the survivor of two persons were granted at eight and a half years' purchase, and to the survivor of three persons at ten years' purchase. In 1703 these prices were raised to nine, eleven, and twelve years' purchase respectively; but it was not till 1808, when the Northampton table was adopted, that the prices were fixed with any regard to scientific principles by making them depend on the age of the nominee. Although the foregoing terms were extremely favourable to purchasers, only a small volume of business was transacted, chiefly with Dutchmen, who, owing to the publications of Kerseboom, knew sufficient of the subject to nominate young female lives, while the English purchasers selected their nominees without regard to age or sex, and therefore found the transactions much less profitable.

The Northampton table just mentioned was published by Dr. Price in 1780, having been deduced from statistics regarding 4,689 deaths which occurred in Northampton between the years 1735 and 1780. The method of calculation left out of account the number of the population, and would have been correct only if the population had remained stationary during the period, which was not the case. The table largely overestimated the rate of mortality throughout the greater part of life, and therefore brought out too low prices for annuities, so that its adoption by the government led to a heavy annual loss. In 1819 Mr. Finlaison proved that the loss was then at the rate of no less than £8,000 per month; but the Chancellor of the Exchequer took no steps to remedy matters, nor did his successor. In 1827 Mr. Finlaison again drew the attention of government to the matter, pointing out that the loss was by that time at the rate of £8,000 per week, and in the following year the government discontinued the use of the Northampton table. Fresh tables were carefully prepared, giving rates for all ages from fifteen to ninety, the annuity allowed at the latter age being £62 for each £100 of purchase money, the first payment to be made three months after purchase. This rate is obviously very large, but nevertheless the government believed that the new tables were correct, and adopted them in 1829. They were soon undeceived. Clever speculators at once realized the opportunity for making large profits, scoured the country in search of hale old yeomen, and purchased large annuities on their lives. Although some of the annuitants died shortly after purchase, large profits could be obtained by spreading the annuities over several lives, and thus averaging the risks, and numerous fortunes were made in this manner. The mistake was then remedied by the removal of the advanced ages from the table, and the government finally put a stop to such speculation by providing that no annuity should be granted on a nominee over sixty-five years unless the nominee should have a *bona fide* beneficial interest in the annuity.

Up till 1854 the Usury Acts prevented a lender charging more than a fixed rate of interest, and, with a view to evade those acts, money-lenders were in the habit of arranging their dealings in the shape of annuity transactions. Instead of granting loans, they purchased annuities from their victims; and as they thus risked losing their capital in the event of the annuitant's early death, the borrowers were made to insure their lives and pay the premiums as well as interest, thus making the annual payment very heavy. The unfortunate borrowers were, in fact, compelled to pay much more dearly than if there had been no restriction on the rate of interest, thus suffering a loss owing to the very laws which were intended to protect them. The extent to which this evasion of the law was carried was shown by a great diminution in annuity transactions shortly after the Usury Acts were repealed.

Since 1829 the government have continued to grant annuities in exchange for stock, with a view to the gradual reduction of the National Debt as the annuities expire. The security for these annuities is, of course, better than can be obtained from any other source, and the terms offered are, in consequence, somewhat less favourable to purchasers than are granted by insurance companies. Over £1,250,000 is annually paid away by government in life annuities, and over

£1,500,000 by insurance companies. Annuities are also granted by the government through the Post Office to the extent of not less than £1 nor more than £100 on any one life of either sex not less than five years of age. About 2,000 such annuities are sold each year, securing an annual payment of about £55,000; and the total number now running is over 20,000, securing payments of over £500,000 a year. Out of the fund raised by the *Daily Telegraph* and other newspapers for the widows and orphans of soldiers killed in the South African war, annuities of £15 each were purchased through the Post Office for about 250 widows.

It has long been a well-recognized fact that annuitants as a class are longer lived than the average. This arises partly from the fact that annuitants usually lead quiet and retired lives, and partly from the fact that no person in bad health is likely to invest money in the purchase of an annuity. A process of selection, or choosing out the best lives, is thus gone through, with the result that the 'expectation of life' of annuitants is considerably greater than that of the average population. This is shown by the above table, which also illustrates the greater longevity of females than males.

EXPECTATION OF LIFE

	OF THE GENERAL POPULATION.		OF ANNUITANTS.	
Age.	*Males.*	*Females.*	*Males.*	*Females.*
20	39·5 yrs.	40·3 yrs.	40·2 yrs.	45·3 yrs.
30	32·8 ,,	33·8 ,,	33·6 ,,	38·0 ,,
40	26·1 ,,	27·3 ,,	28·8 ,,	31·2 ,,
50	19·5 ,,	20·8 ,,	21·0 ,,	24·2 ,,
60	13·5 ,,	14·3 ,,	14·9 ,,	17·0 ,,
70	8·5 ,,	9·0 ,,	9·2 ,,	10·5 ,,
80	4·9 ,,	5·3 ,,	5·2 ,,	5·6 ,,
90	2·8 ,,	3·0 ,,	2·9 ,,	3·0 ,,

It should be observed that the 'expectation of life' cannot be used to find the value of an annuity. A common error is to suppose that a life annuity is equivalent to an annuity certain for a term equal to the expectation of life; the actual fact being that the latter is always greater than the former, and the true value of a life annuity can only be obtained by a lengthy calculation involving the theory of probabilities.

In law, if a testator directs his trustees to purchase a government annuity of fixed amount for A, or to lay out a fixed sum in buying an annuity, A is entitled to have the capital sum paid to him. As a rule, an annuity is charged on income only, and the annuitant is not entitled to have any arrears made up out of capital; but he is entitled, in the administration of the testator's estate, to have a capital sum set aside, the income from which is sufficient to satisfy the annuity. By the Real Property Limitation Act, 1833, only six years' arrears of an annuity charged on land may be recovered; and if the annuity is unclaimed for twelve years, the right is barred altogether. Special provisions are contained in the Stamp Act, 1891, the Sequestration (Scotland) Act, 1856, and the Death Duties Act, 1895, for ascertaining the capitalized value of an annuity for purposes of taxation, etc., but no estate duty is payable on the dropping of an annuity for which full value was given. See *Institute of Actuaries' Text Book*, King's *Theory of Life and Annuity Assurance* (vol. i. 1887), and various articles in the *Jour. of the Inst. of Actuaries* (London).

Annuity Tax, a rate levied by Charles I. in the royalty of Edinburgh and elsewhere to support the Established Church. It latterly provoked strenuous and defiant opposition (1833-48), was reduced (1860), and finally abolished (1870). See *Report of Select Committee on Annuity Tax* (1851).

Annular Eclipse. See ECLIPSE.

Annulet, in architecture, a small band encircling a column; in heraldry, the mark of cadency of a fifth son.

Annunciation, the appearance of the angel Gabriel to the Virgin Mary to announce to her the incarnation (Luke 1:27-38); is now a church festival on March 25, or Lady Day. The subject has been a favourite one in religious art; Tintoretto, Donatello, Botticelli, Della Robbia, and in our day Burne-Jones and D. G. Rossetti, have treated it. Various conventual orders have received this name; and the highest order of knighthood of the house of Savoy is called the Supreme Order of the Annunciation. It was founded in 1360, and reconstituted in 1518.

Annunzio. See D'ANNUNZIO.

Annus Deliberandi, in Scots law the period of one year before the end of which an heir had to decide whether to accept or renounce the inheritance, including its liabilities. The period is now restricted to six months.

Annus Mirabilis, a poem (1667) by Dryden. The year referred to is 1666, when the English fleet destroyed the maritime power of the Dutch. In the same year occurred the Great Fire of London.

Annweiler (anc. *Anvilre*), tn., Bavaria, 22 m. W. of Germersheim, in a valley of the Haardt Mts.; manufactures paper, straw-plait goods, leather, and wine. Formerly an imperial town. Pop. (1900) 3,664.

Anode, the positive pole of a battery, as distinguished from the cathode, or negative pole, in a system for the electro-deposition of metals. The metal is deposited at the cathode. See ELECTROLYSIS.

Anodon. See MUSSEL.

Anodynes, or ANALGESICS, drugs which relieve pain. Opium and morphine are the most powerful; antipyrin, exalgin, phenacetin, and antifebrin are very useful, do not exert a harmful influence on the brain, and are specially used in cases of neuralgia. All are dangerous when used by persons ignorant of their qualities and composition. Aconite, belladonna, opium, and cocaine are applied locally.

Anointing. See EXTREME UNCTION.

Anomalistic Year. The earth is in perihelion when it is at the point in its orbit nearest to the sun. This point is not fixed, but has a slow eastward motion; hence the next return to perihelion occupies a longer period than a complete revolution. This period is the anomalistic year, which is nearly five minutes longer than the sidereal year.

Anomaluridæ, the scale-tailed squirrels, an African family of flying rodents, with imbricating scales on the under side of the tail which are of assistance in climbing.

Anomaly, irregularity or departure from the common rule. In astronomy, the angle subtended at the sun by the portion of its orbit through which a planet, at a given instant, has moved from its perihelion. Planetary orbits being elliptical, the 'true anomaly' increases at an unequal rate in different parts of them; while the 'mean anomaly' is calculated on the supposition of uniform angular velocity in an orbit traversed in the actual period. The difference between these is termed the 'equation of the centre.'

Anomodontia, a group of fossil reptiles, for the most part of considerable size. In many the jaws were toothless, but were covered with horny plates, as in tortoises; in others there were two teeth in the upper jaw. Some were uncouth, short-limbed animals with massive bodies; others were adapted to a more agile life. The remains have been found chiefly in the karroo beds of S. Africa, also in N. America, and in the New Red Sandstone of Elgin, Scotland. See H. N. Hutchinson's *Extinct Monsters* (1892), and Smith Woodward's *Vertebrate Palæontology* (1898).

Anona. See CUSTARD APPLES.

Anonymous (Gr. 'not named'), a term applied to a work published without its author's name. Where an assumed name is used, the work is said to be *pseudonymous.* Anonymity may be the result of accident, as in the case of the doubtful Elizabethan plays, or may be intentionally adopted to shield the author from the consequences of his satire, or because of indifference to public notoriety. The following is a list of some English works published anonymously: *The Rehearsal;* Mulgrave's *Essay on Satire* and his *Essay on Poetry;* Swift's *Battle of the Books* and *Tale of a Tub,* and all his publications previous to 1712; Thomson and Mallet's masque *Alfred,* in which 'Rule Britannia' first appears; Goldsmith's *Citizen of the World;* Akenside's *Pleasures of the Imagination;* Gray's *Elegy in a Country Churchyard;* Horace Walpole's *Castle of Otranto.* Also the following famous French works: *La Satire Ménippée;* Pascal's *Provinciales;* La Rochefoucauld's *Réflexions, ou Sentences et Maximes Morales;* the *Princesse de Clèves* of Mme. de la Fayette; La Bruyère's *Caractères; Manon Lescaut,* by the Abbé Prévost; Montesquieu's *Esprit des Lois;* Voltaire's *Dictionnaire Philosophique;* and the *Christianisme Devoilé* of the Baron d'Holbach. Anonymity is the general rule in British and American journalism, though of recent years signed articles, such as special political or social contributions and extended literary notices, have become common. Leading articles, however, still remain uniformly anonymous, the theory being that the policy of an individual paper as thus embodied is something more than the mere expression of individual opinion. See Halkett and Laing's *Dict. of Anonymous and Pseudonymous Lit.* (1881-8); Cushing's *Anonyms* (1889); indexes to *Notes and Queries* and to *Book Prices Current;* Barbier's *Dictionnaire des Ouvrages Anonymes* (1872-9 and 1889); Quérard's *Les Supercheries Littéraires Devoilées* (1869-71); *Deutsche Anonymenlexikon* (1901, etc.); Melzi's *Dizionario di Opere Anonime* (1848-59 and 1887).

Anopheles. See MOSQUITO; MALARIA.

Anoplotherium (Gr. 'unarmed beast'), an extinct genus of quadrupeds, containing several species of the Artiodactyla—hoofed animals with an even number of toes on each foot. They belong to the late Eocene and Oligocene periods, and have been found abundantly in France (Montmartre, Paris, 1806), and the British Isles (the Isle of Wight). *A. commune* was about the size of a red deer, standing from four to five feet high.

Anor, ry. junction, dep. Nord, France, on the lines Hirson-Valenciennes and Hirson-Namur. Marble quarries and steel forges. Pop. (1901) 4,610.

Anosmia. See SMELL.

Anquetil, LOUIS PIERRE (1723-1806), French historian and member of the Institute; remembered for his *Histoire de Rheims* (1756-7); *Histoire de France* (1805), continued by Bouillet and Baude (ed. 1876-9); *Précis de l'Histoire Universelle* (1797); and *Louis XIV. sa Cour et le Régent* (1789).

Anquetil-Duperron, ABRAHAM HYACINTHE (1731-1805), Orientalist, brother of the preceding, was born in Paris. In 1754 he proceeded to India to study the works of Zoroaster, and returning to Europe in 1761 was appointed interpreter of Oriental languages at the Bibliothèque Royale, Paris. He brought with him nearly 200 Persian MSS., which are now in the Bibliothèque Nationale. He published the first European translation of the *Zend-Avesta* (1771), now, however, superseded; and *Oupnek'hat* (1801-2), a Latin translation of a Persian version of the *Upanishads.*

Ansars (Ar. 'the helpers'). (1.) A name given to those inhabitants of Medina who helped Mohammed when he fled thither from Mecca, A.D. 622. (2.) A Syrian tribe (Nossairians) inhabiting the country between the Orontes (N.) and Tripolis (S.), numbering 75,000. With their Mohammedan tenets they have mixed remnants of old Syrian nature-worship. They also affirm a crude doctrine of the Trinity, and believe in the transmigration of souls. See Dossard's *L'Histoire et la Religion des Nosaires* (1900).

Ansbach, also ANSPACH, tn., Middle Franconia, Bavaria, 27 m. W.S.W. of Nuremberg; from 1486 to 1792 the residence of the margraves of Brandenburg-Ansbach, whose palace (1713-23) remains. Birthplace of the poets Von Platen and Uz. Pop. (1900) 17,563.

Ansdell, RICHARD (1815-85), English animal painter, born at Liverpool. He first exhibited at the Royal Academy in 1840 two pictures, *Grouse Shooting* and *A Galloway Farm,* and in 1842 a historical picture, *The Death of Sir William Lambton.* He afterwards travelled much, especially in Spain. He thrice won the Heywood Medal (Manchester), and in 1855 a gold medal at the great Exhibition in Paris, for *The Wolf Slayer* and *Taming the Drove.* He exhibited over 180 works, and was made R.A. in 1870.

Anseele, EDUARD (1856), Belgian socialist, born in Ghent; has latterly devoted himself to literature. He founded the socialist periodical *Volkswil* (now *Vooruit*).

Anselm (1033-1109), prelate and scholastic philosopher, was born at Aosta, on the south side of the Alpine St. Bernard pass. 'As a thinker, a Christian leader, and a man, he was one of the most remarkable and most attractive characters of the middle ages.' In 1060 he entered the monastery of Bec, which Lanfranc's labours had rendered famous. Both men were Italians, and this fact, along with their zeal for the highest aims of education and moral reformation, bound them fast together. In 1063 Anselm was installed as prior of Bec, in succession to Lanfranc; and fifteen years later, the founder Herlwin having died, the prior was elected abbot, and reluctantly accepted the office. Shortly after the death of William the Conqueror (1087) the great change in Anselm's career took place. Lanfranc having died in 1088, the archbishopric of Canterbury fell vacant. Not till the beginning of the year 1093 was the see filled up. During the interval the king, William Rufus, appropriated the revenues. Anselm, on whom the thoughts of the people fastened as the most worthy successor to Lanfranc, came to England in 1092, and early in 1093 the king appointed him Archbishop of Canterbury. Anselm's later life was a long struggle in behalf of the spiritual against the temporal power. Twice he was exiled—by William II. in 1097, and by Henry I. in 1103—over the question of investiture. In 1105 Henry and the archbishop were reconciled, and in 1106 Anselm returned to England. In 1494 he was canonized. His fame as a theologian excels even his fame as a churchman. He sought to show that the doctrines of Christianity were capable of being expressed in a rational system. He started with the articles of faith, and endeavoured to find in them principles that were intelligible ('*credo ut intelligam*'). This process is exemplified in his great book, *Cur Deus Homo* (Eng. trans. by Prout, 1887), an attempt to explain the necessity of the incarnation and the meaning of atonement. Besides his book he wrote two philosophical works, *Monologion* and *Proslogion.* These, along with his *Letters* and other works, are collected in an edition by Gerberon (Paris, 1675). His *Life,* by Eadmer, is included also. The best-known books on Anselm in English are by Möhler (Eng. trans. 1842), Hasse (1842-53; Eng. trans. 1850), Dean Hook (*Lives of the Archbishops of Canterbury,* 1860-76), and Dean Church (1870). In French the chief monograph is by Charles de Rémusat (1854). *Cf.* Dante's *Paradiso,* xii. 128. See A. C. Welch's *Anselm and his Work* (1901).

Ansgarius, sometimes al ANSKAR, ST. (801-865), 'the Apost of the North,' born in Picardy, was monk at the monastery of Corvey, on the Weser, till 826, when the emperor, Ludwig the Pious, sent him to accompany the newly-baptized Danish king, Harold, to Denmark, there to spread the gospel. Driven from thence, in 828 he went as a missionary to Sweden, and in 831 was made missionary bishop of Hamburg. In 847 the see was transferred to Bremen. He founded the Schleswig Church, and in 852 the Swedish Church also, and preached among the Wends. He wrote *Pigmenta* and *Vita Willehadi*. His own Life was written by his successor, Archbishop Rimbert—*Monumenta Germaniæ Historica*, vol. ii., ed. Pertz. See Tappehorn, *Leben des Heil. A.* (1863).

Anshelm, VALERIUS (d. 1540), whose real family name was Rüd, was of German origin, but practised as a physician in Bern from 1509. A fervent supporter of the reformation, he was entrusted (1529) with the task of writing the history of the city of Bern. His *Berner Chronik* is in the form of annals, and is largely based on original documents. He takes the anti-French point of view, and is specially full on the reformation. See Stierlin's ed. (6 vols. 1825-33), and E. Bloesch's *Anshelm und Seine Chronik* (1881).

Anson, GEORGE, Lord Anson (1697-1762), British admiral, was born at Shugborough, in Staffordshire. Between 1724 and 1735 he made three expeditions to S. Carolina against the Spaniards. In 1740 he was charged to make war against the Spanish colonies; was victorious, and returned to England in 1743 laden with booty. He utterly defeated the French fleet under La Jonquière in 1747, capturing six men-of-war and four East Indiamen, with £300,000 in specie. In recognition of this service he was raised to the peerage, and in 1761 was made admiral of the fleet. The narrative of Anson's *Voyage Round the World* (1748), by Walters, has long retained its popularity. See *Life* by Sir John Barrow (1839).

Anson, a British first-class battleship (1886). A ship of the name was present at Rodney's victory off Iles les Saintes (1782), destruction of the *Calliope* (1797), capture of the *Daphne* (1797), capture of the *Flore* (1798), Warren's action (1798), capture of the *Loire* (1798), the *Pomona* (1806), and of Curaçao (1807).

Ansonia, city, New Haven co., Connecticut, U.S.A., on the Naugatuck R., 12 m. from New Haven. Its manufactures consist largely of brass and copper. Pop. (1900) 12,681.

Ansted, DAVID THOMAS (1814-80), geologist, was born in London, where his earlier work was done as professor (1840) in King's College; he was later (1845) appointed to the Addiscombe military school. He was the author of *Geology* (1844), and of popular writings—*e.g. Great Stone Book of Nature* (1863); *Applications of Geology to the Arts and Manufactures* (1865); *The World we Live in* (1870). See *Geol. Mag.*, 1880, p. 336.

Anster, JOHN (1793-1867), first translator into English of Goethe's *Faust*, was an English barrister and a law professor in Dublin, but is best remembered as an essayist, as a poet, and especially as a translator of Fouqué, Schiller, and Goethe. *Faust* first appeared in '*Maga*' (1820). The translation of the first part of *Faust* appeared in 1835, and that of the second part in 1864. See *Gent. Mag.*, Aug. 1867.

Anstey, CHRISTOPHER (1724-1805), a country gentleman, residing at Trumpington and afterwards at Bath; won great popularity by the *New Bath Guide; or, Memoirs of the B—r—d* [Blunderhead] *Family, in a series of Poetical Epistles* (1766), a clever sketch of Bath life, which was hailed as 'a new and original kind of humour' (Gray, *Letter to Wharton*, Aug. 26, 1766). See also Walpole, *Letter to Montague* (June 20, 1766). His other verse includes *The Patriot* (1767), *An Election Ball* (1776), and *Liberality: or, The Decayed Macaroni* (1779). His *Works*, with Life, were published by his son (1808).

Anstey, F., pseudonym of THOMAS ANSTEY GUTHRIE (1856), born at Kensington. In his undergraduate days he published several short stories, and in 1882 his first book, *Vice Versâ: a Lesson for Fathers*, attained a great success, and was afterwards dramatized. Among his subsequent works are *The Giant's Robe*, *The Black Poodle*, *The Tinted Venus*, *The Brass Bottle*, and *The Fallen Idol*, which have been very popular. Mr. Anstey has contributed to *Punch*, and many of his papers have been reprinted. He has also written the popular play, *The Man from Blankley's*.

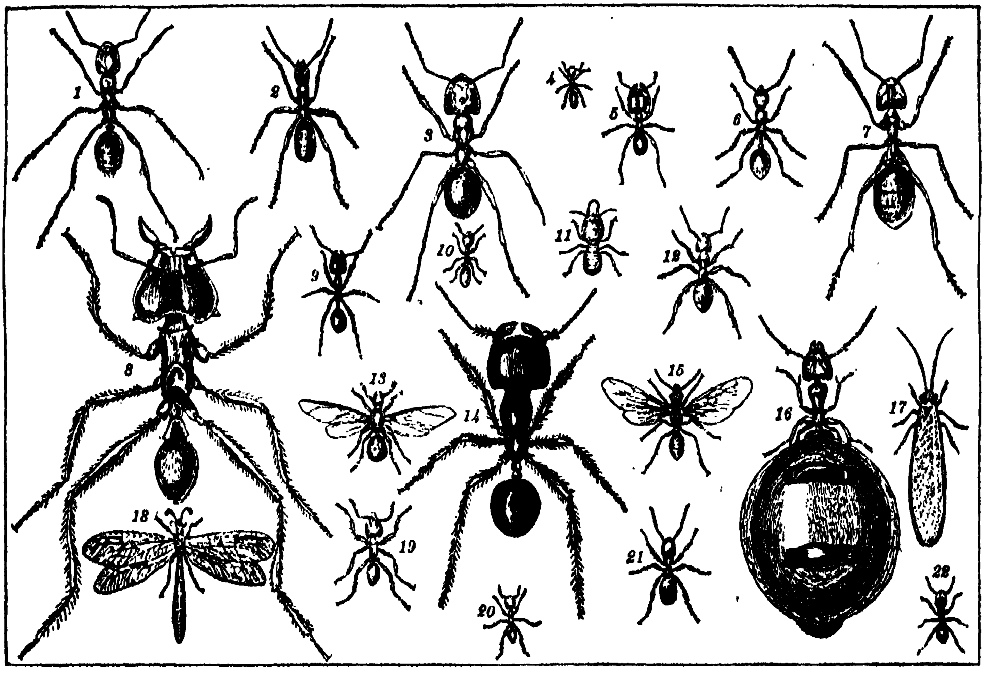
Anstruther, fishing and seapt. tn., Fifeshire, Scotland, on the Firth of Forth, 9 m. S.S.E. of St. Andrews. Consists of Anstruther-Easter (par. and royal and parl. bor., 28 ac.; pop. 1,024) and Anstruther-Wester (par. and royal and parl. bor., 908 ac.; pop. 476). A fine harbour was completed in 1877. It is the chief fishing-station on the Fife coast. Thomas Chalmers (1780-1847) and William Tennant (1784-1848), author of *Anster Fair*, were born here. Pop. (1901) 1,666.

Ant. Ants are social insects belonging to the order Hymenoptera, the order to which bees and wasps also belong. The name is sometimes also given to the termites, or 'white ants,' which are unrelated insects, included in the Neuroptera or May-fly order. The peculiarity which specially distinguishes the true ants (Formicidæ) is the shape of the body, the abdomen being connected with the thorax, or anterior region, by a very mobile joint. This gives great power of movement, and is associated with the frequent presence of a sting. Whether the sting is present or absent, there is always a poison bag, containing formic acid, which is either injected into the wound made by the sting, or is merely squirted at an attacking foe in the stingless forms.

Other characteristics of the ants are, first, the arrangement of the mouth parts. The mandibles (see INSECTS) are so arranged that they can be used for various industrial purposes without their movements affecting the maxillæ and lower lip, the true feeding organs. Further, ants are also characterized by the existence in each species of at least three types of individuals—males, females, and workers, the last type being often divided into castes. The young are helpless maggots, requiring to be fed and tended by the workers. When full grown, these maggots pass into a quiescent pupa stage, from which the perfect insect emerges after an interval.

In conformity with their social habits and instincts, ants always live in communities, and construct nests specially devoted to the purpose of rearing their young. The frequent confusion of ants with termites has arisen from the fact that the nests of the two resemble each other much more closely than those of the ants resemble the chambered structures of their nearest allies, the social bees and wasps. While among the latter the larvæ are always placed in separate cells, the ants keep their young in loose masses, the individuals being moved from one region of the nest to another as the necessities of the case require. Ants are specially sensitive to dryness, and usually construct subterranean galleries and chambers, with the apparent object of obtaining moisture; but the shape and situation of the nest are subject to great variation.

The economy of the ant-nest in its simplest form may be given as follows:—A nest contains numerous eggs, laid by one or more fertile females (queens), which are tended by barren females or workers. The young hatched from these eggs are fed from the mouths of the workers, who are, it is believed, capable of determining the sex of the future insects by the nature, or perhaps the quantity, of the food. The young then become pupæ, out of which hatch either winged or wingless adults. The former are males and females, are produced chiefly at certain seasons of the year, and rise from the nest in a smokelike cloud into the air. This is the nuptial flight, during which pairing takes place, and is followed by the death of the males. The females lose their wings, and either return to the original nest, or are apparently capable of founding new nests. In either case they continue to lay fertile eggs for a prolonged period. The wingless forms do not quit the nest save during their ordinary pursuits, and, though they are all barren females, occur in various forms, as soldiers, large workers, and small workers. To them all the activities of ant life, save that of reproduction, are committed. This is the simplest statement of ant economy; but it is now known that there are various types of fertile individuals, both males and females, some being, apparently, always without wings. Transitional forms also occur between workers and fertile females.



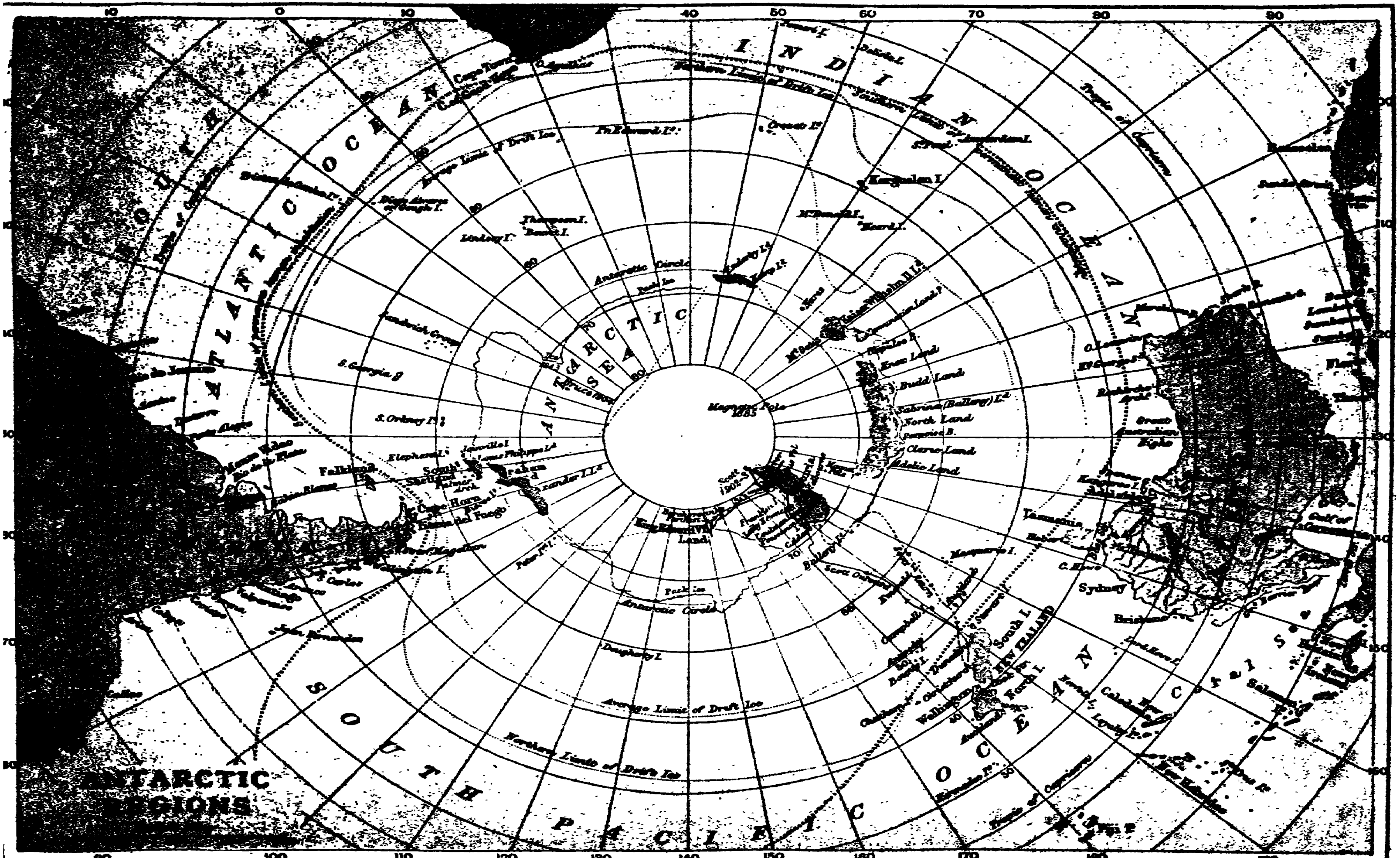
Ants.

1. Polyergus rufescens; 2. Formica fusca; 3. F. sanguinea; 7. F. rufa; 4. Solenopsis fugax; 5. Pheidole megacephala (major); 6. Myrmica ruginodis; 8. Œcodoma cephalotes (major); 13. Œ. cephalus (male); 19. Œ. cephalotes (minor); 9 and 14. Atta barbara (minor and major); 10. Stenamma Westwoodii; 11 and 17. Termes bellicosus (soldier and male); 12 and 15. Lasius flavus; 21. Lasius niger; 16. Campanotus inflatus; 18. Myrmeleo formicalis; 20. Strongylognathus testaceus; 22. Tetramorium cæspitum.

A remarkable peculiarity of ants, and one that has always attracted attention, is the slave-making practised by many species. The British *Formica sanguinea*, a courageous and warrior-like species, at times makes raids on other ants, carrying off their pupæ to its own nest. It is stated that these forays take place only at those seasons of the year when the pupæ are likely to be all workers, and not males or females. It is, at least, certain that the workers hatched from the stolen pupæ remain in the nests of their conquerors, and there perform much of the needful work. The slave-making in the case of this species is not universal, and ants are capable of existing without their slaves; but *Polyergus rufescens*, known as the Amazon ant, found on the continent of Europe, is stated to be entirely dependent on its slaves. These ants have mandibles, which serve as efficient weapons in war—for which they display much natural aptitude—but which are not fitted for ordinary industrial purposes.

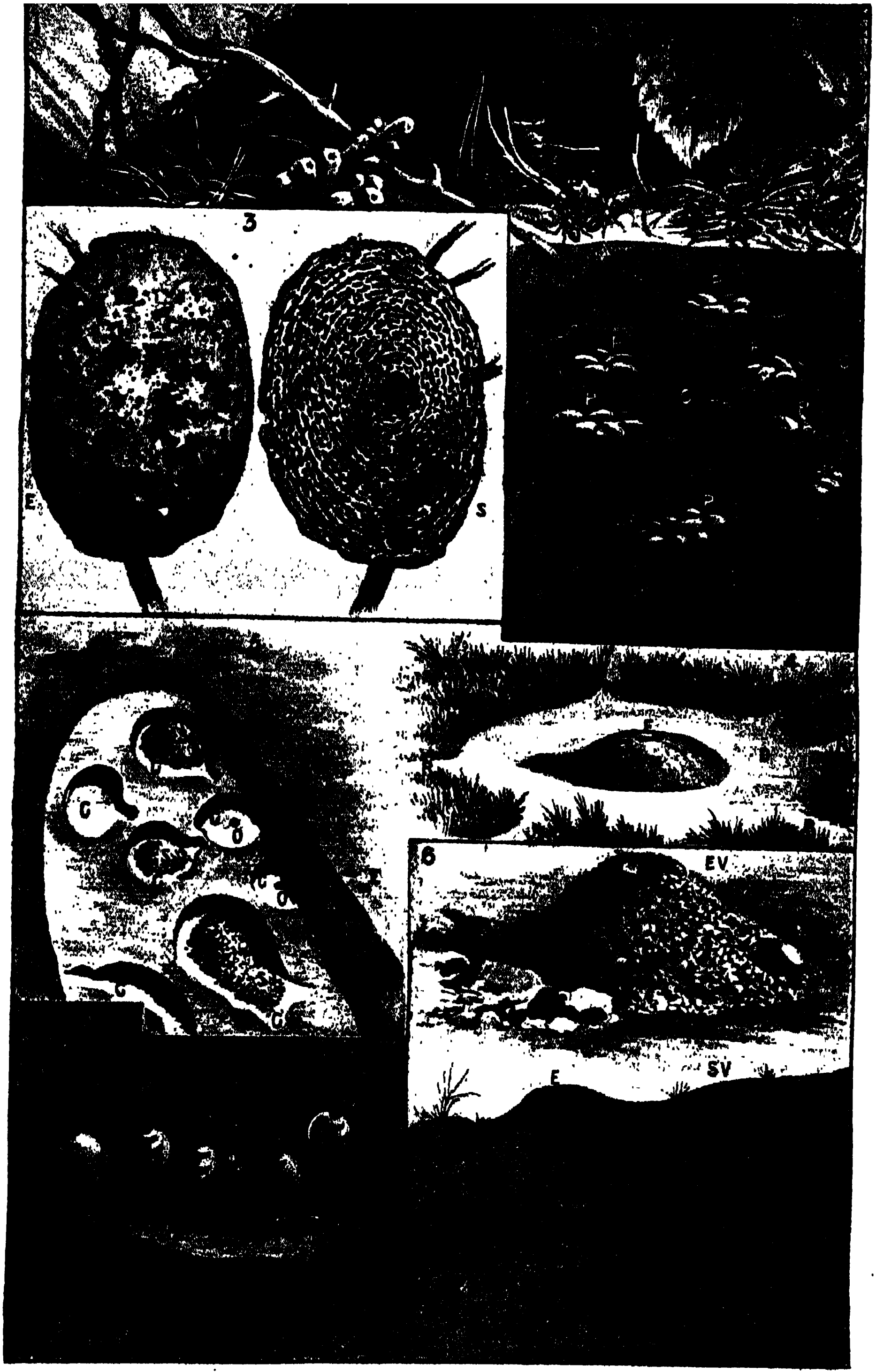
This association of different species of ants as masters and slaves is paralleled by the habit which many display of living in association with totally unrelated insects. The fact that ants domesticate aphides—'ant-cows'—has long been known; but modern research is greatly multiplying the number of kinds of insects which may be found in ant-nests. The association with aphides is not very remarkable; for ants are exceedingly fond of the sugary secretion which these exude, and the general characteristics of the plant-lice lead to the belief that they are quite passive in the transaction. Much more remarkable is the large number of beetles found in ant-nests, some of which are fed by the ants, and carried away by them if any circumstance should render a migration necessary. While in some cases these guests are simply tolerated—perhaps because the ants cannot get rid of them—and others are definitely parasites, some seem to be of the nature of pets.

Ants are so numerous that one or two typical forms only can be mentioned here. The British *Formica rufa*, or red ant, constructs loosely-built, moundlike nests, sometimes reaching three feet in height, in which forty to fifty species of guests have been described. The American leaf-cutting ants (*Atta*) are among the most destructive of insects. They gather an enormous amount of material in the shape of pieces of leaves, and utilize this with much skill to form 'fungus-beds,' on which they grow singularly pure cultures of a fungus



To face page [illegible].

John Bartholomew & Co



Ants' Nests.

1. Wood ants' nest (part), about two-thirds natural size; after White and Kirby.—2. Interior of same (section): G, galleries; P, pupæ.—3. Tree ants' nest, about one-seventh natural size: E, exterior; S, section.—4. Nest of agricultural ant, about one-fiftieth natural size; after M'Cook: M, mound; E entrance; D, disc, cleared of grass, &c.; R, roads.—5. Horizontal section of same: S L, surface level; E, entrance; G, granaries; S, seeds at [illegible] O, openings from below.—6. Nest of honey ant, about one-third natural size, after M'Cook: E V, exterior view; S V, sectional view; E, entrance; G, galleries; H R, honey room.—7. Honey ants in their chamber full of honey, about two-thirds natural size.

which constitutes their main food supply. The naturalists Bates (*Naturalist on the Amazons*) and Belt (*Naturalist in Nicaragua*) have given interesting accounts of these formidable creatures. The wandering ants (*Eciton*) are interesting American forms, which are usually blind, and do not make permanent nests, but wander from place to place. The driver ants (Anomma) of Africa are related forms, which travel in vast hordes, overwhelming everything on their path. See articles by Herbert Spencer and Weismann in the *Contemp. Review* for 1893. For a general account of ants, see the *Cambridge Nat. Hist.*, 'Insects' (vol. i. 1895, vol. ii. 1899); Lubbock's *Ants, Bees, and Wasps;* and Farren White's *Ants and their Ways* (1883).

Antacids, medicines which counteract acidity by combining with the acid. The acids formed in the stomach during digestion, such as lactic acid and butyric acid, are neutralized by antacids given *after* meals. Certain alkalis are given with the object of rendering the blood plasma more alkaline: these are the salts of potassium, sodium, ammonium, lithium, magnesium, and calcium. Antacids are administered chiefly in dyspepsia, gout, rheumatic fever, and rheumatoid arthritis.

Antæus, according to Greek tradition, was a Libyan giant of invincible strength as a wrestler, until overcome by Hercules. It was believed that he was the son of Ge, the earth.

Antagonism, in anatomy, the opposition of one set of muscles to another—*e.g.* of the flexors and extensors of the arm; in medicine, the counteraction of some drug against others—*e.g.* atropine shows antagonism to morphine.

Antalcidas, born in the 5th century B.C., was ambassador from Sparta to the Persians in 393-392 and in 388-387, in each instance with the view of strengthening Sparta against Athens by means of Persian support. On his return from the second of these missions as admiral of the Spartan fleet, he conducted the war against Athens so successfully as to conclude the peace of Antalcidas, by which all the cities and islands of Greece were declared independent, except Imbros, Lemnos, and Skythos, and all the Greek cities of Asia Minor were annexed to the Persian empire. He was again sent to Persia in 371 B.C.

Antananarivo, cap. of Madagascar. See TANANARIVO.

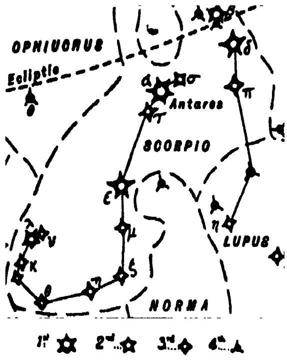
Antar, or ANTARA (-IBN-SHEDDAD), a celebrated Arabian warrior and poet of the 6th century, author of one of the seven *Moallakât*. Many of his poems are published in Ahlwardt's *Six Ancient Poets* (1870).

Antarctic Ocean. This great water division of the globe is, in many respects, the antithesis of the Arctic Ocean. The Antarctic, there is good reason to believe, consists of a central mass of land, covered with a thick and presumably unbroken ice-cap. To this vast accumulation of ice are due the huge table-topped icebergs projecting 150 to 200 ft. above the surface of the sea, and descending 1,200 to 1,500 ft. below it. As the edge of the great ice-barrier is approached, the ocean in many parts very perceptibly decreases in depth. For instance, E. of Victoria Land, and off the adjacent Adélie Land, the depth ranges from 100 to 800 fathoms; E. of the S. Shetland Is. it is 100 to 500 fathoms deep; and W. of Graham Land there is a 'continental' shelf of 200 to 300 fathoms depth. But in the lower latitudes, or between 60° and 40° S. lat., the depth is greatly increased. From Patagonia E. to Kerguelen I. the depth generally exceeds 2,000 fathoms, in some places even 3,000 fathoms. Indeed, the depth on the 60th parallel nearly all round the Pole exceeds 2,000 fathoms; though to the S.W. of S. Georgia Sir James Clark Ross records having sounded a depth of 4,000 fathoms, or more than 4½ m., without touching the bottom. S. America, or rather Tierra del Fuego, is apparently linked to the Antarctic lands at Graham Land by a curving submarine ridge, which separates the S. Atlantic from the S. Pacific, and comes up to within about 110 fathoms of the surface. On the whole, the water of the Antarctic Ocean would appear to be colder than the water of the Arctic. On the surface, and down to about 50 fathoms, it is comparatively warm, though absolutely cold, 29° to 30° F. Thence the temperature gradually increases down to about 165 fathoms, where it is 35°; and this temperature is maintained down to 800 or 825 fathoms. From this level to the bottom it again sinks, to about 31°. These are the results of observations made by the German deep-sea expedition in the *Valdivia* in 1898-9. According to the observations of the *Challenger*, some twenty-five years earlier, the temperature of the surface water was between 29° and 38° (according to latitude), and of the bottom 32° to 35°; and wedged in between these two layers was a colder stratum of water, with a temperature of only 28° to 32·5°. Ross, again, in 1841-3, reported a surface temperature of 27·3° to 33·6°, with an average of 29·8°, this being in the summer. With these data it would be interesting to compare the air temperatures of the S. Polar regions discussed by Prof. A. Supan in *Petermann's Mitteilungen* for 1901 (p. 128, etc.), and the results obtained by Ross (*Antarctic Voyage*, vol. i.) and by the *Belgica* in 1898-9 (reported by Mr. H. Arctowski in *Ciel et Terre*, 1899). Meteorologically, the area over the S. Pole is one of low pressure, having a mean of less than 29 in.; and this vast permanent anticyclone appears to have a much wider extension in winter than in summer. The climatic conditions depend largely upon the wind. When it blows from the south it is clear and cold; but winds from the opposite directions bring fogs and cloud and a rise of temperature. There is continuous daylight from Nov. to Jan. In regions higher than 40° S. lat., the Antarctic plankton, or organic life of the surface, is characterized by an abundance of diatoms. Pelagic animals, such as molluscs, amphipods, copepods, and other marine organisms, are plentiful down to 1,000 fathoms, and are not at all scarce at 2,700 fathoms. Sir John Murray asserts there are species common to both N. and S. Polar regions which are absent in the depths of the intervening oceans.

The southern right whale (*Balæna australis*) extends at least as far south as 50° S. lat., but it is in no sense an ice whale. There are two whales peculiar to southern seas—the pigmy whale (*Neobalæna marginata*) and a bottlenose (*Hyperoödon planifrons*); but these hardly extend into the Antarctic. There are possibly several Antarctic rorquals. Four true seals are peculiar to the Antarctic—Weddell's seal (*Leptonychotes Weddelli*), the sea-leopard (*Ogmorhinus leptonyx*), Ross's seal (*Ommatophoca Rossi*), and the crab-eating seal (*Lobodon carcinophagus*). All are widely distributed throughout the area. No fur-seal is truly Antarctic; but it is stated that the elephant-seal occurs off the coast of Victoria Land. The most characteristic birds are the penguins, especially the emperor and the Adélie; the petrels, especially the ice, giant, and Antarctic petrels; and the Antarctic skua. Meantime the invertebrates are little known; but the *Belgica* and *Scotia* especially, among recent expeditions, have taken rich hauls. Land plants are naturally very few; a grass (*Aira cæspitosa*) and a few mosses and lichens have been described. Much information has been collected by the recent expeditions regarding the geology. In Victoria Land sandstone has been found containing fossil plants (dicotyledons), apparently of Miocene age. In the region of Louis Philippe Land, almost at the opposite side of the circle, a marine volcanic tuff containing (drifted) land plants of Tertiary age occurs. In the same region there are deposits containing Jurassic land plants, and fossiliferous marine beds belonging to the Jurassic and Cretaceous systems. The South Orkneys consist of Primary sedimentary deposits, chiefly greywackes and conglomerates, in which a fossil graptolite has been found. Kaiser Wilhelm II. Land (see below) is apparently composed of Archæan rocks, especially granite, gneiss, and quartzite. Here, as elsewhere within the area, there also occur volcanic lavas of recent date. (For the AURORA AUSTRALIS, see article AURORA.)

ANTARCTIC EXPLORATION.—The history of Antarctic exploration, if the discovery of S. Georgia by Vespucci in 1502, and of the S. Shetlands by Dirk Gerritsz in 1599, be dismissed as doubtful, is of comparatively recent origin. In 1739 the French merchant Captain Bouvet discovered an island to the s.w. of Cape of Good Hope, which he named Cap de la Circoncision, believing it to be part of the long-sought-for south continent. Professor Chun of the *Valdivia* expedition rediscovered the island in 1898, in lat. 54° 26′ 4″ s. and long. 3° 24′ 2″ E., and concluded that other islands reported in the neighbourhood were identical with Bouvet I. The next discovery within the Antarctic area was in 1756, when the Spanish vessel *Leon* sailed round S. Georgia, to which the name of San Pedro was given. But the first voyage of importance to the southern seas was that of Captain Cook in 1772-5. On Jan. 17, 1773, the Antarctic circle was crossed for the first time, in long. 39° 35′ E. After having, in January 1774, reached solid pack-ice, in long. 106° 54′ w. and lat. 71° 10′ s., he visited and named S. Georgia and the Sandwich group. William Smith, in 1819, sighted a row of islands, which he named the S. Shetlands; and Edward Bransfield, in 1820, examined the group as far as 53° w., and nearly to 65° s. In 1819-21, the Russian captain, F. G. von Bellingshausen, visited the Sandwich group, and sailed s. to lat. 69° 21′ in long. 2° 15′ w. He attained his highest latitude, 69° 53′ s. in long. 92° 19′ w., on Jan. 13, 1821, and named the land he saw Peter I. Island; while another point of coast, in lat. 68° 43′ s. and long. 73° 10′ w., he called Alexander I. Land. James Weddell, in 1822, attained the lat. of 74° 15′ s. John Biscoe (1830-2) sighted Enderby Land, and discovered Biscoe Is. and the land now known as Graham Land; and John Balleny, in 1839, the islands named after him. Dumont d'Urville discovered Joinville Land and Louis Philippe Land in 1838, and Adélie Land and the Côte Clarie in 1840. Charles Wilkes, of the U.S. Navy, sighted other points w. of Balleny Is., and gave them the name of Wilkes Land. The finest expedition that has hitherto explored the South Polar seas left Hobart in December 1840. It consisted of the ships *Erebus* and *Terror*, under the command of Captain James Clark Ross, who was accompanied by Dr. (Sir Joseph) Hooker. Possession Islands were discovered, and a landing effected on the largest of the group, and a line of coast, Victoria Land, was traced from Cape North for about 570 m. to Cape Crozier, where it merged into the great ice-barrier, which was followed for 250 m. Several summits and mountain ranges were named, including the mighty volcanoes Erebus (12,400 ft.) and Terror (extinct; 10,900 ft.), and the s. magnetic pole was located in lat. 75° 5′ s. and long. 154° 8′ E. In this region Captain Ross reached the lat. of 78° 4′ s., and the next season lat. 78° 9′ 30″ s. in long. 161° 27′ w. In 1845 Lieutenant Moore, in the *Pagoda*, continued Ross's work. Visits to the Antarctic were also made by whalers subsequently, and by Bull in the *Antarctic* in 1895. The first winter passed by man within the Antarctic circle was that of 1898, when the Belgian expedition in the *Belgica*, under the command of Captain de Gerlache, was beset by ice in lat. 71° 31′ s. and long. 85° 16′ w. Mr. C. E. Borchgrevink, who had visited Victoria Land in the *Antarctic*, went out again in the *Southern Cross* in 1898, and wintered at the foot of Cape Adare. Four important expeditions have recently been at work in the Antarctic region (1.) The British National Antarctic Expedition in the *Discovery* entered the ice-pack in the vicinity of Victoria Land in January 1902, and left that region in February 1904. Before going into winter quarters (in lat. 77° 50′ s., long. 166° 42′ E.), the expedition followed the Ross barrier for a considerable distance to the east, finding that in long. 165° it trends to the north. Here a heavily glaciated land, with occasional bare peaks, rises from the barrier. The coast of this land, named Edward VII. Land by the expedition, was followed as far as lat. 76°, long. 152° 30′. Subsequent explorations showed that Mts. Erebus and Terror are on an island, and that M'Murdo Bay is really a strait. On Jan. 1, 1903, Capt. R. F. Scott, accompanied by Lieut. Shackleton, sledged southward along the coast of Victoria Land, and carried the British flag to 82° 17′ s., the highest southern latitude yet attained. It was found that a great inlet extends to the south for an unknown distance between Victoria Land on the west and Edward VII. Land on the east. Victoria Land itself proves to be a vast continental plateau, 9,000 ft. in height, fringed by a coast range of mountains, broken by large fiords. (2.) The German Antarctic Expedition, in the *Gauss*, left Germany in 1901, returning in 1903. The vessel reached the pack-ice in February 1902, in 61° 58′ s. lat. and 95° 8′ E. long. Proceeding south, she discovered new land, which was named Kaiser Wilhelm II. Land, and wintered off this land in 89° 48′ E. long. and 66° 2′ s. lat. The leader believes that this land forms part of a continuous continent stretching from Knox Land to Kemp Land. Near the coast an inactive volcano (the Gaussberg, 1,200 ft.) was observed. (3.) The Swedish expedition in the *Antarctic* left Europe in 1901; the ship was lost in 1903, but the party was rescued. The *Antarctic* first sailed down the west coast of Danco Land, and proved that it is a continuation of Louis Philippe Land. Subsequently she passed through Antarctic Sound to the east coast of Louis Philippe Land. It was proved that Mount Haddington is placed upon an island, and that King Oscar II. Land is continuous with Louis Philippe Land, both being continuous with Graham Land. (4.) The Scottish National Antarctic Expedition in the *Scotia* left Scotland in 1902, and returned in 1904. The scene of the *Scotia's* work was the Weddell Sea. She there explored in her first season 4,000 m. of ocean, from 17°-45° w. long. in 70° 25′ s. lat., wintering in the South Orkneys. In her second season she reached the south-eastern extremity of the Weddell Sea, and discovered a great barrier of inland ice, believed to be part of the Antarctic continent, which was thus found to be 600 m. north of its supposed position. The expedition also dredged in Ross's Deep, which proves to be 2,600 fathoms, where Ross marks 4,000 fathoms, no bottom. See Fricker's *Antarktis* (1898; trans. 1900); *Antarctic Manual*, ed. by Murray (1901), with bibliography; *Scot. Geog. Mag.*, Antarctic number (1898), with bibliography, and that magazine and *Geog. Jour.*, *passim;* Murdoch's *From Edinburgh to the Antarctic* (1894); Bull's *Cruise of the Antarctic* (1896); Borchgrevink's *First on the Antarctic Continent* (1901); Bernacchi's *To the S. Polar Regions* (1901); Lecointe's *Au Pays des Manchots* (*Belgica* Expedition, 1904); *Résultats du Voyage de la S.Y. Belgica* (10 vols., in course of publication); *Southern Cross Collections* (Nat. Hist. 1903); *Die Deutsche Südpolar Expedition* (Berlin, 1903); Nordenskjöld's *Antarctica* (1905).

Antares, α Scorpii, a red star of 1·5 magnitude. It gives a banded spectrum of Secchi's third type, and forms, with a seventh-magnitude green satellite, a beautiful chromatic combination. Admitting the reality of Mr. Finlay's parallax of 0·02", this star must possess about 540 times the sun's light-power, and appears to us in the place it occupied 155 years ago.



Antares.

Ant-eater, a term applied to several unrelated mammals connected only by their diet. The true ant-eaters are members of the order Edentata, and are confined to S. America. The largest, the great ant-eater or ant-bear (*Myrmecophaga jubata*), reaches a length of 4 ft., exclusive of the large, bushy tail, and has the face prolonged into a long, tubular snout. Teeth are entirely absent, and the long, flexible tongue is covered with sticky saliva. The fore limbs are furnished with powerful claws, which are used in tearing open the nests of termites, or 'white ants,' on which the animals chiefly feed. Related but less modified forms are the tamandua ant-eater (*T. tetradactyla*) and the little ant-eater (*Cyclothurus didactylus*). The scaly ant-eaters, or pangolins, are members of the same order of mammals; as is also the African aard-vark, sometimes called the Cape ant-eater. The term spiny ant-eater is applied to *Echidna*, and banded ant-eater to *Myrmecobius fasciatus*, a curious little Australian mammal, remarkable in possessing a larger number of teeth than any other existing marsupial. It is chestnut-red, with white and dark stripes on its back, and somewhat resembles the English squirrel in appearance. The pouch, usually present in female marsupials, is here absent.

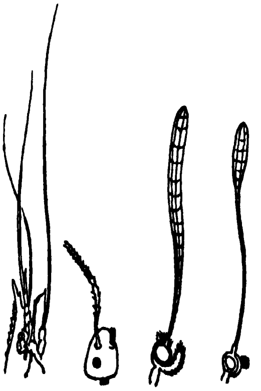
Ant-Bear.

Antecedent, in grammar, the subject to which a succeeding pronoun refers; in logic, the premise from which a 'consequent' proposition is inferred; in mathematics, the first element in a ratio—*e.g.* 2:4 = 3:6.

Antelope, a general name applied to certain of the hollow-horned ruminants (Bovidæ). Generally speaking, those of the Bovidæ which cannot be definitely regarded as sheep, goats, or oxen are relegated to the antelopes, in spite of the fact that some of these (*e.g.* the Alpine chamois) are structurally near the goats, and others (*e.g.* the African antelopes, of the genus Alcelaphus) are far removed from them. On the whole, however, it may be said that, while sheep and goats are typically mountain animals, antelopes are typically plain animals, and are therefore specially at home in Africa. A few only of the more conspicuous antelopes can be noticed here. In the genus Alcelaphus, including the African hartebeest, blesbok, bontebok, and others, the back slopes, owing to the fact that the height at the withers is much greater than at the rump, the head is long and narrow, and the horns are lyrate and bent back at the tips. The African gnu is a near ally of these forms. In size these antelopes should be contrasted with the duikerboks (*Cephalophus*), of which the smallest is not larger than a rabbit, while the hartebeest may stand nearly 5 ft. at the withers. The saiga is one of the few antelopes which occur in Europe and Asia. In India there are relatively few antelopes; but the somewhat cowlike nylghau (*Boselaphus tragocamelus*), with short half-moon shaped horns in both sexes, deserves mention. Related is the African genus Tragelaphus, including the beautiful harnessed antelopes, with long, spirally-twisted horns. Another African antelope, the gemsbok (*Oryx gazella*), is remarkable for its long, straight horns, present in both sexes. The eland (*Oreas canna*), the largest of all antelopes, is said to be rapidly disappearing. In structure and in habitat the European chamois (*Rupicapra tragus*) connects the antelopes with the goats. For S. African antelopes see works by Millais and Bryden; for Asiatic, Baker's *Wild Beasts and their Ways* (1892); Blandford's *Fauna of British India: Mammals* (1888); also Sclater and Thomas's *The Book of the Antelopes* (1896).

Ante meridiem. See A.M.

Antennæ, or feelers, are sense organs, generally tactile, borne on the head in crustaceans, myriapods, and insects, where they are homologous with the other appendages, such as the jaws. In crustaceans there are typically two pairs of antennæ, and these may retain their primitive locomotor function. Thus, the Nauplius larva swims by its two pairs of antennæ, as well as by its third pair of appendages, which constitute the future jaws. Further, except in the highest crustaceans, the second pair of antennæ bears at its base a scale or squama, which assists in locomotion. In the crabs, no less than in insects, the antennæ are purely sensory, and in the latter especially are often of elaborate structure. In insects, as in myriapods and *Peripatus*, only one pair of antennæ is present, and their importance as sense organs may be deduced not only from the frequent elaboration of structure, but from the care taken by the animals to keep them clean and free from dust. The function of the elaborate sense organs found on the antennæ in many insects is obscure. Some are, no doubt, olfactory. It has been also suggested that social insects, such as bees and ants, are capable of communicating impressions to one another by means of the antennal sense organs. See Lord Avebury's (Lubbock's) *Senses, etc., of Animals*, Internat. Sci. Ser., 1888.

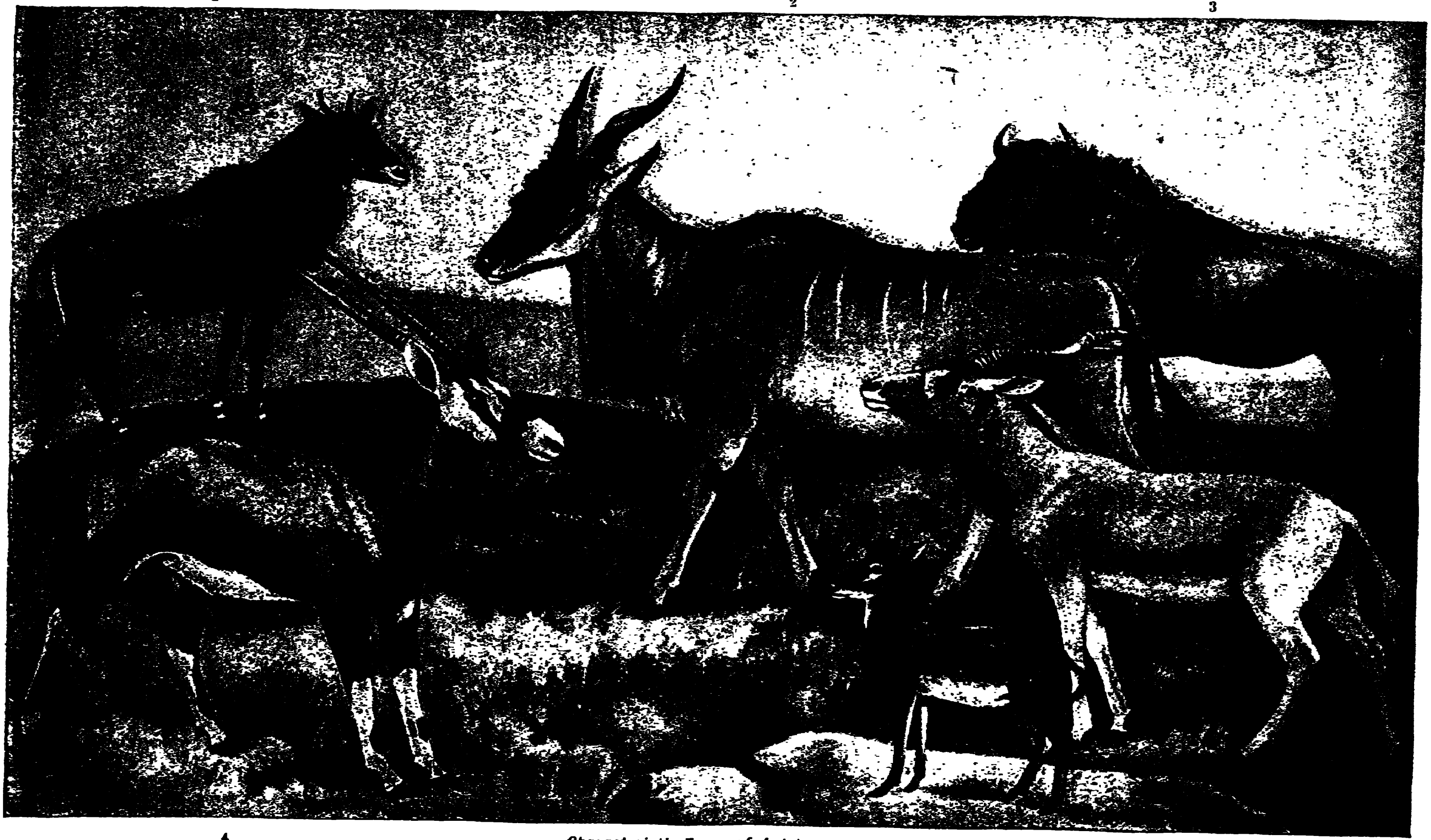


Antennæ of (A) *Prawn;* (B) *Ant;* (C, D) *Butterflies.*

Antenor, the Trojan counsellor who urged the Trojans to restore Helen to Menelaus.

Antequera (anc. *Antiquaria*), tn., prov. Malaga, Spain, 27 m. from Malaga. Pop. (1900) 31,609.

Anthelia, coloured circles, usually three or four in number, which surround the shadow of the observer's head when projected on a fog; seen in the Arctic regions and on mountains: also known as 'Ulloa's circle,' or as a 'glory.'



Characteristic Types of Antelopes.

1. Nylghau. 2. Eland. 3. Brindled Gnu. 4. Gemsbok. 5. Common Duikerbok. 6. Addax.

Anthelmintics, remedies which kill or expel intestinal worms. Vermicides kill the worms, vermifuges expel them. For tapeworms, oil of male-fern is chiefly used; santonin is useful for round worms; and an injection of quassia, or salt and water, is used for thread-worms.

Anthem, a form of musical composition set to sacred words and used in the service of the church. Compositions of this class were first written to be sung in alternate parts; but great diversity of treatment has been admitted, and the modern anthem may be written for solo, soli, or chorus, or for some or all of these parts in combination. In the English Church the anthem takes the place of the motet in the Roman and Lutheran Churches. See ANTIPHONY.

Anther, the male organ in flowering plants; contains the pollen, and is situated at the free end of the stamen. See FLOWER.

Antheridium, the male reproductive organ in the fern and moss groups, and in some species of Algæ. In every case motile sexual cells, called spermatozoids, are developed within the antheridia.

Antherozoid, the free-swimming male element or cell in the sexual reproduction of the lower plants. See SPERMATOZOA.

Anthology (Gr. 'flower-gathering'), a series of select extracts, generally poems, chosen from the works of various authors, and complete in themselves. Much the most important is the Greek anthology. The earliest compilation of any note was the *Stephanos* ('garland') of Meleager of Gadara, put together early in the 1st century B.C. Other similar collections were edited by Philippus of Thessalonica during the reign of Nero, by Strato of Sardis (the *Paidike Mousa*) under Hadrian, and by Agathias of Constantinople (*c.* 550 A.D.). The earliest and completest of the extant versions is that brought together by the grammarian Constantinus Cephalas (probably *c.* 950 A.D.); this work was altered, abridged, and rearranged by Maximus Planudes, a rhetorician of the early part of the 14th century. This inferior Planudean anthology remained for three hundred years the only one known to Europe. It was first printed in Florence by Janus Lascaris (1494), and frequently reprinted—*e.g.* by Wild and Altheer (Utrecht, 1795-1822), and by Stadtmüller (1894, etc.). The anthology of Cephalas was rediscovered by Salmasius (1606) in the library of the Counts Palatine at Heidelberg, whence it is now generally known as the Palatinate Anthology. Salmasius copied the epigrams hitherto unknown, which circulated in MS. as the *Anthologia Inedita;* but the first complete edition was published in Brunck's *Analecta Veterum Poetarum Græcorum* (Stras. 1772-6), an improved recension being Jacobs's *Anthologia Græca* (Leip., 13 vols., 1794-1814; and 4 vols., 1813-17). The handiest working edition is Dübner's, in Didot's *Bibliothèque Grecque* (Par. 1864-72). The range of the Greek anthology is from the 6th century B.C. to the 10th century A.D. It was translated into Latin by Hugo Grotius (1630; pub. 1795-1822), into German by Herder (1785-97), into English by Wrangham, Sterling, Goldwin Smith, Merivale, Macgregor, Sir R. Garnett, etc. The English reader may consult Dr. Wellesley, *Anthologia Polyglotta* (1849); A. J. Symond's *Studies of the Greek Poets* (1873); A. J. Butler's *Amaranth and Asphodel* (1881); Mackail's *Select Epigrams* (1890); and the versions given in Bohn's Library (1854), and in the Canterbury Poets Series. Latin anthologies, in imitation of the Greek, were published by Scaliger (1573), Pitthöus (1590), Peter Burmann (1759; ed. Meyer, 1835), and Riese and Bücheler (1894-7). The substance of the numerous Oriental anthologies is accessible to Western readers in Von Hammer-Purgstall's *Persian Lit.* (1818), in his *W. Turkish Poetry* (1836), and in Garcin de Tassy's *Hist. de la Lit. Hindoue et Hindoustani* (1839-47). The Chinese *Shi-King* (Book of Songs), attributed to Confucius, and said to be the oldest anthology in the world, may be consulted in Rückert's German translation (1833). The standard English anthology is F. T. Palgrave's *Golden Treasury* (1861); other well-known collections are Trench's *Household Book of English Poetry* (1868), R. W. Emerson's *Parnassus* (1875), and Quiller-Couch's *Oxford Book of Verse* (1900). The Psalms also are virtually an anthology.

Antholysis is the formation of double flowers, in which the stamens and carpels become leaf-like; all the organs are usually multiplied. This peculiar condition throws light on the homology of the members of the flower with the foliage leaves.

Anthony, MARK (1817), English romantic landscape painter, exhibited at the Society of British Artists (to which he was elected member in 1845) from 1840-50.

Anthony, ST. See ANTONY, ST.

Anthorism, a counter definition, usually stronger or more correct than that preceding it—*e.g.* 'The hillmen, *hereditary robbers*, descended from their fastnesses.'

Anthozoa, a class of the Cœlentera, including sea anemones. See ACTINOZOA.

Anthracene ($C_{14}H_{10}$), an aromatic hydrocarbon formed when certain carbon compounds are exposed to a high temperature. It is produced in large quantities in the manufacture of coal gas, being found in coal tar, and is used in the production of alizarin and allied colouring matters. It is a white crystalline solid with blue fluorescence.

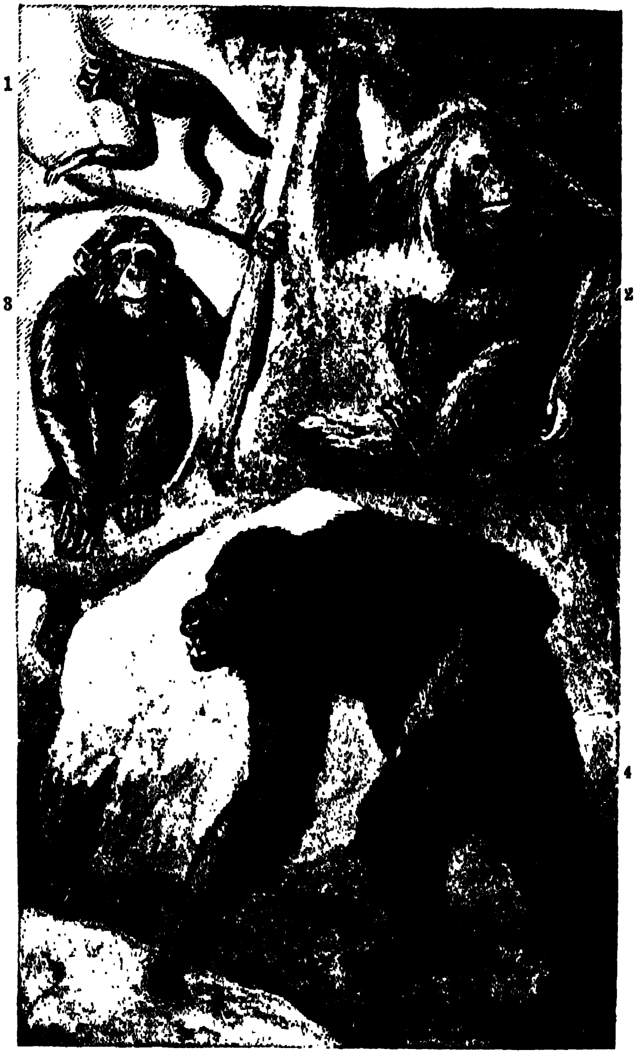
Anthracite, or STONE COAL, a kind of coal distinguished by its great hardness, its high proportion of carbon, and the great heat given out in burning. While ordinary coal has a dull lustre, anthracite is brilliant and even metallic in appearance, often with a curious iridescence like that of a peacock's feather. It has a hollow, rounded, conchoidal fracture, while coal usually breaks into blocks with flat surfaces. It is so hard as not to soil the fingers; its sp. gr. is from 1·3 to 1·8. Anthracite is coal in which the mineralization of woody matters has been carried to a further degree than in coal; but it shows occasional traces of the cellular structure of wood. The percentage of carbon ranges from 85 to 94; in burning, there is little flame, and no caking; combustion is comparatively slow: hence it is of value for fusing refractory metals and for steam-raising. The greatest anthracite fields at present worked are those of Pennsylvania, where the deposits, in pockets, cover nearly 500,000 sq. m., and give employment to 160,000 men; but it is also mined in Wales, Silesia, Westphalia, France, Russia, W. Canada, and the Rocky Mountains. Richthofen estimates that the anthracite deposits round Tse-chow, in the Chinese province of Shan-si, amount to 630,000,000,000 tons, and that the coal-bearing area is greater than that of Pennsylvania. See P. Roberts, *Anthracite Coal Industry* (1902).

Anthracosia and **Anthracomya,** genera of fossil bivalve mollusca supposed to be of fresh-water habit, and not unlike the present fresh-water mussels; are common in certain beds of the Coal Measures.

Anthraquinone, $C_6H_4(CO)_2C_6H_4$, a yellow crystalline solid, melting at 277° C., and obtained by oxidizing anthracene with chromic acid mixture. It is used in the manufacture of alizarin and its derivatives.

Anthrax (Gr. 'carbuncle'), formerly applied both to carbuncle and to 'malignant pustule,' but now used as a synonym for the latter only. 'Anthrax is a disease which attacks man and several of the lower animals (*e.g.* horse, cow, sheep, and goat), and is transmitted by inoculation, or by breathing and swallowing; the former known as external anthrax or malignant pustule, the latter as internal anthrax—"wool-sorters' disease"—from wool, including camel-hair and goat-hair, hides and skins, horsehair, and bristles. The incubation period does not exceed three days. Practical preventive measures suggested are: the employment of persons with the requisite experience; exclusion of workers with open sores; treatment of suspected materials by washing or disinfecting; special ventilating precautions, and cleanliness of rooms, person, and clothing' (*Report* of the Anthrax Com. 1897). The sufferers are generally those whose work is connected with the handling of hides, wool, or carcasses. Malignant pustule (syn. Fr. *charbon*, 'coal') usually starts at some abrasion or scratch, as a pimple, around which the tissues become brawny and hard. The pimple becomes a vesicle; a black, gangrenous patch ensues, around which a circle of fresh vesicles is formed, while outside them the redness and hardness of the tissues spread. Later, the neighbouring glands become infected, tender, and enlarged. The temperature generally rises, exhaustion follows, and death comes through syncope or through œdema, at times affecting the throat, when, as is often the case, the pustule develops in the face or neck. Treatment of the pustule is by the thermo-cautery, or by local injections of iodine or of carbolic acid; or by complete excision of the pustule and the application of strong antiseptics to the wound; or by the use externally and internally of ipecacuanha from which the emetic principle has been removed. Sclavo's anti-anthrax serum is another injection used, and Sobernheim (*Berlin. klin. Woch.*, 1899; No. 13) advises the mixing of this with attenuated cultures of the *bacillus anthracis*, a rodlike body, straight or bent, with cross markings, and sometimes showing spores, which is often found in the lymphatics of the patient. This bacillus was first observed by Davaine in 1850.

Internal anthrax, or wool-sorters' disease, is a form in which the bacillus obtains entrance through the alimentary or respiratory tract. There is no external pustule, but there are swellings and ulcers, with hæmorrhage, in the intestines, bronchi, or lungs, and the bacteria may spread through the lymphatic circulation, and cause secondary ulcers in any organ, with typhoid symptoms. It is sometimes very difficult to diagnose the internal form of anthrax, but the occupation of the patient often suggests the probable condition. In such cases local treatment is impossible; but anti-anthrax serum is recommended, and every step should be taken to support the patient's strength. Anthrax in the lower animals is often called splenic fever.



Anthropoid Apes.

1. Hoolock gibbon. 2. Orang-outan. 3. Chimpanzee. 4. Gorilla.

Anthropoid Apes, or Simiadæ, form, with the exception of man himself, the most specialized members of the Primates. There are four living kinds of anthropoid apes—the gibbon, orang, chimpanzee, and gorilla. (See these names.) In all the tail is absent, and there are no cheek pouches. The fore limbs are much longer proportionately than in man, and the sternum is broad. See Hautmann's *Anthropoid Apes* (1886); Huxley's *Man's Place in Nature.*

Anthropological Societies. These exist in nearly all the capitals of the civilized world. The first to be founded was the Société d'Anthropologie de Paris, in 1859. Then followed the Anthropological Institute of Great Britain and Ireland in 1865; the Moscow Anthropological Society in 1866; the Italian, at Florence, in 1868; the Berlin in 1869; the Vienna in 1870. Similar societies exist at Washington, Sydney, Bombay, St. Petersburg, Rome, Brussels, and Stockholm. Professorial chairs have been founded at Berlin, Budapest, Zürich, Paris, and Munich.

Anthropology, or the SCIENCE OF MAN, is more widely related to other studies than is any other subject; it is, therefore, impossible to delimit its boundaries very rigidly. Thus, it merges into zoology and physiology on the one hand, and, on the other, into history and theology. The description of the human body and of its functions does not fall within the scope of anthropology, except in so far as it is descriptive of a definite group of men, or is comparative between different races or peoples; and although the comparison of man with the higher apes is often made by anthropologists, this inquiry belongs strictly to comparative anatomy, physiology, and psychology. In connection with this article, see especially ETHNOLOGY and MAN.

The detailed study of the anatomy, physiology, and psychology of a distinct race of mankind, and their comparison through different races of men, is known as ANTHROPOGRAPHY—a more comprehensive term than 'somatology' or 'physical anthropology.' This science thus deals with man from a purely animal point of view. While morphological anthropology has been highly developed, the physiological and psychological aspects of anthropography have not received that attention which their importance deserves, and they present a most promising line of inquiry. Anthropography also includes such subjects as the pathology, fertility, criminology, etc., of peoples, as well as biometrical investigations.

The study of the natural history of social life, or the investigation of peoples in respect of the present state and the evolution of their culture, is known as ETHNOLOGY. Although ethnology is subdivided into several separate studies, which deal with arts and crafts on the one hand and with ethical and social matters on the other, yet, since all that man accomplishes is the result of intelligent action, all that is included under ethnology has its psychological aspect.

An essential condition of culture is that art of communication which has developed into language and into writing; and the study of the language of a people, or PHILOLOGY, illustrates the stage of culture which has been reached, and may give a clue to the peoples with whom the race has previously come into contact. 'Linguistics' is, however, an uncertain guide to the origin of a people, because of the facility with which one language may supplant another. Comparative Phonology, or the study of the sounds produced by various peoples, is a study that requires further development. The communication of ideas by visual signs begins with Pictography (in which maps may be included), and ends with our alphabet. Finally, there are the universal languages of definite signs, of which mathematics, music, and, to a certain extent, chemistry afford the best examples.

The utilitarian arts are considered in the study of TECHNOLOGY. The progress in the improvement of tools and mechanical appliances has been spasmodic. The similarity of the stone or other implements used by different peoples does not necessarily imply community of origin, nor even the transmission of culture, as the material of which the object is made and the use to which it is put preclude great variety in form. The persistent use of stone, wood, bone, or shell by modern peoples may be due to lack of other material, as in the case of people living on a coral atoll. The greatest ingenuity is usually shown in weapons of offence; war has proved a great stimulus to invention, and the wit of the hunter has been sharpened in the continual attempt to circumvent his quarry. Certain crafts, such as agriculture, pottery, and weaving, are essentially women's work, as hunting and fighting form that of men. Clothing, house-building, transit, transport, weights and measures, etc., are also studied.

The arts which do not appeal to mere utility, but have been most important factors in the mental development of man, are those which are investigated in the study of ÆSTHETICS. The temporary decoration of the person by paint or ornaments, and its permanent embellishment by tattooing and deformation, are, at least in many cases, associated with some social or religious concept. Pantomimic dances, music, and feasting have played an important part in social development. Stories about the origin of the world and its creatures, and legends of heroes and races, are the beginnings of literature—at first traditional and oral, later recorded in writing. The rhythmic form, associated with a wealth of simile and allusion, leads to poetry as we know it.

Man's social habit gives rise to customs, and then rules, which make for security and good fellowship in the community. Actions were early distinguished as good or evil, according as they were social or anti-social. These distinctions lie within the field of ETHICS, and their sanctions within that of COMPARATIVE RELIGION. Clan morality has widened its area slowly and imperfectly; but the responsibility of the individual was recognized at an early stage, and the social instincts of man have resulted in totemism, and, in a higher form, in various systems of religion. Early speculations as to the nature of the surrounding world and of human life are, indeed, erroneous; but their errors are such as could be remedied by no process of logic, but only by wider experience. Animism and Magic are good examples of theories arising from very limited knowledge.

SOCIOLOGY traces the rise of communities, and their evolution to the complex civilizations of ancient and modern times. History, in the ordinary meaning of the term, deals with the later phases of this development; but sociology is the endeavour to get behind history, and to give an account of the data with which historians work. The physical conditions of a country, including its climate, vegetation, and animals, affect profoundly the life of the inhabitants, and we find that certain types of social organization are related to specific habits of life. With the further advance of civilization there arises the 'state,' which is the subject of Politics, and the complex conditions of social wealth, which are studied by ECONOMICS.

The earlier history of man is known as ARCHÆOLOGY, which is essentially a department of ethnology, to which it bears a relation similar to that which palæontology does to zoology.

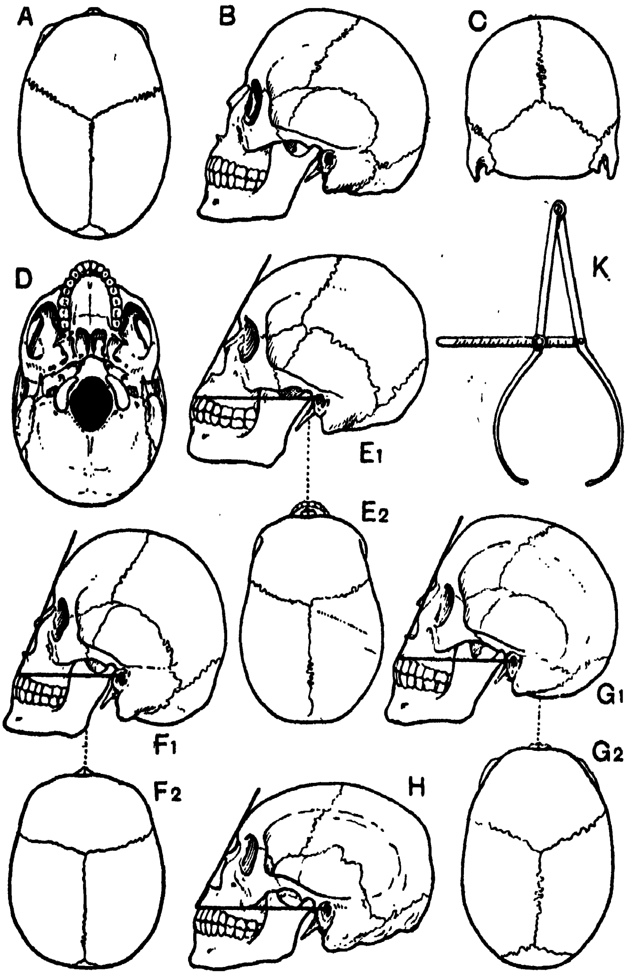
The term ETHNOGRAPHY is limited to the anthropological description of racial or geographical groups of men; and the word ANTHROPOGEOGRAPHY is often used for the study of the distribution of races, and of the effect on civilizations of geographical conditions.

PHYSICAL ANTHROPOLOGY is the comparative study of the structure of the human body in the various races of mankind. In the case of living persons, such characteristics as the colour of the skin, hair, and eyes, as well as the general proportions of bodily stature and facial features, are available for examination; but the detailed study of the skeleton constitutes the most exact part of the science. In this connection, measurements have been devised which are applied in the construction of anthropometric tables. The word *race* is used to designate distinct physical types of mankind, from the intermingling of which *peoples* or *nations* are developed; and it is necessary, in the study of peoples, to analyze the physical factors which have been derived from separate sources. Physical characters may be acquired under varying geological and geographical conditions, from climate and temperature, from food and exercise; clothing modifies the colour of the skin; bones are influenced by habits and posture; and acquired and ancestral characters are transmissible from one generation to another.

The most important anthropological measurements are those of the Skull. Their value is partly due to the fact that the skull contains the brain; but we must not suppose that the dimensions and capacity of the former necessarily affect the quality of its contents. In the skull, the cranium is distinguished from the face. The former is the box which contains the brain. An estimate of its dimensions is formed by measuring its capacity, its circumference in different directions, segments of its circumference, and the chords which subtend them. The face consists of the apparatus for mastication, and of the parts surrounding the organs of sight, smell, taste, and hearing. Its dimensions, either as a whole or in reference to its parts, may be obtained by measurement.

The skull may be examined in two ways—inspection by the eye (cranioscopy), and exact measurements taken by special instruments (craniometry).

1. *Cranioscopy.*—There are certain recognized 'views' of the skull, each of which is termed a *norma.* The view from above (*norma verticalis*) rarely shows any part of the face, or at most the lower part of the nose or the margin of the upper jaw; the cheek arches (zygomæ) may be invisible. Three lines of juncture, or sutures, may be seen: the *saggital,* or longitudinal, the highest point in which is termed the *vertex;* the *coronal,* at the anterior end of the saggital—the meeting-point between these two being termed the *bregma;* and the *lambdoidal,* at the hinder end of the saggital. The skull is said to be 'well-filled' when it bulges on either side of the vertex; but when it presents a rooflike slope, as in the case of many aborigines, it is said to be 'ill-filled.' The *norma lateralis* gives the profile view of the cranium and face, and shows the amount of projection of the face and of its separate parts. This view of the cranium shows the projection above the root of the nose (*glabella*) and the curve of the outline of the vertex. The hinder part of the slope may be precipitous—a deformity due to pressure applied in infancy. This *norma* also shows the mastoid processes behind the ears, and the temporal ridges associated with the temporal muscles of mastication. The *norma facialis* shows the form of the jaws and the character of the teeth, the outlines of the nose and orbits. It is characteristic of man that the highest point of the nasal opening is above the level of the lower border of the orbits. The nasal spine found in the middle line at the lower end of the nasal opening is another important human characteristic. The view from behind (*norma occipitalis*) shows the external occipital protuberance or inion, above which the skull is covered by the scalp, while below it are the attachments of the muscles of the neck. The point of greatest backward projection of the skull occurs above the inion. The area below the inion looks downwards—a human characteristic directly associated with the erect attitude. The *norma inferior* is the basal aspect of cranium and face. Its chief feature is the *foramen magnum,* the front edge of which is named the *basion.* On either side of this foramen are the condyles, by which the skull articulates with the vertebral column. It is important to note that in man the *foramen magnum* looks downwards, whereas in most quadrupeds it looks directly backwards. Because of this backward convexity of man's skull, the cerebellum ('little brain') is placed below the cerebrum, while in quadrupeds the former is behind the latter. This *norma* also shows the form of the hard palate, and gives a view of the teeth, which is of value in the determination of age and habits.



Anthropology.—Craniometry.

A, Norma verticalis. B, Norma lateralis. C, Norma occipitalis. D, Norma inferior. E1, E2, Dolichocephalic type (negro). F1, F2, Brachycephalic type (Chinese). G1, G2, Mesaticephalic type (European). H, Prognathous type (Australian). K, Callipers.

The *age* of the skull may be estimated with considerable accuracy from the state of dentition, and the latter also determines the proportion of face to cranium. As a rule, with the exception of the 'wisdom teeth,' or third molars, which may be very late, dentition is completed by the twenty-fifth year, and from that time the teeth of modern Europeans decay at variable rates; but decay is absent from the teeth of ancient crania and of savage peoples, though the crowns are worn down and flattened by the presence of sand in the food. The general ossification of the skeleton also is completed about the twenty-fifth year. Between the eighteenth and twenty-second years the basi-sphenoid articulation on the base of the skull ossifies, and becomes obliterated. About the fortieth year the saggital suture begins to ossify at its hinder end. Ten years later, the coronal suture begins to obliterate at the bregma. In savages these changes occur earlier than among civilized peoples, with whom metopism (persistent frontal suture) is frequent. Ridges and eminences associated with the attachment of muscles are most marked in adult skulls. Hollow spaces, called 'air sinuses,' which are in direct continuity with the interior of the nose, are found in certain skull bones. These spaces cause modifications of contour—*e.g.* above the eyebrows and the root of the nose—which do not appear before the fifteenth year. There are striking contrasts between the aged skull and that of the adult. In the former, the arched shape of the vault is lost as if by subsidence, while there is an accompanying bulging of the sides and flattening of the base. The loss of teeth from the lower jaw results in a reversion to its infantile form, in which little more than the lower border of the bone is left, while its angle departs from the right-angled adult condition to repeat the obtuse angle of infancy. Similar changes occur in the upper jaw; and the cheeks of the living subject become hollow, the face shrinks, the nose protrudes, and approximates to the chin.

2. *Craniometry.*—The *capacity* of the cranium indicates the development of the brain; but other structures besides the brain are contained within the cranium, and it has been suggested that a deduction of 10 per cent. should be made in order to allow for these. There is no method of estimating the capacity of the cranium which is quite free from error, or by which constant results are obtainable. The operator fills the cranium with some substance, which is afterwards measured in a graduated glass vessel. Special precautions must be taken to ensure equal conditions of pressure during both stages of this operation; the routine of the procedure must be rigidly observed; and it is advisable to have a large series of observations recorded by the same operator. After experiments with numerous substances such as sand, seed, and water, it has been found that the best results are obtained by using chilled shot No. 8, and that, both in filling the skull and in pouring the shot from the skull into the glass measure, it should run through a funnel whose outlet is twenty millimetres in diameter. Even when every precaution has been taken, discrepancies will arise; but if the variation be no more than 10 cubic centimetres, it is regarded as 'slight.'

The capacity of the normal human cranium varies from 1,000 to 1,800 cubic centimetres. In striking averages, it is preferable to compare crania of the same sex, because the mean capacity of female crania is 10 per cent. less than the mean of male crania. On this basis crania have been classified as: (*a*) *Microcephalic*, below 1,350 c.c.—*e.g.* extinct Tasmanians, aboriginal Australians, Bush people, Andamanese, many Melanesians, Veddahs and Hillmen of India; (*b*) *Mesocephalic*, from 1,350 c.c. to 1,450 c.c.—*e.g.* Negroes, Malays, American Indians, and Polynesians; (*c*) *Megacephalic*, above 1,450 c.c.—*e.g.* Eskimos, Europeans, Mongolians, Burmese, and Japanese.

The mean capacity among Europeans is about 1,500 c.c. Sir Wm. Turner has recorded the capacity of a male Scots cranium of nearly 1,800 c.c., and a female aboriginal Australian at 930 c.c. There is no doubt of the human character of the smaller of these two crania, in spite of the enormous difference between them. Another great gap separates man from the nearest of the anthropoid apes, in which 500 c.c. is the maximum capacity. Sex and general bodily stature undoubtedly influence the capacity of the cranium, and thus the weight of the brain. Manouvrier calculates that the cranial capacity multiplied by 0·87 gives the weight of the brain with reasonable exactness.

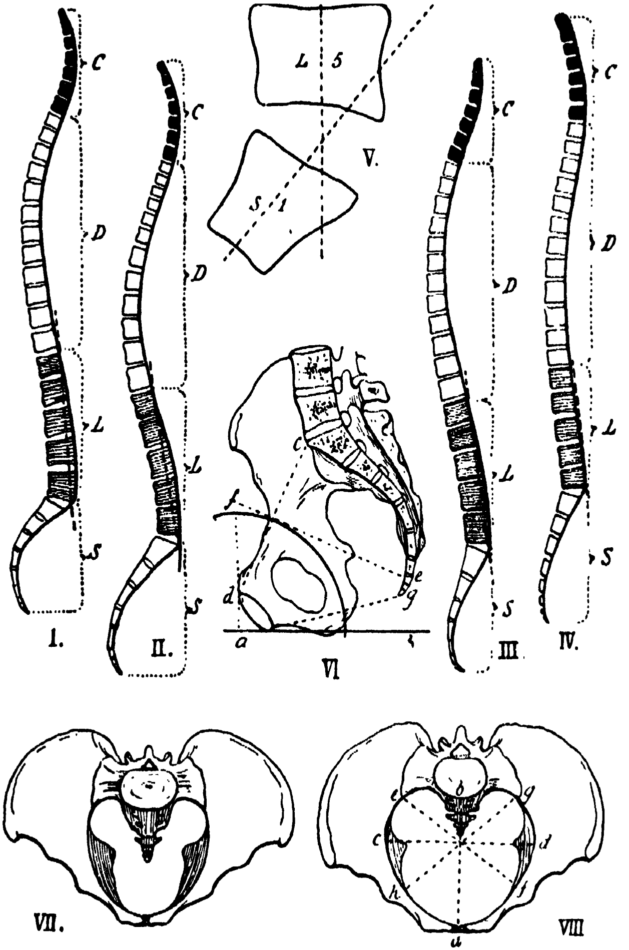
Linear measurements of the skull may be absolute or relative; and since the cranium is not a rectangular box, it is necessary to measure the distances along the arcs of curves, as well as the chords of these arcs—*i.e.* the shortest distances between points upon the surface. For these purposes two instruments are required—*viz.* a graduated steel tape and callipers. The latter consist of a straight graduated bar upon which there are two curved arms; of these one is fixed at zero, while the other may be moved upon the bar so as to record the shortest distance between any two points upon a curved surface. One end of each arm is bent, so as to be available for recording the distance between two opposing points upon the inner aspect of such a hollow chamber as the nose or orbit. The present writer has devised a modification of this instrument whereby a third arm is added to the graduated bar. This arm is placed at zero in the centre of the bar, and is straight, while the two curved arms are both freely movable; thus the relative distances between three points upon the surface of the cranium may be registered—*e.g.* in determining the amount of asymmetry. By the tape, measurements are made of the circumference of the cranium in the horizontal, transverse, and longitudinal directions; though, in order to complete the two latter, it is necessary to resort to the callipers. By the latter instrument the length, breadth, and height of the cranium are determined. Length is technically the glabello-occipital diameter; breadth, for ordinary purposes, is the greatest width; height is the diameter between bregma and basion. The chief interest in the figures thus obtained lies in the comparison of one with the other. It is customary to compare the length with the greatest width. This is done by assuming that the length equals 100, and then representing the width as a percentage. The result is termed an 'index,' the formula for which is $\frac{\text{greatest width} \times 100}{\text{length}}$ = cephalic index. This index affords by far the most important basis for classification of skulls. When the index is low, length greatly predominates over width, giving an elongated or oval skull; on the other hand, when the index is high, the skull tends to be rounded. The current classification of skulls upon this index is the following: *hyperdolichocephalic*, below 70; *dolichocephalic*, from 70–75; *mesaticephalic*, 75–80; *brachycephalic*, from 80–85; *hyperbrachycephalic*, above 85. These divisions are quite arbitrary, and unnecessarily minute. It may serve to indicate the general result of this classification to state that Eskimos, Fuegians, African Negroes, Veddahs, Australian aborigines, Fijians, and certain races of N. Europe are typically dolichocephalic; while aboriginal Americans, Malays, Mongols, Sandwich Islanders, Lapps, Finns, Poles, Tyrolese, etc., provide illustrations of brachycephalic skulls. The mesaticephalic crania are found among Japanese, Chinese, Greeks, French, Germans, Danes, British, etc.

Sometimes height is contrasted with length, and a *vertical index* is calculated on the principle stated above. In this way we get low skulls (*platycephalic*)—*e.g.* Bushmen and aboriginal Australians; moderate skulls (*metriocephalic*)—*e.g.* Scottish, English; high skulls (*acrocephalic*)—*e.g.* Fijians, Loyalty Islanders.

From what has been said, it is clear that there are always two distinct and extreme types of cranium; but any attempt to explain their origin must be largely speculative. It must not be forgotten that the indices merely express relative proportions between two diameters of the cranium, whose function it is to contain and protect the brain. We do not know whether brain growth has an influence on the period of obliteration of sutures; but when a cranial suture obliterates, no further expansion is possible along that particular line, although this may readily be compensated by continued growth along the line of another still unobliterated suture. It is possible that these two conditions react upon each other in producing the different types of cranium.

The Face is of peculiar interest, because it is modified more rapidly than the cranium in the process of evolution. To define its limits is not so simple as it might appear. Popularly, the face includes the forehead, and extends to the tip of the chin; anatomically, the forehead, being part of the cranium, is not included in the face. Sometimes its upper limit is taken above the root of the nose, in order to include the eyebrows; but, as a rule, the root of the nose (frontonasal suture) is the limit. The facial width is calculated between the projecting convexities of the zygomatic arches. A percentage comparison of the length and width gives a *facial index*, according to which high faces are above and low faces are below ninety. The lower jaw, however, is frequently absent from collected skulls, since this bone may be used as an ornament—*e.g.* in New Guinea, where it is used as a bracelet. Accordingly, an upper facial or *maxillary index* is necessary, in which fifty forms the dividing line between high and low faces. Most Europeans have high—*i.e.* narrow—faces; but Mongols, Eskimos, etc., have low or broad faces. The skeleton of the nose varies greatly; and the marked contrast between the Grecian nose and the squat, bridgeless nose of the aboriginal Australian or extinct Tasmanian is chiefly due to a difference in the size of the nasal bones. The nasal spine of the anterior nasal aperture may be well developed, as in Europeans, or feebly, as in the aboriginal Australian, who, in this respect, approximates to the lower animals. When it is feeble, a certain amount of jaw projection (*prognathism*) is always present; and this becomes pronounced when, as in the apes, the nasal spine is absent. The nasal aperture of the skull looks forwards; its downward direction during life is due to cartilages which are absent from the dry skull. The height of the nose is measured from its roof to the anterior nasal spine; the width is taken where greatest. From these data a *nasal index* is calculated, according to which a skull is *leptorhine* (narrow nostrils) below 48—*e.g.* English, Eskimos, etc.; *mesorhine* (medium nostrils) from 48-53—*e.g.* Chinese, etc.; *platyrhine* (broad nostrils) above 53—*e.g.* aboriginal Australian. No European is ever platyrhine, nor any aboriginal Australian ever leptorhine. The *orbit* is the somewhat pyramidal chamber which lodges the eyeball; the height and width of its outlet are compared. These measurements are taken at right angles to each other, the width being calculated from the *dacryon*—a fixed point upon the inner wall—to the most distant point upon the outer edge of the orbit. The width is always greater than the height, and hence $\frac{\text{height} \times 100}{\text{width}} =$ *orbital index*. High orbits (*megaseme*) are above 89—*e.g.* Andamanese, Chinese; moderate orbits (*mesoseme*) from 84-89—*e.g.* English; low orbits (*microseme*) below 84—*e.g.* Bushmen and aboriginal Australians. By various measurements of the hard palate we obtain a *palatal index*, which expresses the relation of width to length. As a rule, the width exceeds the length; but in apes the opposite is the case, and aboriginal Australians approximate to the apes in this respect.

So far the cranium and the face have been considered separately, but they must be compared in order to express the relation of



Anthropology.—Spinal Column and Pelvis.

Figs. I.-IV., *Spinal Curves.*—I. European (male). II. European (female). III. Hottentot—bushman. IV. Orang. (C, cervical; D, dorsal; L, lumbar; S, sacral vertebræ.)

Fig. V., *Lumbo-Sacral Angle.*—L5, fifth lumbar vertebra; S1, first sacral.

Fig. VI., *Inclination of the Brim of the Pelvis and its Axis in the Erect Posture.*—*ab* horizontal line; *cd*, line of inclination of the brim of the true pelvis; *ef*, axis of inferior outlet; *g*, diameter of inferior outlet.

Fig. VII., *Male Pelvis* (*European*).

Fig. VIII., *Female Pelvis* (*European*).—*ab*, antero-posterior or conjugate diameter; *cd*, transverse or widest diameter; *ef*, *gh*, oblique diameter.

face to cranium. The scientific terms indicate the relative projection of the face in front of the cranium. Such animals as the horse, tiger, ape, etc., in which the amount of projection is great, are called *prognathic*. Europeans, in whom the amount of projection is slight, are called *orthognathic;* but the lower races are prognathic. To determine the amount of projection, the distance from the basion to the base of the incisor teeth is multiplied by 100, and the product is divided by the distance from the basion to the root of the nose. The quotient gives the *gnathic index.* Skulls below 98 are *orthognathous*—*e.g.* Europeans, Bushmen; from 98-103, *mesognathous*—*e.g.* Chinese, Japanese, Malays, Maoris; above 103, *prognathous*—*e.g.* Hottentots, Negroes, Kaffirs, aboriginal Australians. Prognathism may be intensified by the lips, incisor teeth, and lower jaw, by the curvature of the skull, and by its attitude upon the spinal column, which is, normally with the axis of vision, horizontal. The facial angle, which only affects the face, and may be determined on the living head as well as on the skull, may also express the amount of prognathism. To obtain this angle, a line is drawn from the external auditory opening either to the subnasal point (*camper*) or to the alveolar point between the two central incisor teeth (*cloquet*). This line is intersected by a face line, drawn from the face margin of the upper lip to the glabella. The facial angle is highest among Europeans, whose skulls are orthognathous, and becomes lower according to the amount of prognathism.

Deformities of the cranium may result from a variety of causes, and the two lateral halves are rarely, if ever, symmetrical. A disease such as hydrocephalus enlarges the skull in all directions. Premature closure of certain sutures may cause abnormal expansion in special directions, producing skulls which are unduly elongated, rounded, or even triangular. Again, certain aboriginal tribes and some civilized peoples cause artificial flattening of the front, back, and sides of the skull by peculiar methods of treating the heads of infants. Lastly, it has been observed that deformity resulting from pressure occurs in skulls which have been softened by burial in water-laden or clay soils.

The SPINAL COLUMN of the infant consists of thirty-three distinct vertebræ. Of these, twenty-four remain separate in the adult, while five fuse to form the sacrum, and four to form the coccyx, or concealed and rudimentary tail. Between the bodies of each pair of distinct vertebræ there is an intervertebral disc of white fibrous tissue having a certain amount of elasticity. In Europeans the vertebræ present certain definite characters; but occasionally structural variations occur, suggesting conditions characteristic of lower animals. Such variations are much more common among the lower human races. During life the adult vertebral column of man presents three well-marked curves—*viz.* cervical, dorsal, and lumbar, of which the cervical and lumbar have their convexity, while the dorsal curve has its concavity, forwards. These curves are directly associated with man's bipedal gait and his erect attitude, in which the weight of the head requires to be poised upon the summit of the vertebral column. The curves are therefore most distinct in civilized man, but the difference between him and primitive man is only one of degree. Quadrupeds do not possess these curves, and the anthropoid apes show them only to a modified extent. At the time of birth the spinal curves of the human infant are quadrupedal, but with the acquisition of the erect attitude the curves change gradually into those which are characteristic of the adult civilized man.

The SACRUM is very wide in relation to its length, and the percentage proportion between these measurements is expressed by a *sacral index.* Width predominates in white races, but among many black races the length is the greater—the normal condition in lower animals.

The PELVIS, or basin, consists of the sacrum and the two haunch bones articulated together. It ranks next to the skull in anthropological importance, and possesses peculiar interest both because of modifications due to the erect attitude and because of sex characters associated with its obstetrical functions. Compared with that of animals, the human pelvis presents great breadth and shallowness, while the capacity of what is called the 'true pelvis' is also great. The pelves of the various human races present certain differences, the most important of which have relation to the antero-posterior and transverse diameters of the inlet or brim of the true pelvis. The percentage relation between these two diameters provides the *pelvic* or *brim index.* In classifying the indices, it is necessary to group the pelves of the two sexes separately; the male pelvis is the more important for comparison. According to Turner, pelves whose index is below 90 are *platypellic*—*e.g.* European; 90-95, *mesatipellic*—*e.g.* Negroes; above 95, *dolichopellic*—*e.g.* aboriginal Australians, Andamanese, orang-outang (126), chimpanzee (133), gorilla (144). In this respect dolichopellic races closely approximate to the lower animals. Among Europeans both sexes are platypellic. Increased width is a feature of all female pelves, and Turner knows no race in which the females have dolichopellic pelves.

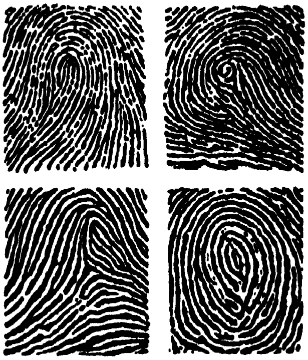
The LOWER LIMB consists of the *haunch;* a *shaft,* divisible into thigh (of which the femur forms the skeleton) and leg (containing the tibia and fibula); and the *foot.* This limb is used for support and locomotion; only to a very slight extent can the foot be used for grasping. The femur presents many distinctive human characters directly associated with the erect attitude. Before birth this bone closely resembles the femur of the anthropoid ape. Its proportions and general characters in the adult have intimate relation with the stature, attitude, muscularity, and habits of the individual; it may also be used in determining sex. The maximum diameter of its head, as well as that of its lower or condylar end, are found with callipers. In the upper and middle thirds of its shaft the antero-posterior and transverse diameters are taken at fixed points. In the upper section the percentage comparison between the two diameters yields a *platymeric index,* and in the middle section we obtain a *pilastric index.* Each of these gives interesting results which bear upon attitude and habits. The total length of the femur, as of any long bone, is obtained by using an osteometric board, of which there are several varieties. Among Europeans its length is about 18 in. in males, and 17 in. in females. The two femurs of the same person are very rarely of equal length. In relation to the total stature of the individual the femur equals about ·275. Of the bones of the leg, the fibula, or outer bone, possesses no special interest; but the tibia, or shin bone, is important. Its upper or knee joint end may present its articular surfaces looking upwards or considerably bent backwards. The latter condition, which is called retroversion, is usually associated with considerable lateral compression of the shaft, whereby its antero-posterior diameter greatly exceeds its width. The amount of this flattening (*platyknemia*) is calculated at the middle of the shaft by $\frac{\text{tibial length} \times 100}{\text{antero-posterior diameter}}$ = platyknemic index. The total length of the tibia, which does not include the spine at its upper end, is measured as in the femur. It is believed that squatting—*i.e.* sitting on the heels—influences not only the extent of the articular surfaces at the upper and lower ends of the femur, but that retroversion of the tibial head, platyknemia of its shaft, and extension of its inferior articular surface to the front of the bone, are due to the same cause. Similar appearances are found in the new-born infant, but these usually disappear unless fixed by the squatting attitude. From the fact that the bones of prehistoric man presented similar conditions, many investigators believe that he could not walk erect, but assumed the posture of the anthropoid apes.

The human femur is always longer than the tibia, but the proportions vary; the relationship is expressed by $\frac{\text{tibial length} \times 100}{\text{femoral length}}=$ tibio-femoral index. In Europeans this index is about 81; aboriginal Australians, 83; Tasmanians, 85; Bushmen, 86. All above 83 are *dolichoknemic*—*i.e.* the proportion of leg to thigh is greater than in Europeans; all below 83 are *brachyknemic.* It is seldom that the two lower limbs are of equal length, but taken together, the femur and tibia are used for determining the stature. Of several methods, the simplest is: length of tibia + length of femur × 2, and 1 in. added for soft parts. Up to ten years of age the rate of growth is greater in the male than in the female; from ten to fourteen years the female is the taller; after fourteen the male again predominates. The maximum height is reached about the thirty-fifth year; and as ossification is completed about the twenty-sixth year, the additional height is believed to be gained by an increase in the intervertebral discs. The peoples of the world present great differences in height. Among Andamanese the mean height is below 5 ft., and among Bushmen, Lapps, Eskimos, and Veddahs the average is also below 5 ft. (1·4 to 1·5 m.). The Akka of equatorial Africa, in whom the height of both males and females is below 4 ft., are the most dwarfed; but among the more northern tribes the height is greater, through intermarriage with negroes.

The UPPER LIMB is primarily adapted for grasping (prehension), and in a minor degree for support and locomotion. The *clavicle,* or collar bone, merely presents variations in length and thickness, due to stature and muscularity. The *scapula,* or shoulder blade, is platelike and triangular. Its anatomical features are believed to be considerably modified by muscularity, depending upon habits and occupation. In man (unlike quadrupeds) the length exceeds the width. Length is reckoned from the upper to the lower angles of the bone, and width from the middle of the outer border of the glenoid fossa to the vertebral border at the root of its spine. From these data, $\frac{\text{width} \times 100}{\text{length}}=$ scapular index. Among Europeans the mean index is 65·3, but is higher in infants than in adults. The index varies from 62·6 in Lapps, and 64·9 in aboriginal Australians, to 70·2 among Andamanese. It is doubtful whether it possesses much value as a race character. The *humerus,* or upper arm bone, is a typical long bone. The maximum diameter of its head possesses a certain amount of value as a sex character. A small hooklike projection on its shaft—supracondyloid process—is occasionally found, representing a portion of bone which encloses a foramen in many animals. Sometimes the olecranon fossa is perforated—a condition which was of frequent occurrence in prehistoric bones. The *radius* and *ulna*—the outer and inner bones of the fore arm—are not in themselves of great interest. For some time, however, it has been recognized that there are variations in the relative lengths of upper arm and fore arm. In expressing this relationship, the length of the humerus is compared with that of the radius, and thus $\frac{\text{length of radius} \times 100}{\text{length of humerus}}=$ radio-humeral index. A high index, therefore, indicates a long fore arm in relation to the upper arm, and *vice versâ.* The Lapps and the Eskimos, who have the shortest fore arms, have an index about 71; Europeans, 74; aboriginal Australians, 77; Negroes, 79; Andamanese, 81; the chimpanzee, 90; and the gorilla, 100. This index is higher in the infant than in the adult.

Indices are also employed to represent the relative length of the humerus and femur, the latter being taken as 100. This is called the *femoro-humeral index.* Further, the combined length of the humerus and radius is compared with that of the femur and tibia, by regarding the latter as equal to 100. In this manner an *intermembral index* is obtained, which, when it is above 100, indicates that the shaft of the upper limb is longer than that of the lower limb, as in the orang.

The fullest exposition of these details is known as *Bertillonage,* from M. Bertillon, who aims at establishing the identity of individuals by careful tabulation and classification of the data obtained by measurements. For this purpose actual measurements, and not indices, are employed—*e.g.* standing height; sitting height; span of arms; length and breadth of ear, of nose; length of fore arm and hand, of foot, of fingers, etc. The colour of the eyes—*i.e.* of the iris—and the nature and direction of the opening between the eyelids are also observed and noted. Similar attention is paid to the colour of the skin (whether black, brown, yellow, copper coloured, fair white, or dark white), and to marks upon it, such as tattooing, or scars resulting from wounds. The natural structure of the skin, as seen in the palm of the hand and sole of the foot, where it shows fine alternating ridges and furrows, has led to elaborate methods of recording, classifying, and interpreting the finger-print patterns which may be obtained from the palmar surface of the terminal phalanges of the digits. Lastly, the hair is studied in regard to its colour, and the shape which it presents on section. Among Europeans it is circular, in transverse section; among aboriginal Australians, ovoid; among Hottentots, laterally compressed; among Papuans, kidney-shaped. Huxley classified mankind as *leiotrichi* (smooth-haired) and *ulotrichi* (crisp or woolly haired). See the art. MAN; and Turner, in *Challenger Reports,* and papers in *Jour. of Anat. and Phys.*; Tylor's *Anthropology* (1881); Deniker's *The Races of Men* (1900); Galton's *Finger Prints* (1893); Bertillon's *Identification Anthropométrique* (2nd ed. 1893); Henry's *Classification and Uses of Finger-Prints* (1900); Hepburn, papers in *Jour. of Anat.*; and *Proc. Ed. Roy. Soc.*



Specimens of Finger Prints (enlarged).

Anthropometric Survey of Scotland. In Scotland, the pioneer of anthropometry is Dr. John Beddoe, who published, in 1885, *The Races of Britain,* a work giving detailed measurements of fifty-five Highlanders and a few Lowland Scotsmen. In 1893, Captain J. F. M'Pherson published some interesting statistics on the stature of the men of Roxburgh and Selkirkshire, in the *Transactions* of the Berwickshire Naturalists' Club. Messrs. John Gray and J. F. Tocher carried out an anthropometric survey of the population of East Aberdeenshire as represented at the Buchan gathering in 1895, and in 1896 made a survey of the colour characteristics of the whole of the school children (14,500) of East Aberdeenshire. In 1896, Rev. Dr. Walter Gregor measured 116 persons belonging to the district of Galloway; and recently, Professor R. W. Reid, Aberdeen University, surveyed the whole of the Aberdeen police force, and made a number of anthropometric observations on the students attending his classes at the university. In 1902, Professor Sir William Turner read a paper before the Royal Society of Edinburgh, giving an account of his anthropometric investigations on the crania of the people of the south of Scotland. Dr. Thomas H. Bryce has made extensive investigations on the remains of the prehistoric inhabitants of the island of Arran (B.A. Report, 1901, and J.A.I., xxxii.). Messrs. J. Gray and J. F. Tocher have extended their surveys to West Aberdeenshire and to the fishing population of the east coast of Scotland. Their memoirs may be found in the *Transactions* of the Buchan Field Club, B.A. Reports, and the Jour. Anthrop. Institute. A survey, having for its purpose the determination of the distribution of the hair and eye colours of the school children of Scotland, is at present being carried out by them. Dr. John M'Pherson is engaged in organizing an anthropometric survey of the inmates of the lunatic asylums of Scotland.

	Highlanders. Dr. Beddoe.	Aberdonians and East Coast. Gray and Tocher.	Men of Galloway. Dr. Gregor.	Professor R. W. Reid, Sir William Turner, and Dr. Bryce.
Mean stature ..	....	1,740 mm.	1,733 mm.	**Results not yet published.**
Head form — mean length..	200 mm.	197 ,,	....	
Head form — mean breadth.	152 ,,	155 ,,	....	
Mean cephalic index	76·2	78·6	77·4	
Mean colour values :—	Edinburgh			
Hair—Red ..	6·7 per cent.	5·7 ,,	7·5 ,,	
Fair ..	17·5 ,,	9·5 ,,	20·0 ,,	
Med...	37·2 ,,	64·1 ,,	39·2 ,,	
Dark..	32·4 ,,	20·7 ,,	29·4 ,,	
Black..	5·7 ,,	....	3·8 ,,	
Eyes—Light..	58·2 ,,	25·4 ,,	48·0 ,,	
Med...	13·7 ,,	48·6 ,,	41·5 ,,	
Dark..	27·6 ,,	26·0 ,,	10·5 ,,	

Anthropomorphism (Gr. 'in the form of man'), usually defined as the ascription to the Deity of qualities which properly belong to human beings, really denotes a more generic tendency to represent all things under conceptions derived from man's personal experience. Thus the child instinctively attributes feelings like its own to inanimate objects, and it is never possible entirely to banish this element from our thought. Many of our most important conceptions are, in varying degrees, transcripts of the nature of the self, and therefore anthropomorphic. The anthropomorphism which science and philosophy have to avoid arises from the mind's imposing its own nature upon things, not in the way which is essential to cognition, but in ways that are arbitrary and unintelligent. But anthropomorphism is most prominently exemplified in religious thought. It is impossible for the religious mind to formulate the relations between God and man save by attributing to Him a nature akin to its own. Still, there have been sects in the Christian Church whose doctrine of God has assumed forms so anthropomorphic as to threaten the purity of the faith. It is impossible to forget that the attraction of Christianity for man, and its power over his heart, is largely due to its setting forth the Divine so livingly in terms of the human. And those who put forward various reasons for denying altogether the legitimacy of such forms of thought have to answer the question whether science is not as anthropomorphic in construing the universe logically and rationally as religion is in construing it morally and spiritually. In both cases it is a reasonable position that anthropomorphism is forced on us by fidelity to the facts.

Anthropophagi. See CANNIBALISM.

Anthropopithecus. See CHIMPANZEE.

Anthurium, a large genus of tropical American plants, belonging to the arum order. A kind grown in greenhouses in Britain has a deep crimson inflorescence.

Antibes (anc. *Antipolis*), fort. tn. and health resort of France, 12 m. s.w. of Nice, in the French Riviera. The harbour is deep and easy of access. Oranges and olives are cultivated, and there are tobacco factories. Pop. (1901) 10,947.

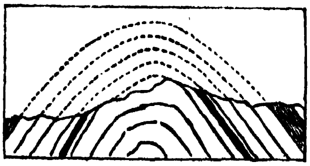
Anti-Burghers, Scottish secessionists who, in 1747, condemned the 'burgess oath,' and adopted the name General Associate Synod. See PRESBYTERIAN CHURCH.

Antichlor, a name given by bleachers and papermakers to any substance used to neutralize small quantities of free chlorine which the cloth or paper retains. If not removed, the chlorine would act injuriously on the fabric, destroy the dyes, and damage the machinery. In paper it would bleach the inks used in printing or writing, and in time destroy the fibres. Thiosulphate of soda (hyposulphite) and sulphite of soda are the principal antichlors. The presence of free chlorine is indicated by a very simple test. A quantity of any ordinary starch is boiled in water, and a few crystals of potassium iodide added. When the solution is cold, a few drops of it on the fabric or paper pulp containing chlorine is at once turned blue. The antichlor is then added to the bulk of the pulp until the test produces no blue colour.

Antichrist. In the New Testament the word occurs only in the Epistles of John (1 John 2:18, 22; 4:3; 2 John ver. 7). It may mean either a false claimant to the Messiahship or an antagonist to the true Messiah. Of the former aspect of the personage or personages denoted by the name, we have illustrations in the discourses of Jesus—'false prophets,' 'false Christs' (Matt. 7:15; 24:11, 24; Mark 13:22; Luke 21:8); while the Johannine passages noted above furnish examples of the latter. In 2 Thess. 2:2-12 Paul amalgamates the two in the figure of the 'man of sin,' the lawless one, who, meanwhile mysteriously held in check, will be at length fully revealed as the blasphemer and adversary of God; only, however, to be finally overthrown at Christ's second coming. Next we have the antagonistic powers of the Book of Revelation: the beast that rises from the abyss and wars successfully against the two witnesses, ch. 11; the dragon of ch. 12; and the two beasts of ch. 13, one of which blasphemes God, while the other bears the character of a false prophet, and deceives men by his miracles. It is not easy to frame from these data a consistent figure of antichrist. In the view of the early eschatologists, the antichrist is a definite personality, a Jewish pretender to the Messiahship who is to appear towards the end of the world, rebuild Jerusalem and establish himself there, and, performing great signs and wonders, gain the allegiance of the world. The two witnesses who withstand him are Enoch and Elijah, who convert some from their delusion; but at length, the true Messiah having come to the rescue of the faithful, the forces of antichrist are shattered and himself slain. With this as our starting-point, we may endeavour (1) to find a fulfilment of the prophecy regarding antichrist. The Westminster Confession of Faith, for instance, and indeed most of the reformers, identify him with the Pope; others, again, regard Mohammed as antichrist. But whatever points of resemblance may exist between the mysterious personality of Scripture and these or other individuals, the whole method of interpretation is preposterous and unwarranted. (2.) It is a more promising mode of inquiry to seek to trace the elements of the figure of antichrist which may have been suggested by the adverse experiences of the early Christian Church. Paul's teaching regarding the 'man of sin' was doubtless influenced by the bitter opposition which his preaching evoked among the Jews; while it was natural enough that the cruelties wreaked upon the Christians by the persecuting emperors Caligula and Nero should seem to exalt these men to the unholy eminence of being incarnations of the unseen powers that defy God. (3.) Finally, we may not unprofitably seek for some ancient tradition which, with gradual transformations and accretions, at length developed to the idea of the potent adversary of all that was divine—an earthly representative of Satan, as Christ was of God. Now, as a matter of fact, we find in Jewish tradition the sinister figure of such an adversary, traceable, as some think, even to the Tiamat of Babylonian mythology, and embracing such opponents to the divine purposes as Gog (Ezek. 38 *f.*; *cf.* Rev. 20:8), the beasts of Dan. 7, Belial or Beliar (2 Cor. 6:15), and Satan himself. Here we seem to find the key to the problem of antichrist. See Alford's *2 Thess.* for a very exhaustive list of identifications; also Bousset's *Der Antichrist* (Eng. trans. 1896).

Anticlimax, a rhetorical figure in which the expressions, after rising in intensity, suddenly fall to a lower level—*e.g.* 'For the cause of liberty we would sacrifice everything, including even our wife's relatives' (*Artemus Ward*).

Anticline. The rocks of the earth's crust lie, as a rule, in folds or undulations; and when a series of beds has been so folded as to form a crest or arch, they are said to lie in an anticline. In most cases the crest has been planed away by denudation, and the configuration of the surface has little or no relation to the folding of the beds beneath. In such a denuded anticline we have on each side of the central line a series of beds which dip in opposite directions, and away from the centre. Traced outward from that line, the beds will be found to follow in the same order on each side—the lowest bed being that which occupies the central position, while the others follow in ascending order as we pass outward. Such an anticline may be very small, say 100 yards across, or it may cover half the breadth of a continent. In mountain chains it is usual to find a great number of anticlines running side by side almost parallel. See Mountains.



Anticline, denuded (diagrammatic section).

Anti-Corn Law League, formed in 1838-9, with headquarters at Manchester, to effect the repeal of the corn laws in Britain, was led by Cobden, Bright, Villiers, Joseph Hume, and Roebuck. With meetings, oratory, a paper (the *League*), organization, and agitation, it was an aggressive and effective body. Its objects having been achieved in the royal assent given to the repeal (1846-9) of the corn laws, the league was dissolved by its promoters. See Corn Laws.

Anti-corrosives, the materials employed to hinder the rusting or solution of iron structures that are exposed to air or water. They differ in nature according to the circumstances—such as, whether the iron is to be exposed to hot or cold, or to fresh or salt water; and may be divided into two classes, according to whether they act as mere protectives, or whether they act galvanically—*i.e.* transferring the corrosion to a mere electropositive metal attached to the iron. The practice of dipping water-pipes into a hot tarry composition, or of coating iron with a layer of its magnetic oxide, as in the Bower-Barff process, are examples of the first class; while galvanizing—*i.e.* coating iron with zinc, or the fixing of masses of zinc in boilers—exemplifies the second.

Anticosti, a cigar-shaped island in the Gulf of St. Lawrence, Canada, which it divides into two channels, is about 140 m. long, and 35 m. wide at its broadest part. It is low-lying and sterile. The fisheries are good, but not much frequented, and there are few settlers. In 1896 it was purchased as a game preserve by M. Menier of chocolate fame.

Anticyclone, an area of high barometric pressure surrounded by nearly circular isobars. The barometer is highest in the centre, and gradually falls as it proceeds outwards. The air in the centre is calm, cold in winter and warm in summer; while the winds blow spirally outwards round the centre, in the direction of the hands of a watch in the northern, and in the opposite way in the southern hemisphere. Radiation is a marked feature of anticyclonic weather, the sky being usually blue, the air dry, and cold in the shade but hot in the sun, and hazy, with heavy dew or hoar frost at night.

Anticyra, or Anticirrha, the name of two towns of ancient Greece—one in Phocis, on a bay of the Gulf of Corinth; the other in Thessaly, on the Spercheus R., near the sea. Both were famous for the production of hellebore, the specific remedy in antiquity for madness.

Antidiphtheritic Serum. See Serum-Therapy.

Antidote, any substance which prevents or counteracts the effects of poison. Some antidotes form with the poison insoluble or harmless compounds—*e.g.* chalk forms with oxalic acid an insoluble, and therefore innocuous, oxalate of lime. Vegetable poisons cannot thus be counteracted. If an alkaloid has been taken, we must rely on the stomach pump or tube, on emetics, and on the administration of the physiological antagonist of the poison—*e.g.* chloral hydrate in strychnine poisoning. Atropine is an antidote to morphine, physostigmine to atropine. See Poisons.

Antietam, riv., rising in Alleghany Mts., Pennsylvania, U.S.A., and flowing s. into the Potomac R. near Sharpsburg. Here, in Sept. 1862, a stubborn battle was fought between the Federals under M'Clellan and the Confederates under Lee; the former were victorious.

Antifebrin, the trade name for acetanilide or phenyl-acetamide, $C_6H_5NHCOCH_3$, prepared by boiling aniline with glacial acetic acid. It is a colourless crystalline solid, slightly soluble in water, and with a pungent taste. Used in medicine, in 3 to 10 grain doses, as an antipyretic and analgesic, in place of quinine, though it should not be taken except under medical advice.

Anti-fouling Compositions, substances for application to the under-water parts of ships to prevent the adherence of seaweeds, barnacles, etc. They act on the principle of providing a coating that will either give way when the plant or animal attains any considerable size, or that contains an ingredient inimical to life. With wooden ships, copper or Muntz metal sheathing is quite effective, acting chiefly, but not wholly, on the second principle; but with the introduction of iron ships, the destructive galvanic action between the two metals rendered such a protection impossible without the interposition of a costly wooden sheathing. Slow-moving iron sailing-ships can be treated with a greasy composition of the first class; but as this would be washed off steamships, a coating of the poisonous variety only can be applied. Many such paints, of various degrees of efficiency, have been patented, the most effective being those which contain insoluble mercury compounds, such as the cyanide or oxide, which are slowly given off from the vehicle enclosing them.

Antigalactic, or Antigalactagogue, any means whereby the secretion of milk is checked—*e.g.* belladonna, or its active principle, atropine.

Antigo, co. tn. of Langlade, co. Wisconsin, U.S.A., 205 m. N.W. of Milwaukee. Pop. (1900) 5,145.

Antigone, daughter of Œdipus by his mother Jocasta. Antigone is represented as a maiden of noble and unselfish character. Her devotion to her father led her to accompany him when exiled from Thebes, and her affection for her brother Polynices gave her courage to defy the prohibition of Creon, then ruler of Thebes, which forbade the honouring of Polynices' corpse with the rites of burial. For the latter offence she was buried alive. It is particularly in Sophocles's play, called by her name, that her character is developed; but she appears also in his *Œdipus Coloneus*, in the *Seven against Thebes* of Æschylus, and in the *Phœnissæ* of Euripides, who wrote an *Antigone* himself, of which only a few fragments remain. The Latin poet Statius treated the subject in his *Thebaid*, and the Italian dramatist Alfieri also composed an *Antigone*. See Sophocles.

Antigonus. (1.) One of the generals (381-301 B.C.) of Alexander the Great of Macedonia, after whose death he became ruler of Greater Phrygia, Lycia, and Pamphylia. Aspiring to the sovereignty of Asia, he defeated and killed Eumenes (316 B.C.), and for several years waged war with Seleucus, Ptolemy, Cassander, and Lysimachus. After defeating Ptolemy's fleet (306), he took the title of king. Finally, he was defeated by Lysimachus at Ipsus, in Phrygia (301), and fell in the battle. (2.) Surnamed Gonatas, son of Demetrius Poliorcetes, and grandson of (1); assumed the title of King of Macedonia in 283 B.C. Pyrrhus of Epirus drove him out of his kingdom in 273, but he regained it the next year. He died in 239. (3.) Surnamed Doson ('about to give'), as he was lavish in promises, but slow to perform; son of Demetrius of Cyrene, and grandson of Demetrius Poliorcetes. On the death of Demetrius II. of Macedonia he married his widow, and became king. He defeated Cleomenes of Sparta at Sellasia, and took Sparta (221). He died in 220.

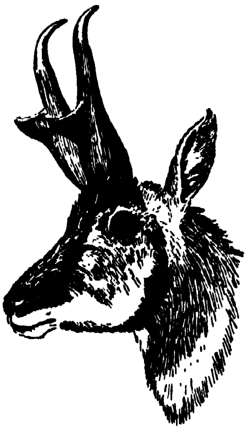
Antigua. (1.) British isl. (108 sq. m.), one of the Leeward group, W. Indies; presidency and seat of government; Barbuda and Redonda are dependencies. Cap. St. John; pop. (1901) 9,262. The island exports sugar, pine-apples, etc. Pop. (1901) 34,971. (2.) Town, Guatemala, Central America, between the volcanoes Fuego and Aqua. Pop. 14,000.

Anti-incrustators. See Boiler Compositions.

Antilegomena (Gr. 'things spoken against'), a term applied by Eusebius to 2 Peter, James, Jude, Hebrews, 2 and 3 John, and Revelation, which were not at first admitted into the canon; called by the Roman Catholics *Deuterocanonical*.

Anti-Libanus. See Lebanon.

Antilles. See West Indies.



Head of Antilocapra or Prongbuck.

Antilocapra, or Prongbuck, an interesting N. American ruminant, sometimes placed among the antelopes, from which it differs in having branched horns which are periodically cast off and renewed, while the antelopes, like all the Bovidæ, have simple horns which do not fall off. The prongbuck is a graceful animal, about three feet in height.

Antilochus, one of the heroes of the Trojan war, son of Nestor and friend of Achilles, renowned for beauty and bravery; fell in battle while trying to save the life of his father, but was revenged by Achilles. The ashes of the three friends, Antilochus, Achilles, and Patroclus, were placed in the same grave near the Hellespont.

Antimachus, the Colophonian, a Greek poet who flourished during the latter period of the Peloponnesian war. His works, of which the chief were *Thebais*, an epic, and *Lyde*, an elegy, exist now only in fragments. Quintilian placed him first after Homer. The fragments have been collected by Schellenberg (1786), and Stoll (1845); the *Thebais* is found in Düntzer's *Die Fragmente der Epischen Poesie der Griechen* (1840-2), and Bergk's *Poetæ Lyrici Græci* (1843).

Antimony, Sb, 120·2, rarely occurs native, but chiefly as stibnite, antimony sulphide, Sb_2S_3. It is, however, not profitable to smelt ore which contains less than half its weight of the metal. The operation is carried out in a furnace which contains twenty plumbago crucibles capable of holding 40 lbs. of metal each. The ground ore, mixed with one-tenth of its weight of salt, is placed in the crucibles, and scrap iron added. In this way sulphide of iron and metallic antimony are obtained. The contents of the crucibles are poured into moulds and allowed to cool, the antimony readily separating from the iron sulphide. This metal contains 90 to 95 per cent. of antimony, and is twice remelted to obtain the purer 'star antimony.' The purity of the metal is judged by a characteristic fern leaf or star pattern on its surface. The world's annual production is about 3,000 tons, most of which has, up to the present, been smelted in England. The price fluctuates greatly; £35 to £40 a ton is its average value. Antimony is a bluish-white, brittle crystalline metal, and possibly also exists in an allotropic form which is amorphous and explosive. Sp. gr. 6·7. It is not acted on by air at the ordinary temperature, but when heated it burns brilliantly, forming the oxide. It melts at 450° C. It is a poor conductor of heat and electricity, is oxidized by strong nitric acid, but is not acted on by dilute sulphuric or hydrochloric acids. Antimony expands on solidifying, and imparts this property to its alloys, such as type-metal; hence its value in making fine and sharp castings. Other important alloys are Britannia metal and antifriction metal.

The principal compounds of antimony are the sulphides, chloride, and tartar emetic. The black sulphide, Sb_2S_3, as found native or prepared by fusion, is a shining crystalline solid, used in the preparation of matches and percussion caps, and in pyrotechny.

The orange sulphide, which is prepared by precipitation of a salt of antimony by hydrogen sulphide, is of the same composition; while kermes mineral also contains oxide and alkali. The golden sulphide is the pentasulphide; while antimony cinnabar, used as a paint, is an oxysulphide. Antimony trichloride, or 'butter of antimony,' is a caustic deliquescent solid, used for 'browning' gun-barrels; and tartar emetic is a potassium antimonyl tartrate, prepared by heating cream of tartar with antimonious oxide. Tartar emetic is, like other antimony compounds, used in medicine, and is a cardiac depressant, a powerful emetic, and deadly irritant poison. Tartar emetic is also used as a mordant in dyeing.

Antinomianism, the constantly recurring tendency among Christian mystics to realize so fully the higher possibilities of spiritual experience, that they lose hold of the sane and necessary conventions of social morality. The opposite tendency is sometimes called 'legalism.'

Antinomy, a Kantian term to denote an apparent conflict of reason with itself: *e.g.* it may be argued with apparently equal truth both that the universe is infinitely extended in space and that it has spatial limits.

Antinori, MARCHESE ORAZIO (1811-82), Italian traveller and scientist, who explored the region of the Upper Nile in 1860-1; the north of Abyssinia in 1868; and in 1876 Shoa, where he died.

Antinous, page and favourite of the Emperor Hadrian, who was greatly attracted by his wonderful but melancholy beauty, and made him his constant companion. When Antinous was drowned in the Nile (120 A.D.), the emperor perpetuated his memory by numerous statues and bas-reliefs, caused him to be deified, erected a temple in his honour, and having rebuilt the city of Besa near to the scene of his favourite's death, called it Antinoöpolis.

Antioch. (1.) Town of Syria, on the Orontes R., first the Syrian and afterwards the Roman capital; a great city of Bible times, ranking in importance next after Rome and Alexandria. Built by Seleucus Nicator about 300 B.C., and named by him after his father, it became notorious for its wealth and luxury, and for the turbulence of its inhabitants. There the name 'Christian' was first used (Acts 11:26). It was the centre whence missionaries were sent to the Gentiles. (See Acts 13:1; 15:22-25; Gal. 2:11, 12.) Chosroës, king of Persia, destroyed it in 538; but it was rebuilt by Justinian, and called by him Theupolis. Its importance declined on its capture by the Saracens in 658, but in the time of Chrysostom it is reputed to have had a population of 200.000. From 1098 to 1268 it was the capital of a Christian principality. After a gradual decline it was almost destroyed by an earthquake in 1872, but has since recovered, and has now a population of 26,000 (Mohammedans, Greeks, and Armenians). There are warm springs in the vicinity, and the town has a trade in silk and other local products. (2.) Town in Pisidia, visited by Paul and Barnabas (Acts 13:14). They were driven out by the Jews, but afterwards returned (Acts 14:21). See '*Résumé chronologique de l'Histoire des Princes d'Antioch*' in *Revue de l'Orient Latin*, vol. v. (1896); Benni's *Tradition of the Syriac Church of Antioch* (1871).

Antiochus, the name borne by most of the kings of Syria belonging to the family of Seleucus, who founded the dynasty; hence called that of the Seleucidæ. Two of the name demand particular attention. (1.) ANTIOCHUS THE GREAT (reigned 223-187 B.C.), in the early part of his reign, carried on unsuccessful war, first with Egypt, then with Parthia and Bactria. In 198 he conquered Palestine and Cœle-Syria, and afterwards became involved in war with the Romans. Hannibal, after his defeat at Zama, took refuge at his court, and urged him to invade Italy; but he did not take the advice. In 192 he crossed into Greece, and the next year was defeated by the Romans at Thermopylæ, and forced to return into Asia. In 190 he was again defeated near Magnesia, in Asia Minor, and obtained peace in 188 on condition of ceding all his possessions east of Mt. Taurus and paying a heavy indemnity. In trying to extract money for this purpose from a rich temple in Elymais, he was murdered by the people of the place in 187. (2.) ANTIOCHUS EPIPHANES, son of Antiochus the Great, King of Syria (175-164 B.C.). From 171-168 B.C. he waged war with success against Egypt. He is notorious for his oppression of the Jews and their religion. In 170, and again in 168, he took Jerusalem, and endeavoured to suppress the worship of Jehovah, probably introducing instead the worship of himself. But the Jews revolted, under Mattathias and his sons the Maccabees, and defeated Lysias, the general of Antiochus. He soon afterwards died in madness, which both Jews and Greeks attributed to his sacrilege, and he was nicknamed *Epimanes*, 'maniac,' instead of *Epiphanes*. For both the above, see the *Books of the Maccabees* in the Apocrypha, and Bevan's *House of Seleucus* (1902).

Antioquia, a dep. of Colombia, occupied by branches of the Central Cordillera and of the Cordillera of Citara. The soil is poor. Gold is abundant in the Porce valley; and platinum, iron, galena, cinnabar, coal, and rock salt are found at other places. The N. part is almost exclusively a mining region; Medellin is the centre of a mining and commercial district. Besides minerals, leather, coffee, india-rubber, and Panama hats are exported. Area, 22,316 sq. m. Pop. 500,000. The town, on the l. bk. of the Cauca, is the seat of a bishop, and has a fine cathedral. Alt. 1,880 ft. Pop. about 10,000.

Antiparallel. If, in a triangle ABC, a line is drawn cutting AB in F, and AC in E, so that the angle AEF is equal to the angle ABC, FE is said to be *antiparallel* to BC with respect to the angle A.

Antiparos. See PAROS.

Antipater (d. 319 B.C.), a most distinguished general in the time of Alexander the Great and Philip of Macedon; appointed by the latter, on his invasion of Asia, regent of Macedonia. In 331 B.C. he defeated the Spartans under Agis, and a coalition of the Greek states at Crannon (322), though he was at first (323) defeated by Leosthenes and besieged in Lamia. He used his victory with moderation, though his demand for the surrender of Demosthenes caused the latter's death, as he took poison to avoid capture.

Antipatharia, or BLACK CORALS, a group of Actinozoa, with horny skeleton. The individual polypes have tentacles in multiples of six.

Antipathy. See DISGUST.

Antipatris (Acts 23:31), a city on the edge of the Sharon plain, on the main road from Jerusalem to Cæsarea; named after Antipater, father of Herod the Great. Now the ruined mound at Râs el-Ain.

Antiperiodics, drugs used in the treatment of those diseases (fevers) in which the active symptoms are periodic—*e.g.* ague. Quinine, given either as a prophylactic or as a cure, is the best known; the other alkaloids of cinchona, salicylic acid with its alkaloids, and arsenic, are also used.

Antiphanes (408-334 B.C.), the most famous of the Middle Attic comedians; his plays number over 260. Extant fragments have been collected by Kock in *Comicorum Atticorum Fragmenta* (1884), and by Meineke (1839-57).

Antiphilus OF EGYPT, a painter of the 4th century B.C., pupil of Ctesidemus, is ranked by ancient critics next to Apelles and Protogenes. He painted portraits of Philip and Alexander of Macedon, and Ptolemy, son of Lagos.

Antiphlogistics, remedies against inflammation, including drugs, low diet, local applications, and blood-letting.

Antiphon (480-411 B.C.), Attic orator and teacher of rhetoric, who wrote speeches for others to deliver in the law courts. The fifteen speeches which have come down to us show a rhetorical style less developed than that of the later orators. He played an important part in the overthrow of the democracy, but after the fall of the Four Hundred (411 B.C.) was condemned to death. See ed. of the text by Blass (Ger., 1881); Jebb's *Attic Orators* (1876).

Antiphony, a piece of sacred music sung in alternate parts replying to each other. Antiphonal singing has been practised from the earliest times in the Hebrew Church, and many of the Psalms show that they were intended to be sung in this manner. In the Christian Church it has been in use since the 1st century. See Anthem and Motett.

Antipodes. (1.) The name given to those inhabitants of the earth who are diametrically opposite to each other—*i.e.* feet to feet. (2.) Islands, a group of uninhabited rocky islets, belonging to New Zealand, in the S. Pacific, about 475 m. S.E. of Stewart I.; the nearest land to the antipodes of Greenwich.

Antipope. See Papacy.

Antipyretics are agents which lower temperature in fevers. They act far more readily on the abnormal than on the normal temperature, and they work either by increasing the constant normal loss of heat, or by lessening its production, or, indirectly, by removing the cause of abnormal production. Cold baths are most rapid and powerful antipyretics; but in using them it is essential to remember that the temperature is likely to continue dropping after the bath is stopped, that a subnormal temperature must be avoided, and that, therefore, the bath must cease before the normal temperature is reached. The hot bath is also antipyretic, so is the wet pack; and such drugs as antimony, ipecacuanha, and jaborandi are antipyretic by inducing perspiration. Alcohol is antipyretic by dilatation of the superficial blood-vessels, thus cooling the blood at the body surface; also by lessening heat production, presumably through diminishing oxidation within the body. Quinine, antipyrin, phenacetin, and other similar preparations, are widely used. An aperient draught will very often lower temperature indirectly, by removing a toxin or other irritant.

Antipyrin, or Phenazone, $C_{11}H_{12}N_2O$, a synthetical drug, is a white, crystalline, inodorous solid with a bitter taste. It is chiefly used in medicine as an antipyretic and analgesic, and is now largely used in place of quinine. It gives relief in neuralgia, headache, toothache, etc., and is said to decrease the excretion of sugar in diabetes. In sea sickness it has been administered with success. It should only be taken on the advice of a medical man.

Antiquarian Society of U.S.A., founded in 1812, headquarters at Worcester, Mass., has published *Proceedings* since 1849.

Antiquaries, Society of, London, was constituted in 1717, and received its charter in 1750. It had a predecessor in a society formed in 1572 by Camden, Bishop Parker, Sir R. Cotton, and others, but suppressed in 1604. It has published *Proceedings* since 1849. The letters F.S.A. indicate fellowship of this society.

Antiquaries of Scotland, Society of, was instituted in 1780, and publishes yearly *Proceedings*. It is in official charge of the Scottish National Museum of Antiquities—originally the society's own collection.

Antique, prov. (839 sq. m.) W. coast of Panay, Philippines; weaving and cattle-rearing; cap. San José de Buenavista. Pop. 9,356.

Antiquities. See Archæology.

Anti-rentism, a movement amongst the leaseholders of certain counties in New York State during the years 1839-47 to resist the feudal dues appertaining to the Dutch manorial and patroonship rights still remaining, though virtually abolished in 1775. In 1839 the heirs of one of the largest landowners in Albany Co. endeavoured to evict those tenants who had not paid the feudal rents. The tenants resisted, the movement spread, anti-rent associations were formed, and disturbances occurred. Repressive measures were adopted, and the resistance was put down. In 1846 feudal tenures of all kinds were abolished, and agricultural leases were limited to an extreme period of twelve years. See Cheyney's *Anti-Rent Agitation in New York* (1887).

Antirrhinum, or Snapdragon, is a genus of the foxglove order. The common garden species is *A. majus*, a hardy herbaceous perennial. When the plant is found wild in Britain, it may be regarded as a garden escape.

Antis, a historical people of Peru; gave their name to the Andes Mts. and to the Antisuyu or eastern division of the Inca empire. They are the Campas of the early Spanish writers, and are now represented by the Chunchos, who still roam the forests about the head-waters of the Ucayali. The Antis were formerly fierce warriors and reputed cannibals.

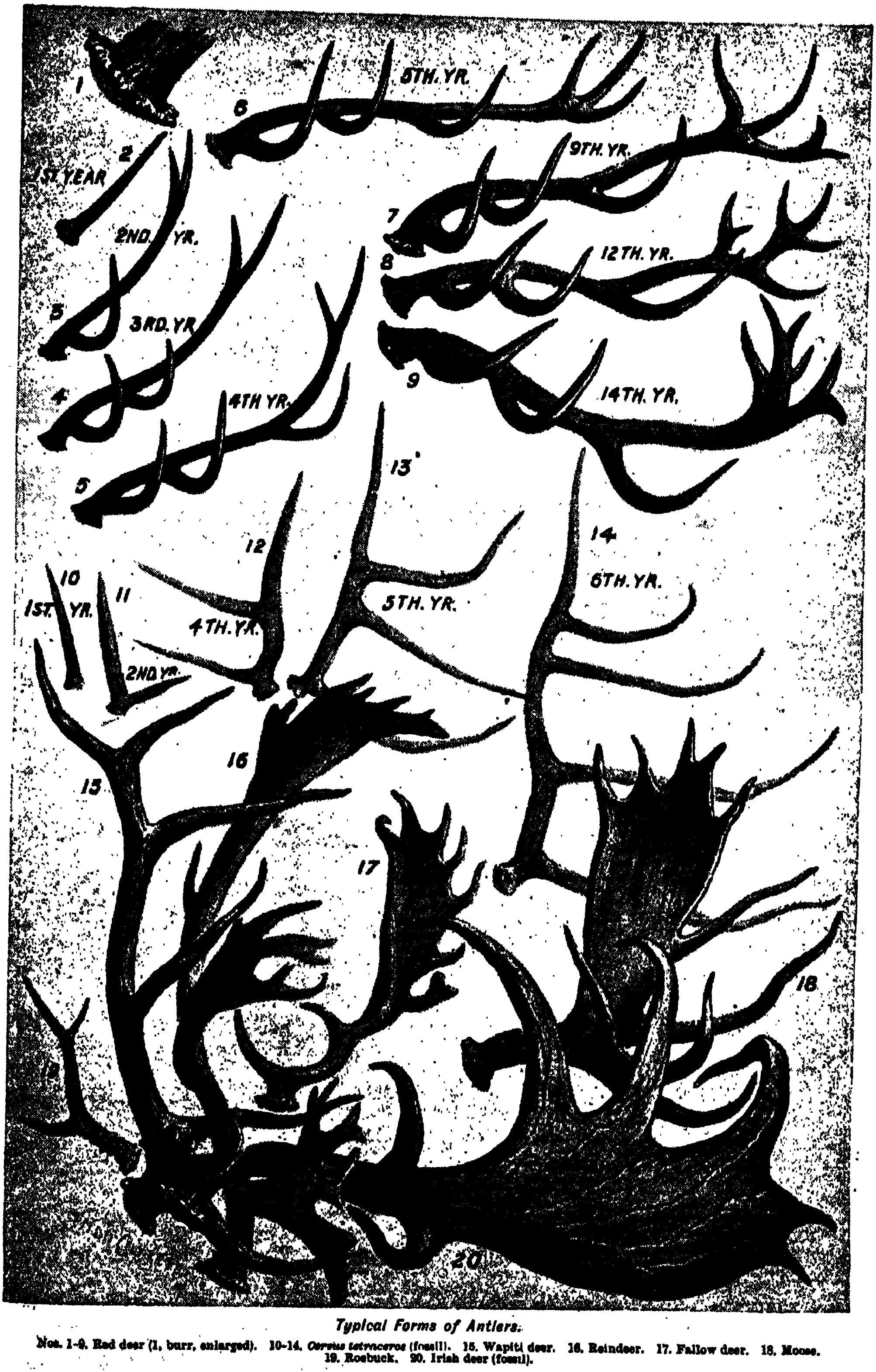
Antisana, snow-covered volcanic cone of the Andes (19,335 ft.), in Ecuador, 35 m. S.E. of Quito; now dormant, though partially active during Alexander von Humboldt's visit in 1802. The village of Antisana stands on its slopes at a height of 13,000 feet.

Antiscorbutics, drugs counteracting scurvy.

Anti-Semite Movement. See Jews.

Antiseptics and Antiseptic Surgery. The theory of antiseptic treatment is based upon the conviction that sepsis, or putrefaction, and other infectious disorders, are started by minute organisms, bacteria, and their products, which are not a part of the body, but which are introduced from without; and antiseptics are those substances or measures which prevent sepsis, either by preventing the approach of the bacteria, or by destroying them or their power to do harm if they do approach. In surgery the term antiseptic is used to cover the prevention of all bacteria, not those of putrefaction only; and the same means are often used, first to disinfect, and afterwards to keep aseptic. Heat is antiseptic, and burns and scalds are aseptic for the time being. Cold is antiseptic, and thus meat, fruit, and other perishable foods are kept sweet in freezing-chambers. Sunlight is death to many bacteria, which flourish in moisture, warmth, and darkness. Absolute dryness of atmosphere is antiseptic; and so, in some places, meat may be preserved by exposure to the sun, and is often preserved by smoking.

Carbolic acid, corrosive sublimate, and various other preparations of mercury, many coal-tar derivatives, silver salts, boracic acid, and many aromatics, are used most generally in surgery. The less powerful the antiseptic the better, provided it does its work; for obviously the weaker the drug the less chance of either irritation to the tissues, which often results from carbolic acid, or of poisoning by absorption, which may follow the use of corrosive sublimate in large quantities. But as an antiseptic need not be so strong as a disinfectant, the disinfection is first carried out, and a weaker solution used afterwards for antiseptic purposes. While carbolic acid, various salts of mercury, and some of the coal-tar products, such as lysol, seem at the time of writing to be in most general use among surgeons, the silver salts are preferred by some; and Credé of Dresden, for example, puts itrol (citrate of silver) in the first place, claiming for it that it is absolutely efficient, inodorous, and



Typical Forms of Antlers.

Nos. 1-9. Red deer (1, burr, enlarged). 10-14. *Cervus tetraceros* (fossil). 15. Wapiti deer. 16. Reindeer. 17. Fallow deer. 18. Moose. 19. Roebuck. 20. Irish deer (fossil).

unirritating to body cells, while Levassort claims as much for calcium permanganate. But it is not easy to imagine a drug that kills all bacterial cells, but can be relied upon to go no further. During operation some antiseptic solution is poured or sponged over the part at frequent intervals, and antiseptic dressings are applied at the end. The surgeon and his assistants sterilize their hands as far as possible with hot soap and water and various antiseptic solutions; all instruments are sterilized, mostly by boiling and afterwards keeping in trays of antiseptic solution; and all towels, sponges, etc., are sterilized by steam or otherwise. Some surgeons operate in boiled rubber gloves, or gloves of steamed cotton thread, with sterilized instruments and sponges, etc., using sterilized water containing no antiseptic, and claim that the result is perfectly satisfactory. This is not antiseptic, but *aseptic* operating, and is most to be commended when the operator is working on uninfected tissues. The introduction of antiseptic methods in surgery is due to Lord Lister.

Some antiseptics are also used medicinally, for their effect on the alimentary, respiratory, or genito-urinary tract. Creosote, carbolic acid, sulphurous acid, menthol and other aromatics, are examples. Condiments, such as mustard, horse-radish, and garlic, act antiseptically on the intestinal tract. Alcohol, too, acts as an antiseptic to anything which is placed in it; but there is no ground for the not uncommon theory that, added in small quantity to impure water, it makes that safe for drinking. Consult the chapter on this subject in the works cited under SURGERY.

Antisialagogue, anything which decreases or stops the flow of saliva. Fear will sometimes do this, and so will disgust at an unpleasant taste or smell; either of which, on the other hand, may induce profuse salivation, and even vomiting. Certain drugs act as antisialagogues, but are rarely or never used for that specific purpose—*e.g.* belladonna, hyoscyamus, opium in full doses, and tobacco in excess.

Anti-Slavery Movement. See SLAVERY.

Antispasmodics, drugs which relieve or prevent involuntary muscular spasm, and the pain which often accompanies it. Involuntary spasm may affect voluntary or involuntary muscles—cramp of the thigh or calf muscles being an example of the first, and asthma or colic of the second. Anæsthetics (*e.g.* chloroform), sedatives (*e.g.* bromides), narcotics (*e.g.* opium and its alkaloids, and stramonium and the nitrites), acting on unstriped muscle, are all antispasmodics. Warmth and friction also tend to relieve spasm; and tonics, such as arsenic and quinine, are indirectly useful where the spasm depends partly upon the general health, as in asthma, laryngismus stridulus, and infantile convulsions.

Antispast, a tetrasyllabic foot —thus, ᴗ – – ᴗ.

Antisthenes (*c.* 445-370 B.C.), Athenian philosopher, pupil first of Gorgias, then of Socrates. He was the founder of the Cynic school of philosophy, and taught that virtue alone is the true end of life, pleasure—probably sensual pleasure—being merely an evil. The Stoics developed his ideas into their system. He wrote many works, of which only two rhetorical exercises, on Ajax and Odysseus, have come down to us. See Zeller's *Socrates and Socratic Schools* (1877).

Antistrophe (Gr.), in rhetoric the repetition of the same word at the conclusion of successive clauses—as, 'Wit is dangerous, eloquence is dangerous, everything is dangerous that has efficiency and vigour for its characteristics.'

Anti-Taurus. See TAURUS.

Antithesis, a bringing together and setting in opposition to each other of distinct ideas—*e.g.* 'He dazzles more, but pleases less.'

Antitoxin. See SERUM THERAPY.

Anti-trades, winds in the upper air blowing in a direction contrary to that of the trade winds of lower levels. Above the N.E. trade winds the higher aerial currents, or anti-trades, are from the S.W. In the southern hemisphere they blow from N.W. The direction of the anti-trade winds has been shown by dispersion of matter ejected from volcanoes.

Antitrinitarianism. See UNITARIANISM.

Antitype. See TYPE (in Theology).

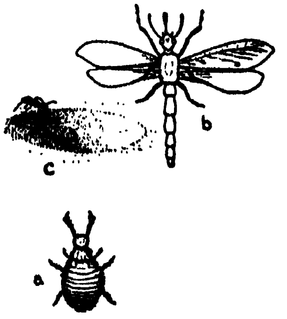
Antium, Italy. See ANZIO.

Antivari, fort. port and episc. see of Montenegro, on Adriatic Sea, 18 m. N.W. of Scutari; was transferred to Montenegro by the treaty of Berlin in 1878. Pop. (1896) 1,147.

Anti-Vivisection Society, founded in London in 1876, for the purpose of opposing vivisection. See VIVISECTION.

Antlers are outgrowths of the frontal bones, which occur in deer under many forms, and may be functionally compared with horns, which have quite a different structure. During their period of growth antlers are covered with a vascular, hairy skin, known as 'velvet,' which is exceedingly sensitive and well supplied with blood. As the period of growth is completed the velvet dries up, is rubbed off, and leaves the bare and insensitive bone to constitute a powerful weapon of offence and defence. The antler is not attached directly to the skull, but to a stalk or pedicle of varying length, the junction of antler and pedicle being marked by a bony ring, the 'burr.' Beneath the burr bone absorption takes place, with the result that, late in the season, the antler falls of its own weight, or is knocked off by the deer, to be renewed again in the following spring. Except in the reindeer, antlers are confined to the male sex, and are altogether absent only in the musk-deer (*Moschus*) and the Chinese water-deer (*Hydropotes*). Their degree of development varies enormously, from the minute points of the Chinese *Elaphodus* to the huge structures found in the extinct Irish deer or the living elk. A point of great interest is the parallelism between the yearly increase in complexity of the antlers of living deer, and the similar increase in a series of fossil forms of different ages.

Antlia Pneumatica, 'the Air-Pump,' a southern constellation, placed by Lacaille, in 1752, between Argo and Hydra. One of its stars, S Antliæ, is variable in a period of 7 hours 47 minutes.



Ant-lion and Pit.

a, Larva known as the ant-lion; *b*, adult insect; *c*, ant-pit.

Ant-lion (*Myrmeleon*), an insect belonging to the order Neuroptera, which as larva has a remarkable method of trapping other insects on which it feeds. In loose sand the larva excavates a conical pit, at the base of which it buries itself. An ant or fly, near the edge of this pit, dislodges some of the loose sand. This rouses the ant-lion, which throws sand at the struggling victim until it is brought within reach of its jaws. The juices are then sucked, and the carcass flung to a distance by movements of the head. The ant-lion, when full fe pupates within its pit, the adu escaping as a winged, flylike mal. There is no Britis but several occur on the

Antofagasta. (**1.**) Port, Chile, in prov. of same name. The narrow-gauge railway to Oruro in Bolivia, of which 275 m. are within Chilean territory, starts from here. Besides Bolivian goods, some nitrate, copper, borate of lime, silver, and salt are exported. The place was founded in 1870, and developed through the discovery of minerals, and especially of saltpetre. Pop. (1900) 19,482. (**2.**) Province, the largest of Chile. Area, 47,932 sq. m. Pop. (1895) 44,085.

Antoine, André (b. 1858), founder of the *Théâtre Libre*, Paris (1887), an association for producing plays of unconventional type and literary quality. It was imitated in London, Berlin, and New York, and ceased to exist in 1894; but in 1897 Antoine started the *Théâtre Antoine.*

Antokolsky, Marc (1842-1902), Russian sculptor, born of poor Jewish parents at Vilna; went to St. Petersburg, where he worked at engraving and studied sculpture. Success first came when Alexander III. bought his statue of Ivan the Terrible (1871), now in the Hermitage, St. Petersburg. After some years in Italy, Antokolsky went to Paris (1880). His chief works are: *Christ before the People* (1874), *Sister of Mercy tending Wounded Soldiers*, *Mephistopheles* (1881), *Spinoza* (1882), *Death of Socrates* (1876), and busts of Turgeniev, Tolstoy, Alexander II., Alexander III., Nicholas II., Peter the Great, etc.

Antomarchi, Francesco (1780-1838), Italian surgeon, born in Corsica, and physician to Napoleon I. at St. Helena. After the death of the ex-emperor he published a cast of his head, the genuineness of which gave rise to much discussion. He wrote *Les Derniers Moments de Napoléon* (1823). On the outbreak of the Polish revolution he proceeded to Warsaw, and devoted himself to the care of the wounded. He died in Cuba. See Lord Rosebery's *Napoleon* (1900).

Anton, Robert (c. 1616), a Cambridge graduate, author of *Philosophers' Satyrs* (1616). The work is specially interesting on account of its references to contemporary writers.

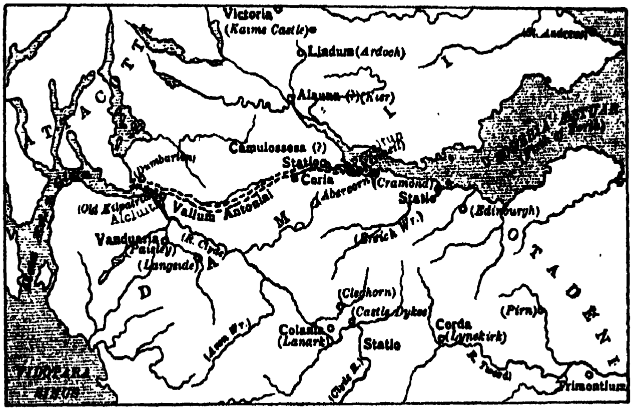
Antonelli, Giacomo (1806-76), cardinal and statesman, born at Sonnino, near Terracina. He held various offices under Pope Gregory XVI., and Pius IX. created him a cardinal (1847), and appointed (1848) him premier in the Liberal cabinet which framed the *Statuto*, or 'Constitution.' The ministry was short-lived, and the Pope, accompanied by Antonelli, fled (1848) to Gaeta. On their return to Rome (1850) he again became premier, which along with other offices of state he held till his death.

Antonello da Messina (1444-93), Venetian painter, born in Sicily, who persuaded Van Eyck to reveal the secret of his rich and enduring colouring. He settled in Venice, and became very popular as a portrait painter after the Flemish master's method. Of his authentic pictures, the National Gallery, London, possesses a portrait, his earliest known picture, *Salvator Mundi* (1465), and a *Crucifixion* (1477). There are fine portraits in the Louvre, also in Berlin, Venice, and Rome.

Antongil, bay, E. coast of Madagascar, 30 m. long by 22 m. broad.

Antonina, port, Parana, Brazil, on bay of Paranagua. Pop. 10,000.

Antonine Itinerary, a work, in two parts, giving a survey of the principal land and sea routes in the Roman empire, with the names of the stations and the distances between them. It was published in the reign of the Emperor Antoninus Caracalla, but was based upon a survey made between the consulship of Julius Cæsar (44 B.C.) and the reign of the Emperor Augustus.



Sketch-map of Antonine's Wall and Neighbourhood.

Antonine's Wall, the more northern of the two Roman walls in Great Britain; stretches from Bridgeness, near Bo'ness, on the Firth of Forth, westward to a point beyond Dumbarton, on the Clyde, a total distance of about 40 m. It is not a stone structure like the Wall of Hadrian, but a long *vallum* built of sods, upon a stone foundation. Its estimated height was 20 ft., on a base 24 ft. thick. Along its N. front ran a V-shaped fosse, about 20 ft. deep by 40 ft. in width, with a counterscarp on the farther side; and there were some twelve supporting forts or camps at irregular intervals. It has been calculated that the wall required a garrison of 50,000 men. Inscribed tablets, found from time to time, prove that it was the work of the 2nd, 6th, and 20th Legions and their auxiliaries under the Emperor Antoninus Pius. In or near the forts have been found gold, silver, and bronze coins of Antoninus, Vespasian, Trajan, Hadrian, Nero, Titus, Domitian, Faustina, Commodus, and Constantine. The *vallum* is still traceable. The popular name is Graham's or Grime's Dyke. See *The Antonine Wall* (1899), published by the Glasgow Archæological Society, whose *Transactions* (1902) include 'The Antonine Lines as a Defensive Design,' by Major Ruck.

Antoninus Pius (86-161 A.D.), Roman emperor, born near Lanuvium, was adopted by Hadrian in 138 A.D., and succeeded him in 139, reigning until 161—his period of rule, along with those of his immediate predecessors, Trajan and Hadrian, and that of his successor, M. Aurelius, forming the Golden Age of the Roman empire. His reign was remarkable for its absence of history—in those times a record of war, tumult, and crime. An able and virtuous prince, he remained faithful to his profligate wife, Faustina.

Antonio, Prior of Crato (1531-95), pretender to the Portuguese throne, was the son of Dom Luis, second son of John II., and of a Jewess, Yolanda da Gomez; was appointed prior of Crato, and, later, constable of the kingdom. In 1578 he was made prisoner by the Moors at the battle of Alcazar Kebir, but was soon liberated. In 1580, on the death of King Henry, he was proclaimed king of Portugal, but was defeated by Spaniards under the Duke of Alba at Alcantara (Aug. 24, 1580), and compelled to fly to France. In 1582 he made an unsuccessful attack on the Azores, with the aid of Catharine de' Medici; and in 1589 another unsuccessful attack on Lisbon, with the aid of an English fleet under Drake. His second son, Christopher, wrote his life (1629).

Antonius, the name of several distinguished Romans. (1.) MARCUS ANTONIUS (143-87 B.C.), called *Orator*, consul in 99 B.C., was one of the aristocrats who supported Sulla, and, when Marius and Cinna seized Rome in 87, was executed by them. He is introduced as one of the characters in Cicero's *De Oratore*. (2.) GAIUS ANTONIUS, son of the above, was expelled from the Senate in 70 B.C., but was Cicero's colleague as prætor in 65, and as consul in 63. He was a partisan of Catiline, but Cicero secured his loyalty to the state by yielding to him the province of Macedonia; and his army defeated Catiline, though, because of his friendship for the latter, he relinquished the command to one of his lieutenants. He plundered his province, and in 59 was condemned for extortion, though Cicero defended him. He retired to Cephalonia, but was recalled by Cæsar to Rome in 44 B.C. (3.) MARCUS ANTONIUS, the famous Mark Antony of the Second Triumvirate, son of Marcus Antonius Creticus and Julia, sister of L. Julius Cæsar. Antony was born about 83 B.C., and was brought up in the house of Lentulus, a fellow-conspirator with Catiline. He joined Cæsar in Gaul (54), and by his influence was elected quæstor (52). Cæsar's most ardent supporter, he was with him until the battle of Pharsalia (48), when he commanded the left wing. He became consul with Cæsar (44). When Cæsar was murdered on the Ides (15th) of March, Antony, by his famous speech over Cæsar's body, inflamed the people against the assassins. He had previously received from Calpurnia, Cæsar's widow, all Cæsar's private papers and treasure, and had seized the public treasury. On March 17 his position was strengthened by a resolution of the Senate to ratify all Cæsar's arrangements—the *Acta Cæsaris*. But before long a new rival crossed his path. This was Octavius (afterwards Emperor Augustus), the great-nephew and adopted son of Cæsar, who joined the senatorial party, led by Cicero, against Antony. It was at this time that Cicero composed the famous Philippic orations against Antony, which emboldened the Senate and people to declare him a public enemy. In April 44 Antony was severely defeated at Mutina (where he was besieging D. Brutus) by the consuls Hirtius and Pansa, who both fell in the battle. Antony retreated over the Alps, and there joined Lepidus, who effected a reconciliation between Antony and Octavius; and the three formed the Second Triumvirate for five years. The first result of their union was a proscription, involving the murder of Cicero and others. In 42, the triumvirs, thanks mainly to Antony, defeated Brutus and Cassius at Philippi. Then passing into Asia to collect supplies, Antony met Cleopatra in Cilicia, and followed her to Egypt. Meanwhile his wife Fulvia and his brother Lucius had made war on Octavius in Italy. But Fulvia dying, he married Octavius's sister Octavia (40), and received as his share of the Roman world the provinces east of the Adriatic. In 37 the triumvirate was renewed for five years. In 36 he invaded Parthia, with little success; but in 34 he overran Armenia, bringing away its king captive to Alexandria. Antony now entirely gave up the character of a Roman citizen, and appeared as an Eastern despot by the side of Cleopatra. The disgust caused in Italy by this aroused Octavius to overthrow him. The war was decided by the sea-fight of Actium (Sept. 2, 31 B.C.). Antony and Cleopatra fled to Alexandria, where, on receiving a false report of Cleopatra's death, he killed himself. Perhaps few Romans were of greater individual power and energy than Antony, but his love of pleasure and unbridled ambition made him impossible as ruler of the Roman world. Few of the ancients are better known to us, thanks to Shakespeare's studies of his character in *Julius Cæsar* and *Antony and Cleopatra*. There is also a life of him by Plutarch. Cicero's *Letters* and *Philippics* give contemporary but biassed evidence as to his career. (4.) GAIUS ANTONIUS, brother of the triumvir, prætor in Macedonia in 44; being captured by Brutus in 43, was put to death in revenge for Cicero's murder.

Antonomasia (Gr.), the use of an epithet, patronymic, or appellative instead of a proper name, as when we say 'the son of Peleus' for Achilles, or the 'swan of Avon' for Shakespeare.

Antony, MARK. See ANTONIUS, MARCUS.

Antony, ST., OF PADUA (1195-1231), born at Lisbon; became a Franciscan in 1220, and was soon renowned for his Biblical and patristic lore. As a revival preacher he attained great success, and on his death was canonized. He is usually represented as the patron saint of the lower animals, probably because of the legend that he preached to the fishes. In the Roman calendar his feast is June 13. Representations of him by Murillo are in the cathedral and museum of Seville. His monument stands in St. Antony's church, Padua. See the biographies of Seeböck (1878), Salvagnini (1887), Sorinzi (1888), Hilaire (1890).

Antony OF THEBES, ST., or 'Antony the Great' (?251-356), was born in Upper Egypt. He gave his large fortune to the poor, and lived as a hermit in the wilderness near the Nile for twenty years. The fame of his sanctity spread abroad, and his anchorites induced him to found a monastery near Memphis—his immediate following at his death numbering 15,000. The effect of his preaching and of his holy example was sufficient to cause monasticism to be adopted in every country of Christendom. He died about 356 A.D. His life was written by Athanasius. The temptations of St. Antony, and other incidents of his life, many of them legendary, have afforded numerous subjects for sacred art. See Verger's *Vie de Saint Antoine le Grand* (1890).—ST. ANTONY'S FIRE, a pestilential disease of the middle ages. See PLAGUES.

Antraigues, EMANUEL LOUIS HENRI DE LAUNAY, COUNT D' (1755-1812), French politician, author of *Mémoires sur les Etats-Généraux* (1788), which, by its advocacy of liberty, helped to bring on the revolution (1789). Chosen deputy in 1789, he joined the royalist party, and in 1790 was sent to St. Petersburg and Vienna in the Bourbon interest. He settled in England, and in 1812 was murdered near London. See *Life* by Pingaud (1893).

Antrim. (1.) Maritime co., N.E. of Ireland, including Rathlin I., and having Loughs Neagh and Beg in the S. and S.W. Area, 711,487 ac. Pop. (1901) 461,240. Largest town, Belfast. Mountainous in the E. and N., where it fronts the Atlantic in a series of noble basaltic cliffs (see GIANTS' CAUSEWAY), the surface sinks gradually to the extensive bog tracts of the interior. Flax (21 per cent. of the total for Ireland), cereals, and oats are grown, 31½ per cent. of the surface being under cultivation; and cattle, sheep, and pigs are reared. There are extensive deposits of iron ore and salt, and limestone is largely worked. Chief seat of the Irish linen manufacture. Cottage industries (hand embroidery) are common, and there are several large distilleries; while the fisheries of the coast are important. It was colonized from England and Scotland at the Settlement of Ulster, in the reign of James I. (2.) Market tn., cap. of above co., junction on Belfast and Northern Counties Ry., 14 m. N.W. of Belfast, with linen weaving and bleaching, paper manufacture, etc. Antrim Castle, a round tower, and Shane O'Neill's Castle are in the vicinity. The town, founded in 495, has had a stormy history. Pop. (1901) 1,825.

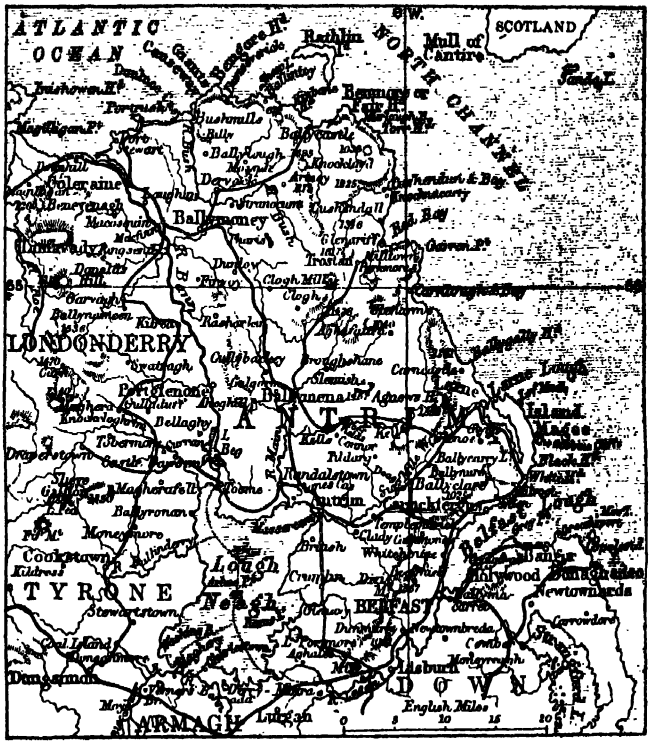
Antrim, Glens or **Glynns of**, narrow valleys which open out upon the sea through the high coast-line of Antrim. The most charming are Glenarm, Glenariff, Cushendall, and Cushendun.

Antrim, Randal Macdonnell, 1st Marquis of, and 2nd Earl of Dunluce (1609-83), a Catholic nobleman, one of the Kilkenny Council; created a marquis by Charles I. in 1643, in anticipation of his raising a royal army for service in England. He promised 10,000 men, but failed to raise them. In 1644 he sent over 1,600 men to Scotland to assist Montrose.

Antsirane, tn., Madagascar; since 1888 a free port. There are springs which contain salts of soda, potash, magnesia, and lime, and vary in temperature from 97° to 118° F. Pop. 6,000.

Ant-thrush, a popular name applied to certain tropical and sub-tropical birds which feed chiefly on ants.

Antwerp (Fr. *Anvers*), a fort. city, seapt., and cap. of prov. Antwerp, Belgium, on the r. bk. of the Lower Scheldt, 27 m. by rail N. of Brussels. The docks and quays stretch along the river front, and are principally at the N. end of the city. In 1899 the Belgian Government voted 20,000,000 francs for the extension of the quays to 9¾ m. The river bed has been dredged so as to give a width of 1,150 ft. and a minimum depth of 26¼ ft. right up to the quays. Vessels with a tonnage of over 9,000,000 visit the port annually, and, in addition, some 5,000,000 tons reach the city from the interior by river and canal. (See Belgium.) Antwerp is also engaged in diamond-cutting, wool-washing, sulphur-refining, the manufacture of candles, waxcloth, thread, etc., brewing, distilling, and shipbuilding. The old fortifications have been converted into boulevards, and the city has a fine park and zoological garden. The Gothic cathedral contains magnificent pictures by Rubens, and has a noble spire, hung with a remarkably fine peal of bells. In the Place Vert is the well-known statue of Rubens. The museum contains a unique collection of the master's pictures, and works by Quentin Matsys, Jan van Eyck, Roger van der Weyden, Steen, Rembrandt, Halls, etc. Other notable institutions are an ancient printing-house, the Musée Plantin-Moretus, the town hall, various churches, the Bourse, Rubens's house, etc. The town is the main military bulwark of Belgium, being defended by a circle of strong modern detached forts, so situated that a large portion of the adjacent country can be inundated if necessary. Rubens, Jordaens, Teniers, Van Dyck, Matsys, and other painters, lived at Antwerp. Its commercial prosperity dates from the 11th century. After the middle of the 16th century it was the largest seaport and the richest city in the N. and N.W. of Europe, and was the money market of European princes. Then followed the ruinous effects of the Spanish Inquisition and soldatesca, the siege by Alexander Farnese in 1585, and the closing of the Scheldt in 1648. A trade revival took place when Napoleon I. recognized the advantages of Antwerp as a naval base; and its union with Holland in 1815 gave an additional impetus. The present prosperity of the city dates from 1863, when Antwerp bought back from the Netherlands the right to levy the Scheldt tolls, and declared the navigation of the river free to all nations. The annual trade amounts to 100 millions sterling, of which approximately two-thirds are imports. Pop. of tn. (1790) 40,000; (1900) 272,851. Pop. of prov. (1900) 819,159; area, 1,093 sq. m. See *Guide* by J. P. van Mol (1886); Rowland's '*Le Port d'Anvers*,' in *L'Economiste Français*, vol. ii. (1899).



Antrim.

Anu, a Babylonian deity, supreme god of heaven.

Anubis, an Egyptian deity, usually represented in the form of a man with a dog's head. He was the god of embalming, and the assistant of Osiris in weighing the hearts of the dead. The Greeks identified him with Hermes, and he was worshipped in Rome as Mercury.

Anupshahr, tn., 58 m. S.E. of Meerut, United Provinces, India, on the Ganges; much frequented by pilgrims. Pop. (1901) 8,601.

Anura (Gr. 'without tail'), an order of amphibia to which the frogs and toads belong, including the most highly specialized members of the class.

Anuradhapura, ruined city and ancient capital (437 B.C.-750 A.D.) of Ceylon, 64 m. S.W. of Trincomalee. It has a bo tree (*Ficus religiosa*) venerated as a shoot of the tree under which Gautama became Buddha. Pop. of dist. over 79,000, of tn. 3,000.

Anus. See Rectum.

Anwari, Auhad uddin (d. between 1191 and 1196), Persian poet and astrologer. A panegyric in honour of the Sultan Sanjar won for him the patronage of that potentate. His verses exhibit consummate skill and great satirical powers. As an astrologer he was not a success.

Anyu Skaya Krepost, fort and vil., Siberia, 165 m. from Nizhne-Kolimsk. In March a great fair is held here, which is frequented by Russian traders, by Chukchis, etc.

Anzengruber, Ludwig (1839-89), Austrian dramatic writer and novelist, spent most of his life in narrow circumstances, but won lasting fame by his tragedies of domestic (peasant) life—*Der Pfarrer von Hirschfeld* (1870), *Der Meineidbauer* (1871), *Das Vierte Gebot* (1878), *Mahl und Stein* (1889), and *Der Fleck auf der Ehr'* (1889). He also gained success in comedy, of which *Die Kreuzelschreiber* (1872) is typical. But in the novel, again, he reaches a high level in his characterization and description of the life of the common people—*e.g.* in *Der Schandfleck* (1876; rewritten 1884) and *Der Sternsteinhof* (1885). His *Gesammelten Werke* were published in 10 vols. in 1890 (3rd. ed. 1897). See good *Biography* by A. Bettelheim (2nd. ed. 1897).

Anzin, the most important coal-mining centre of France, dep. Nord, 1 m. from Valenciennes. Annual production of coal about 4,000,000 tons. It has also metallurgical industries, and manufactures steam-engines, machinery, chain cables, etc. Pop. (1901) 14,444.

Anzio, Porto d' (anc. *Antium*), small seapt., 33 m. S.E. of Rome, Italy. In ancient times it was a stronghold of the Volscians. Caligula and Nero were born here. It was a favourite Roman watering-place, and art treasures (*e.g.* the Apollo Belvedere) have been discovered there. Pop. (1901) 3,449.

Aoki, Shuzo (1844), Japanese statesman; was ambassador (1874 and 1892) in Berlin. Foreign Secretary of State in Japan three times—in 1885, 1889, and 1898. In 1897 he conducted the negotiations for the revision of the treaties of Japan with the different European powers, and (1898-1900) was Minister of Foreign Affairs.

Aomori. See Awomori.

Aonla, tn., 18 m. S.W. of Bareilly, United Provinces, India; contains the tomb of Ali Mohammed, a Rohilla leader (d. 1751). Pop. (1901) 14,383.

Aorist (Gr. 'indefinite'), a tense of the Greek verb expressing indefinite past time, and corresponding to the English simple past tense, 'did,' 'went,' 'came.' There are two aorists in the Greek verb, known as 'first' and 'second' aorists, but there is no distinction between them in use.

Aorta. See Heart. The chief diseases of the aorta are atheroma fatty degeneration, calcification, and aneurism.

Aosta (anc. *Augusta Prætoria*), tn. and episc. see of Italy, prov. Turin, 50 m. N.W. of Turin. Its strategic position at the junction of the passes over the Great and Little St. Bernard induced Augustus to found there (25 B.C.) a military colony. The walls are in great part those constructed by the Romans. Other ruins are the triumphal arch of Augustus, the double prætorian gate, and the remains of a theatre, amphitheatre, and bridge. Modern buildings include the 14th century cathedral, the 12th century church of Sant' Orso, and the prior's house (1490). Birthplace of Anselm. Pop. (1901) 7,554.

The Val d'Aosta is one of the most charming valleys of the Piedmontese Alpine country, grassy, well wooded, and in part planted with vineyards. Cretinism is common among the people.

Apaches, N. American aborigines, the southernmost branch of the Athapascan family, who formerly ranged over the southwestern parts of the United States, and the northern provinces of Mexico, between 30° and 35° N. They were fierce, predatory tribes, but have now been mostly exterminated or swept into reservations (*e.g.* Oklahoma), where, with their Navajo kinsmen, they number about 24,000.

Apafii. (**1.**) Michael I., prince of Transylvania (1632-90), who remained faithful to the Porte until the unsuccessful siege of Vienna (1683). Then he entered into a treaty with the Emperor Leopold I. of Hungary (1687), who guaranteed his independence. (**2.**) Michael II. (1677-1713), son of above, maintained his claim to the throne of Transylvania against Count Tekeli, mainly by aid of the emperor. On his death Transylvania was incorporated in the empire.

Apalachicola, or Appalachicola, riv. in S. part of the U.S.A., formed by the junction of the Flint and Chattahoochee Rs., and flowing into the Gulf of Mexico at the seapt. of Apalachicola in Florida. It is navigable throughout its length of 130 m.

Apamea, on the Orontes, anc. tn. of Syria, S.E. of Antioch. Formerly called Pharnake, it was enlarged and fortified by Seleucus Nicator. It was completely destroyed in the 7th century by Chosroes II. of Persia. Numerous ruins exist near the little fort of Kalaat-el-Medik.

Aparri, port at mouth of the Rio Grande, Cagayan Prov., N. of Luzon, Philippine Is. Pop. 11,262.

Apatin, tn. on the l. bk. of the Danube, 10 m. S.W. of Zombor, Hungary; produces hemp, madder, and silk. Pop. (1900) 13,940.

Apatite, the principal natural phosphate of the crystalline rocks. As phosphoric acid is an essential constituent of the food of both plants and animals, vegetable and animal life are dependent on the existence of apatite in the earth's crust. The phosphates in sedimentary rocks and in soils are derived from the apatite set free by the disintegration of the older crystalline rock masses. Apatite is a phosphate of lime with fluoride or chloride of lime, or more usually a mixture of these last two ($FCa_5P_3O_{12}$). It has various forms, but always crystallizes in hexagonal prisms, with a hardness of 5, and a not very perfect cleavage. It is soluble in dilute nitric acid, and with ammonium molybdate the solution gives a yellow precipitate (test for phosphates). From several places in Switzerland come transparent and colourless, or white and cloudy, crystals. These are found in fissures in gneiss and crystalline schists. It is more frequently of a sea-green or bluish-green colour; fine crystals of this variety come from Norway and many parts of N. America. Asparagus stone, osteolite, and moroxite are names given to other forms. Apatite is mined at Kragerö in Norway; and in S. Burgess (Canada) there is a vein, 3 ft. thick, of pure sea-green apatite, from which large quantities have been extracted. The microscope shows that apatite is always present in such rocks as granite, gneiss, and diabase, as very small transparent crystals, usually long and pointed, and never visible to the naked eye. The lime phosphate known in commerce as apatite contains many impurities.

Ape, a term sometimes used to designate the anthropoid apes only, and sometimes quite indefinitely for the monkeys, baboons, and their allies of the order Primates.

Apeldoorn, tn., 11 m. by rail S.W. of Deventer, Gelderland, Netherlands. Several paper factories. Near it is Castle Loo, the summer residence of the royal family. Pop. of comm. (1899) 25,761.

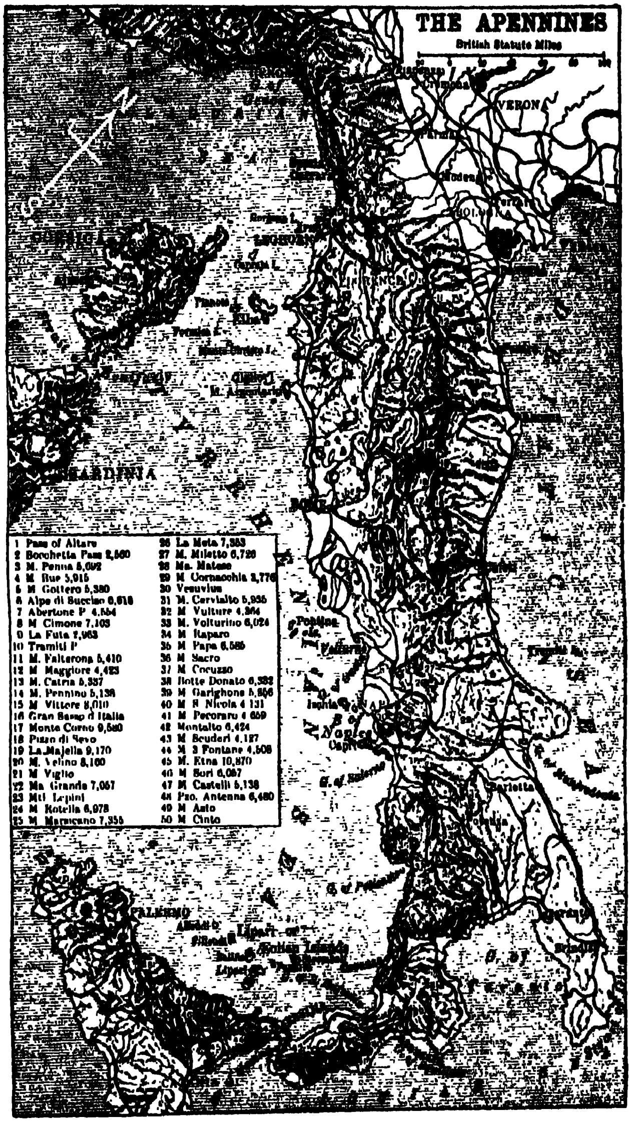
Apelles, the most celebrated painter of ancient Greece, contemporary of Alexander the Great, his patron. Born in Colophon, he went to Macedonia during the reign of Philip: there Alexander gave him the exclusive right to paint his portrait. Two of his greatest pictures were, *Alexander wielding a Thunderbolt*, in the temple of Artemis in Ephesus; and *Aphrodite Anadyomene* (*i.e.* rising out of the sea), in the temple of Æsculapius in Cos. Other celebrated pictures are, *Alexander entering the Triumphal Car*, *Hercules*, and *Artemis*. His peculiar excellence was grace—*i.e.* perfection of proportion and harmony in the treatment of his subjects in grouping, drawing, and colouring. See Wustmann's *Apelles Leben und Werke* (1870).

Apelt, Ernst Friedrich (1812-59), professor of philosophy (1840-59), Jena, author of ph [illegible] works: *Epochen der Geschichte der Menschheit* (1845; 2nd ed. 1852); *Theorie der Induktion* (1854); *Religions Philosophie* (1860).

Apennines (anc. *Mons Apenninus*), one of the principal mountain ranges in Europe, running the entire length (some 750 m.) of the Italian peninsula, and continued through Sicily. At their N.W. extremity they touch the Maritime Alps, the dividing line being drawn at the Pass of Altaro, at the head of the Bormida valley. The range bears different names (*e.g.* Ligurian, Etruscan, Roman, Neapolitan, Calabrian, and Apuan. The Calabrian Apennines and the Apuan Alps are of granite, gneiss, and crystalline slate; the rest of the system is composed mainly of sandstones and limestones of Cretaceous and Tertiary age, the older rocks being conspicuously absent. Bosses of intrusive gabbro, trachyte, basalt, diorite, etc., are found. In the Central Apennines the most characteristic feature is the abrupt emergence, above the broad base of the Tertiary strata, of huge ellipsoidal high limestone plains of older formation. On the E. side of the Sibylline Mts., reaching 8,010 ft. in Mt. Vittore, there has been a gigantic subsidence, exposing the mountain wall for a vertical height of 6,500 ft. In the Abruzzi, two parallel chains separated by the valley of the Aterno, the loftiest and most rugged stretch of the system occurs: the E. has the huge knot of the Gran Sasso d'Italia, culminating in the snow-capped Monte Corno (9,580 ft.); farther to the S.E. rises Monte Amaro (9,170 ft.). The Calabrian Apennines terminate in the volcanic upheaval of Aspromonte (Monte Montalto, 6,425 ft.), overhanging the Gulf of Messina. The N. Apennines subside into the valley of the Po; the Central make a steep plunge towards the Adriatic; on the W. or Tyrrhenian side the slope is more gradual, and the Apennines enclose several longitudinal valleys —*e.g.* the Chiana, the Pistoja-Florence plain—parting the different lateral chains from the main range. The Apennines are, as a rule, bare and picturesquely rugged in their higher altitudes, but their lower slopes are clothed with forests. The system is poor in minerals, but is especially rich in marble. The Romans made roads over the Pietra Mala Pass (2,960 ft.), between Florence and Bologna; the Furlo Pass (flanked by rocky walls of over 1,500 ft.), debouching upon the Adriatic coast at Fano; the Via Salaria, between the Sibylline Mountains and the Gran Sasso; and the Caudine Forks, between Naples and Benevento. The Bocchetta Pass (2,560 ft.) connects Genoa with the upper valley of the Po. Railways now unite the two coast belts. See Partsch's '*Die Hauptketten des Centralen Apennins*,' in *Verhandl. d. Gesch. f. Erdkunde zu Berlin* (1889); Marinelli, in *Atti*, of the First Ital. Geog. Congress, vol. ii.; *Globus* (1899); *L'Appenino Bolognese* (1881); and *L'Appenino Modenese* (1895).

Apenrade, port and seaside resort on the Baltic, in the Prussian prov. of Schleswig-Holstein, 30 m. N. of Flensburg by rail. Trade in coal, grain, fodder, and timber. Pop. (1900) 5,952.

Aperients, or LAXATIVES, are the mildest class of purgatives, intended to assist the natural action of the bowels. They act by moderately increasing peristalsis, or in some cases—*e.g.* belladonna —apparently by allaying a spasm. As examples of 'natural aperients,' one may instance hot or cold water taken on an empty stomach, ripe fruits generally, coffee in some cases, whole-meal bread, oatmeal biscuits, and porridge. Instances of aperient drugs are castor oil, senna, olive oil, sulphur, cascara sagrada, and glycerin, all in comparatively small doses; most of these in large doses become so purgative in their action as to be classed among cathartics. Some writers classify aperients as (1) laxatives, (2) purgatives—the latter being subdivided as (*a*) cathartic, and (*b*) drastic. The habit of taking even mild aperients is to be condemned. See CONSTIPATION; also MINERAL WATERS.

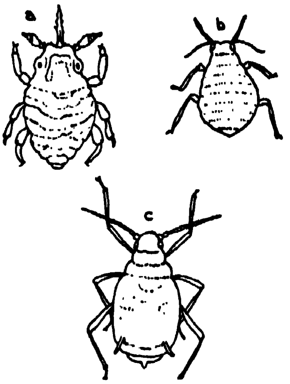


Aphasia (Gr. 'absence of speech'), total or partial loss of the power of speech, either in its spoken or its written form. The term always covers loss of the power of expression by spoken words, accompanying some morbid condition of the brain; but some extend the meaning, and include the misunderstanding of what is said (word-deafness), and inability to read words (word-blindness). Again, the inability to make the movements necessary to express oneself, whether by gesture, writing, or speech, is distinguished as *motor* aphasia, from inability to understand familiar gestures and written or spoken words, which is *sensory* aphasia. Aphasia, in any of these cases, is the term used only when consciousness is unaffected, and the intellect otherwise normal. The causes are lesions affecting the nerve-centres concerned, such as hæmorrhage, emboli, thrombi, and adjacent tumours. With the first two causes aphasia may follow almost instantaneously; with the other it is of slower growth. Temporary aphasia may be caused by fright, excitement, any severe illness, or, indeed, any cause disturbing normal cerebral circulation. Treatment consists in first dealing with the cause of the disorder, and then in educating the brain—the education being the same as that of a child. See also AMNESIA and APHEMIA.

Aphelion (Gr. 'away from the sun'). The planets revolve round the sun in elliptical orbits; and the sun is situated, not at the centre of these orbits, but at one of the two points known as the foci. The greater axis of each ellipse is the line passing through the centre and the foci. At one extremity of this axis the planet is at its greatest distance from the sun, and at the other extremity at its least distance. The former is known as the aphelion, the latter as the perihelion. The earth is in aphelion early in July, in perihelion in the beginning of January. In the former position we are distant about 94½ millions of miles from the sun, in the latter about 91½ millions.

Aphemia (Gr. 'absence of speech') is a term strictly reserved for speechlessness, or difficulty in speech, arising from disease affecting the lines of communication between the speech-centre and the tongue, but not implicating the centre itself, and so differing from aphasia and amnesia. It applies only to spoken words.

Aphidides, a group of minute Hymenoptera, including forms which are parasitic upon aphides. The adult insects lay eggs within the body of the aphides, and these eggs develop into minute larvæ, which grow at the expense of the host. The host in consequence becomes distended, and may be distinguished among its healthy fellows by its tense, glistening body. When the larvæ are full fed, they pupate within the body of the host, and the latter dies. Common forms belong to the genera Aphidius and Trioxys. The aphidides belong to the family Braconidæ, which includes many parasitic forms useful in keeping down agricultural pests.



Aphidæ.

a, Phylloxera vastatrix; *b*, Schizoneura lanigera; *c*, Aphis mali.

Aphis. Aphidæ are insects known to gardeners as plant-lice or green-fly, and to entomologists as a family of bugs (Hemiptera-Homoptera). All feed upon plant juices, and their destructive power is intensified by the enormous rapidity with which they reproduce, and the elaboration of the arrangements by means of which they migrate from one host to another, or from one region of the same host to another.

The life history is always complicated. In its simplest form it may be given as follows:—In spring, wingless female aphides hatch from winter eggs, and bring forth living young, which develop without previous fertilization (parthenogenetically), and become themselves capable of parthenogenetic reproduction after about ten days. The result is to form a rapidly-increasing colony, whose members attach themselves to the succulent parts of plants, and being well fed are capable of continuing their prolific multiplication until the growth of the plant is checked by the approach of autumn, or by the attacks of the aphides. Any check to nutrition, however produced, leads to the production of winged forms, capable of migrating to a new host, but much less prolific than the imperfect wingless forms. In autumn there invariably appear truly sexual forms, male and female, from whose union fertilized eggs arise, which are capable of withstanding the winter cold. It would seem, however, that these sexual individuals are not necessarily identical with the winged forms, for perfect females seem to be always without wings, and perfect males often so.

A remarkable physiological peculiarity of the aphides is their habit of excreting from the food canal surplus food material in the form of a sugary secretion ('honey-dew'). The insects attach themselves to their plant host by means of their beaks, and absorb food to such an extent that much of it passes through the body in only a slightly altered condition, and is highly prized by other insects as food. The fact that ants are very fond of this secretion, and actually domesticate the aphides in order to obtain it, has long been known. Under ordinary circumstances the honey-dew is washed from the leaves by rain, but during seasons of drought it forms a sticky varnish over the affected plants.

In colour aphides closely resemble their surroundings. They are greatly relished as food, not only by birds and other insect-eating vertebrates, but also to a much greater extent by other insects, notably the 'ladybirds' (*Coccinellidæ*). The cottony threads of 'American blight' (*Schizoneura lanigera*), the false cones or galls produced by *Chermes* on the spruce fir, are instances of protective coverings formed by aphides. A specially destructive form is *Phylloxera vastatrix*, an introduced aphid, which has wrought great damage in vineyards in Europe.

All aphides are soft-skinned insects of small size, possessing a three-jointed suctorial beak, long antennæ, two-jointed feet, and usually remarkable tubes or siphons on the fifth abdominal segment. These were formerly believed to secrete the honey-dew, but this is now known to be an error. See Sharp's 'Insects,' Part II., in the *Cambridge Natural History* (1899); Buckton's *Monograph on Aphides* (Ray Society, 1879–83); Ormerod's *Injurious Insects* (2nd ed. 1890).

Aphonia (Gr. 'voicelessness'), loss of voice, sometimes due to disease of the larynx or vocal cords, sometimes to nervous disorders. See VOICE.

Aphorism, a concise statement of some truth, generally more or less abstract, such as, 'Wisdom is knowledge in action.' The adjective 'aphoristic' is applied to the style of writers who convey their meaning in a series of abstract and isolated sentences, omitting the usual logical connectives. The chief examples of this in English are contained in the works of Emerson.

Aphrodite, called VENUS by the Romans, the goddess of love and beauty. As her name (ἀφρός) indicates, she sprang from the sea-foam, though in the *Iliad* Zeus and Dione are said to be her parents. Commonly represented as the faithless wife of Hephæstus (Vulcan), her lovers were many, including, amongst the gods, Hermes (Mercury), Ares (Mars), Dionysus (Bacchus), and Poseidon (Neptune); and amongst mortals, Anchises and Adonis. She generally bears one of the three epithets, Urania, Pontia or Thalassia, and Pandemos. By the famous judgment of Paris, described in Tennyson's *Œnone*, she was declared the most beautiful of the goddesses. Her girdle had the miraculous power of granting invincible charms to others. In works of art she is constantly represented with her son Eros (Cupid). The dove, swan, swallow, and the bird called iynx drew her chariot, or served as her messengers; and these, with the myrtle, rose, apple, and poppy, were sacred to her. Of the statues which remain may be mentioned the celebrated Venus of Milo in the Louvre, found in 1820 on the island Milos; Aphrodite of Capua; and the Medicean Aphrodite in Florence. The chief seats of her worship were Cythera and Cyprus. Her worship is of alien origin. Undoubtedly, also, the worship of the Phœnician goddess Astarte, brought in by Phœnician traders in early days, helped to form the conception which the Greeks had of Aphrodite. Compare also VENUS.

Aphthæ, small gray and yellow catarrhal patches, occurring singly or in groups, on the mucous membrane of the mouth, usually in teething infants. The most common position is within the lower lip, and towards the tip of the tongue. Treatment consists in attention to digestion, and local application of borax powder.

Apia, seapt. on the N. coast of the German dependency Upolu, and cap. of Samoan Is., lat. 13° 49′ N., long. 171° 44′ W.; anchorage for large vessels, though exposed to N. winds—four German and American warships were wrecked here in 1889, the British warship *Calliope* alone escaping without injury. Apia exports copra and cocoa beans. Pop. 3,750.

Apianus, PETRUS (Lat. for PETER BIENEWITZ, 1501-1552), German mathematician and cosmographer, professor of mathematics at Ingolstadt (1527); author of *Cosmographicus Liber* (1524), *Astronomicum Cæsareum* (1540), *Inscriptiones Sacrosanctæ Vetustatis, etc.* (1534). His work on cosmography contains some of the best maps of his time.—PHILIPP APIANUS (1531-89), his son, geographer, was professor of mathematics at Ingolstadt (1552-68), and later at Tübingen. See Günther, *Peter und Philipp Apianus* (1882).

Apicius, the name of three celebrated gluttons, though it has been suggested that only one was a real character, the other two being reproductions of the type. MARCUS GABIUS lived in the reign of Tiberius (14-33 A.D.). Having squandered most of his fortune on gluttony, he hanged himself rather than live without the means of enjoying his favourite indulgence. There is a book on cookery ascribed to him, but really of much later date, ed. by Schuch (1874).

Apion (1st cent. A.D.), Greek rhetorician, native of Libya, who removed to Rome A.D. 30, and taught rhetoric; author of numerous works now lost, including a history of Egypt in 5 vols., commentaries on Homer's poems, and a polemic against the Jews, which evoked a reply from Josephus.

Apios, a N. American genus of climbing plants of the pea order, producing starchy, edible, pear-shaped tubers on underground shoots. The only species, the *A. tuberosa*, a native of the Atlantic States of America, is known as the ground-nut or wild bean.

Apis (in the hieroglyphics *Hapi*, 'the hidden'), a sacred bull worshipped by the Egyptians at Memphis. Originally, perhaps, a local divinity, in historical times he appears as the incarnation of the god Ptah. Later he was looked on as the incarnation of Osiris, or even of the sun, and through a false etymology was connected with the Nile. Tradition varies as to the precise nature of his marks, but, as a rule, he had a black hide, with certain markings on the forehead and back, and a peculiar knot in the shape of a scarabæus under the tongue. He was not allowed to live more than twenty-five years. If he died before his allotted span, he was embalmed and buried in a splendid sarcophagus in a special part of the temple of Serapis, called the Serapeum. After his death he became an Osiris or Osiris-Hapi, whence by corruption came the name of Serapis, which the Greeks and Romans gave to the Egyptian god. The birthday of the bull (which coincided with the rise of the Nile) was celebrated every year as a national festival. Mariette's discoveries of the Serapeum at Memphis (1856) threw much light upon the cult of Apis. See Mariette's *Le Sérapéum de Memphis* (1882).

Aplanatic, a combination of lenses so arranged as to bring parallel rays to a focus without spherical or chromatic aberration.

Apnœa (Gr. 'breathlessness'), strictly applied only to that form of breathlessness which is caused by hyperoxygenation of the blood, when breathing, for the time, has become unnecessary.

Apocalyptic Literature, a peculiar type of Jewish literature which originated in the time of Israel's oppression by the Syrians, and furnished a consolatory forecast of the future of the nation. In form these writings are pseudepigraphic prophecies, issued under the name of some famous Israelite of a former age, and claiming to be supernatural revelations. From this assumed standpoint the writers predict the future history of Israel and of the world, and intentionally veil their meaning by the use of symbols, parables, and visions, although naturally they cease to be definite on reaching their own time, which is represented as the time of judgment and of Messianic deliverance. The aim throughout is at once didactic and hortatory: where the former element preponderates, the chief object in view is the glorification of Judaism, or the unfolding of divine mysteries; where the reverse is the case, the main purpose is to comfort the godly and warn the sinner. Against the gloomy background of the present there stand out in bold relief the glories of the future. These apocalyptic writings, of which the Book of Daniel is the earliest example, did much not only to quicken the Messianic hope, but also to produce among the people that political unrest which culminated in the revolt against the Romans in A.D. 66. They were largely the compositions of Jewish Christians. Among those extant in whole or in part, the most important for the history of the Jewish religion are the Apocalypse of Baruch, the Book of Enoch, the Ascension of Isaiah, the Book of Jubilees, the Assumption of Moses, the Testaments of the Twelve Patriarchs, the Psalms of Solomon, and the Sibylline Oracles. For these works, see Schürer's *Hist. of the Jewish People* (II. iii. p. 44 *ff.*), 1890, and Prof. Charles's article in the *Encyc. Biblica*.

Apocalyptic Number. See NUMBER OF THE BEAST.

Apocarpous, in botany a term used to designate fruits made up of separate carpels, the product of a single flower.

Apocatastasis, the return at length of all lost souls and fallen angels to divine forgiveness: a heresy held by Origen and others.

Apocrenic Acid, a compound discovered by Berzelius in soil containing rotting vegetable substances, and in the yellow deposit of chalybeate waters. It is formed by oxidation of crenic acid.

Apocrypha. From being applied in a laudatory sense to the secret or esoteric writings of the Gnostics and other sects, this term came to be used (*e.g.* by Augustine and Jerome) as the designation of works the origin of which was veiled in mystery. Of these the vast majority were forgeries, issued under one or other of the illustrious names of Israelitish history. By Athanasius the term was used as virtually equivalent to 'heretical;' but in the Western Church the meaning associated with it was rather that of 'pseudonymous.' From this, 'apocryphal' naturally came to signify 'non-canonical;' and then was gradually appropriated as the technical designation of those books which, although included in the Septuagint and the Vulgate, were never admitted into the Hebrew canon.

The Apocrypha proper include the following, arranged in the order of the English Bible: 1 Esdras; 2 Esdras; Tobit; Judith; the Additions to Esther; the Wisdom of Solomon; Ecclesiasticus; Baruch; the Song of the Three Holy Children; the History of Susanna; Bel and the Dragon; the Prayer of Manasses; 1 Maccabees; 2 Maccabees. (Two other so-called books of Maccabees—3 Maccabees and 4 Maccabees—are contained in some important MSS. of the Septuagint).

The books may be classified critically as genuine, legendary, pseudepigraphic, and supplementary additions to canonical books, or ethnologically as Persian-Palestinian, pure Palestinian, and Jewish-Alexandrian. But it is simpler to arrange them according to their literary character as narrative, prophetic, and didactic. Most of them belong to the first class. Only 1 Maccabees, however, can rank as history. It furnishes an authentic record of the forty years from the accession of Antiochus Epiphanes to the death of Simon (B.C. 175-135). 2 Maccabees covers only about half of the same ground, and is by comparison very inaccurate and highly coloured. 1 Esdras is a combination of the canonical Ezra with legendary tales. The additions to Esther and the additions to Daniel (the Story of Susanna, the Song of the Three Children, and the Story of Bel and the Dragon) are purely fabulous. Tobit is an almost idyllic work of fiction, and Judith is a romance. To the second or prophetic division belong the Book of Baruch (including the Epistle of Jeremy), the Prayer of Manasses, and 2 Esdras, the last named being the only specimen of apocalyptic literature contained in our Apocrypha. The didactic books of the collection are Ecclesiasticus—or, as its Greek title is, the Wisdom of Jesus, the son of Sirach—and the Book of Wisdom. See further the separate articles.

Although some of them (*e.g.* Ecclesiasticus and 1 Maccabees) were originally written in Hebrew, none of these books ever found a place in the Jewish canon, from which all books written after the cessation of prophecy appear to have been rigidly excluded (*cf.* 1 Maccabees 9:27 with Josephus, *c. Apion* (1-8). But the Jews of Alexandria, unlike their Palestinian brethren, drew no sharp distinction between prophets and hagiographa, and did not scruple to include in the Septuagint other sacred writings besides the 22 books of the Hebrew canon. As the Greek Bible remained practically the Bible of the Christian Church for centuries, the place given by it to the Apocrypha certainly conferred upon some of these books an exaggerated importance. But in relation to Jewish history, and apart altogether from the question of canonicity, the apocryphal books as a whole are of singular interest and value. Except the writings of Josephus, who was largely indebted to them, the Apocrypha form indeed the only source of information to speak of for the period between the Testaments. In this connection, 1 Maccabees, as a trustworthy historical record, is of priceless worth; and most of the other books afford significant glimpses into the internal condition and religious feelings of the people. Generally speaking, and in spite of the chilling influence of a rigid Pharisaism, they mark an advance in the religious life of the Jews as compared with the position reached in the time of Nehemiah. There is reflected in them a deeper reverence for the law, a purer monotheism, a stronger Messianic hope, and a clearer apprehension of a future life. Some of them also present an interesting combination of Jewish thought and Greek philosophy, especially in the Book of Wisdom.

The Apocrypha are, however, inferior to the canonical Scriptures in originality and strength. Instead of the freshness and simplicity of the earlier literature, we have the mechanical stiffness, the artificial and florid language, and the imitation of older models which show that the nation had begun to live on its past. That books should have been issued under assumed names was perhaps a necessity in times of persecution; but such distortions of Old Testament narratives (Wisd. 11:2-20) and contradictory statements (2 Macc. 1:15-17; 9:5-29) as sometimes occur, as well as the introduction of ostensibly genuine but really fabricated official documents (1 Macc. 12:20-23; 2 Macc. 1:1-9; Esth. 16), clearly indicate that these writings are on a lower plane than the canonical books.

The judgment of the Christian Church as to the Apocrypha has been far from uniform. Some of the New Testament writers (St. Paul, St. James, and the author of the Epistle to the Hebrews) were evidently familiar with them. They were excluded from the canon of Melito, bishop of Sardis (*c.* A.D. 172). By many of the early fathers, however, they are referred to in the same terms as the canonical books. Among the Greek fathers they are so treated by Clement and Origen, and among the Latin fathers by Irenæus, Tertullian, and Cyprian. After Jerome's time the tendency was to refrain from founding upon them in matters of controversy. This writer adopted the Hebrew canon, but allowed an 'ecclesiastical' use of the Apocrypha. To this position Ambrose, Augustine, etc., adhered. At the reformation the Roman Catholic Church virtually adopted the Greek Bible, and the Protestant Church the Hebrew. The Council of Trent (1546) accepted as canonical all the books embraced in the Vulgate—*i.e.* the whole of the Apocrypha except the Prayer of Manasses, and 1 and 2 Esdras. Till about the end of the 17th century all English Bibles contained the Apocrypha. Coverdale's Bible (1535) was the first in which they were placed by themselves under a separate title at the end of the O.T. They were also printed in most copies of the Geneva Bible (1560). Within the Reformed Church itself the fortunes of the Apocrypha have been varied. In the Sixth Article of the Church of England it is declared that 'the other books [*viz.* the Apocrypha] the church doth read for example of life and instruction of manners; and yet doth it not apply them to establish any doctrine.' The Westminster Confession, on the other hand, asserts that they 'are of no authority in the Church of God, nor to be any otherwise approved or made use of than other human writings' (ch. i. 3). See Fabricius's *Codex Pseudepig. Vet. Test.* (1713 and 1723); Bretschneider's *Die Dogmatik der Apokryphischen Schriften d. Alt. Test.* (1805); Fritzsche and Grimm, in the '*Kurzgefasstes Exegetisches Handbuch*' Series; Nicolas's *Des Doctrines Religieuses des Juifs, pendant les 2 Siècles antérieures à l'Ere Chrétienne* (1860); Langen's *Das Judenthum in Palestina zur Zeit Christi* (1866); Ewald's *Hist. of Israel*, vol. v. (Eng. trans. 1874); Stanley's *Jewish Church*, vol. iii. (1876); Bissell, in Lange Schaff's *Comm.* (1880); Churton's *Uncanonical and Apocryphal Scriptures* (1884); Wace and Salmon's

Speaker's Comm.: 'Apocrypha;' Stade's *Geschichte des Volkes Israel* (1881); Schürer's *Hist. of the Jewish People in the Time of Jesus Christ* (Eng. trans. 1890); Strack and Zöckler's *Apokryphen d. Alt. Test.* (1891); Kautzsch's *Die Apok. und Pseudepig. des Alt. Test.* (1898). For the text, see Ball's *The Variorum Apocrypha*; Fritzsche's *Libri Apocryphi Vet. Test. Græc.* (1871); and Swete's *Cambridge Septuagint* (1894).

Besides the O.T. Apocrypha proper, 'an unspeakable quantity of apocryphal writings' (Iren. 1:20) were current in the early centuries of our era. Those that survive group themselves naturally into two divisions, according as they link themselves on to the Old or to the New Testament.

Old Testament.—1. Poetical.—This category includes the very interesting collection of eighteen psalms called *The Psalms of Solomon.* These short poems (see Fritzsche's *Libri Apoc. Vet. Test. Græc.*, 1871) give expression to the clearest faith in the resurrection, and depict the triumphant rule of the Messianic King. Of Pharisaic authorship, they probably date from the middle of the 1st century B.C. In this connection mention may also be made of a psalm on David's victory over Goliath, which appears as Ps. 151 in the Greek Psalter; and of three apocryphal psalms in Syriac—*viz.* a thanksgiving of David, a prayer of Hezekiah, and a psalm on the restoration.

2. Legendary.—Many haggadic histories—*e.g.* of David, the Captivity, etc.—exist only in manuscript translations preserved in great libraries. *The Testament of Adam*, a Jewish romance purporting to give a biographical account of Adam and Eve subsequent to the Fall, is found in Greek, Latin, Syriac, Arabic, and Ethiopic fragments. *The Testaments of the Three Patriarchs* describe circumstantially the deaths of Abraham, Isaac, and Jacob; and *The Apocalypse of Abraham* tells the story of Abraham's conversion. In the *Life of Asenath* we have an attractive Jewish sketch of the circumstances attending her marriage with Joseph. *The Testament of Solomon* recounts that monarch's magical supremacy over demons, and his ultimate downfall. All these books have been more or less Christianized. *Liber Antiquitatum Biblicarum*, a compendium of Bible history down to the death of Saul, by Pseudo-Philo, and existing only in a Latin version, appears, however, to be pre-Christian. *The Book of Jasher*, a haggadic commentary upon the Hexateuch, and a Hebrew Midrash called *The Book of Noah*, practically complete the list.

3. Apocalyptic.—(1.) *The Book of Enoch* represents the residue of an extensive literature that grew up around this honoured name. It takes the form of a series of revelations vouchsafed to Enoch as he journeyed through earth and heaven. The work has been much disarranged and interpolated. The most complete and trustworthy text is the Ethiopic. Apart from its marked influence upon Jewish literature, this book helped to shape the language and doctrine of the N.T. It is directly quoted in Jude (14, 15), and numerous coincidences of language in the Gospels, Acts, and Epistles, but especially in the Revelation, show that it was known to the N.T. writers. The Messianic title 'the Son of man' is first found in this book, which furnishes important material for the study of doctrinal development (*e.g.* as regards the Messiah, angels, Sheol, and the resurrection) in the period between the two Testaments. In the Epistle of Barnabas it is cited as Scripture, and many of the early fathers quote it with approval. But it gradually lost favour, and was ultimately condemned in the *Apostolic Constitutions*, vi. 16. (2.) *The Apocalypse of Baruch.* In this book Baruch recounts his experiences immediately before and after the destruction of Jerusalem, and represents himself as receiving revelations regarding the future of Israel. It is a composite work, of Pharisaic sympathies, and written after A.D. 70. Preserved in a Syriac MS. of the 6th century, it was rendered into Latin by Ceriani in 1866. This Latin version has been reprinted by Fritzsche in his *Lib. Apoc. Vet. Test. Græc.*, pp. 654-699. (3.) *The Assumption of Moses* purports to have been addressed to Joshua by Moses prior to his death. After handing over to his successor certain prophetical books, Moses gives a forecast of Israel's history. The book was probably written in Hebrew by a Pharisee during the period A.D. 7-30. It is referred to by Origen (*De Prin.* iii. 2, 1) as the source of the legend about the strife between the archangel Michael and Satan regarding the body of Moses; but it was only in 1861 that Ceriani published part of an old Latin version discovered by him at Milan. (4.) *The Testaments of the Twelve Patriarchs.* In each case the patriarch tells the story of his life, bases upon this an exhortation to avoid his errors and imitate his virtues, and predicts the future fortunes of his descendants. The apocalyptic sections are from the hand of a Jewish interpolator, and the work contains many interpolations by Christian writers. Date uncertain. (5.) *The Book of Jubilees*, so called from its adoption of the jubilee period of forty-nine years as the basis of reckoning in its system of chronology, is a haggadic commentary on Genesis, written from the standpoint of Pharisaic legalism, and dating probably from the 1st century A.D. Preserved in Ethiopic. (6.) *The Ascension of Isaiah.* A composite work containing (*a*) the account by a Jewish author of the martyrdom of Isaiah; (*b*) the vision of Isaiah, which is of Christian origin; (*c*) an apocalyptic section by a later editor. Written originally in Hebrew, and preserved in Ethiopic. Date, 1st century A.D. (7.) *The Sibylline Oracles* are a heterogeneous collection of Jewish and Christian matter, the earliest portions of which are separated from the latest by about five hundred years. In form they resemble the utterances of the ancient sibyl prophesying the fate of the world from the beginning, who is made to address the heathen world in Greek hexameters. For further details regarding these books, see Schürer, *Hist. of the Jewish People* (1886), etc., II. iii.

New Testament.—1. Gospels.—There are extant a large number of uncanonical gospels in more or less fragmentary form, but they are all of later date than our canonical gospels, and are devoid of historical worth. (1.) The Aramaic *Gospel of the Hebrews*, which contains some independent sayings of Jesus, was used by Jewish Christians in Palestine. It is coloured by Ebionitic views, and *The Gospel of the Ebionites* and *The Gospel of Peter* are perhaps only altered forms of it. (2.) *The Gospel of the Egyptians*, quoted by Clement of Alexandria, and mentioned by Epiphanius, was used by the Encratites. It exhibits Gnostic and mystic tendencies. (3.) *The Logia* is the name given to seven 'sayings of our Lord,' first published in 1897 from a Greek papyrus (5¾ × 3¾ inches) discovered at Oxyrhynchus. They partly resemble sayings contained in the canonical gospels, and partly present features that are novel. (4.) Several gospels deal in a legendary way with the infancy and childhood of Jesus. Of these, the best known are *The Protevangelium of James*, an Arabic *Gospel of the Infancy*, and *The Gospel of Thomas.* (5.) Others—*e.g.* *The Gospel of Nicodemus*, with the *Letters of Pilate*, and *The Narrative of Joseph of Arimathea*—treat of the Saviour's trial and passion. (6.) Of *The Gospels of Matthias and Bartholomew*, mentioned by Origen and Jerome respectively, nothing definite is known. The same is true of *The Gospel of Apelles. The Gospel of Marcion* was used by his own sect, and some regard it as having been a form of St. Luke's Gospel.

2. Acts.—These are probably of later date than the earliest of the apocryphal gospels. The Acts of Peter, John, Thomas, and Andrew are usually ascribed to one Leucius, and seem to belong to the 2nd century. The Acts of Paul and Philip may be referred to the same period. The Acts of the remaining apostles are of later origin. Of the thirteen extant writings of this class, the most interesting perhaps, and certainly the oldest romance of its type, is *The Acts of Paul and Thekla*. Tertullian speaks of it as having been composed in honour of Paul by a presbyter of Asia. It recounts the heroic devotion shown by a virgin of Iconium converted under Paul's preaching.

3. Apocalypses.—These include *The Apocalypse of Esdras* and *The Apocalypse of John*—the one a feeble imitation of the apocryphal 2 (or 4) Esdras, and the other of the canonical Book of Revelation; *The Apocalypse of Paul*, detailing the revelations made to him when caught up into paradise; *The Apocalypse of Peter*, containing a history of the world from its beginning till the appearing of Antichrist; *The Apocalypse of Bartholomew*, which sets forth the favours bestowed upon the apostles in answer to the prayers of Christ; *The Apocalypse of Mary*, describing her descent into Hades; and *The Apocalypse of Daniel*, which deals with the consummation of the world.

4. Miscellaneous.—(1.) *The Abgarus Epistles*, consisting of a letter from Abgar, king of Edessa, to Jesus, inviting Him to his city, and a reply from the Saviour, declining the invitation, but undertaking to send an apostle. Eusebius found in Syriac at Edessa, and rendered into Greek (*H.E.*, i. 13). (2.) *The Didactic*, or 'Teaching of the Apostles,' is a handbook of ethics and ecclesiastical procedure, dating perhaps from the middle of the 2nd century, and first published in 1883. (3.) *The Preaching of Peter*. Of this book fragments have been preserved by Clement of Alexandria. They consist of sayings of Jesus addressed to the apostles, and of warnings against Judaism and polytheism. (4.) There are also some spurious epistles of Paul to the Laodiceans, Alexandrians, etc. See Fabricius, *Codex Apoc. N.T.* (1719; 2nd ed. 1743); Nicolas, *Etudes sur les Evangiles Apocryphes* (1866); Hilgenfeld, *N.T. extra Canonem Receptum* (1884); Bleek, *Introd. to the N.T.* (Eng. trans., 2nd ed. 1875); James, *Apocrypha Anecdota* (1897), i., ii.; Lipsius and Bonnet, *Acta Apostolorum Apoc.* (1891), i., ii. For an English translation of the apocryphal Gospels, Acts, and Revelations, based on Tischendorf's edition of these writings, see vol. xvi. of Clark's *Ante-Nicene Christian Library* (1867, etc.).

Apocynaceæ, an order of plants represented in Britain by the blue periwinkles, which cover banks and ground under trees with their evergreen, privet-like leaves. Most of the genera belong to the tropics, and many of the plants are poisonous. Most species have a milky juice, which in certain cases forms caoutchouc; some are tropical climbers known as lianas. Among the most important species are several producing india-rubber, trees yielding dita and other medicinal barks, cow-tree of Demerara, and ordeal-nut tree of Madagascar.

Apodictic, or Apodeictic (Gr. 'proving'), in logic, a term applied to judgments which admit of no contradiction, their truth being implied in the nature of thought or reason.

Apogee (Gr. 'away from the earth'), that point in its orbit at which the moon is farthest from the earth—the point where it is nearest the earth being known as *perigee*. At apogee the distance is 253,000 m., at perigee 222,000 m.

Apol, L. F. H. (1850), Dutch painter of winter and snow scenes. In 1880 he went with the William Barents expedition to the Arctic seas, and produced many pictures—*e.g. Nova Zembla* (1896). His *January Evening in the Hague Wood* is in the Amsterdam Museum.

Apolda, an industrial tn. in the duchy of Saxe-Weimar, Germany, 9 m. E.N.E. of Weimar; manufactures hosiery, bells, preserved foods, etc. Pop. (1900) 20,364.

Apollinaris, a spring in the Prussian prov. of Rhineland, situated in the valley of the Ahr, about 5 m. from Remagen. It was discovered in 1851, and yields the well-known alkaline Apollinaris water.

Apollinaris. (1.) The Elder, native of Alexandria (4th century A.D.), became presbyter of Laodicea, and was associated with his son in an attempt to reproduce the Old Testament in the form of classical poetry, and the New in the form of the Platonic dialogues. (2.) The Younger (d. 390 A.D.), bishop of Laodicea, son of the above, a controversial theologian upon whose teaching a sect, the Apollinarians, founded their creed. He denied the true humanity of Christ, asserting that the place of human mind was in Him taken by the Divine Reason, or *Logos*. The sect spread rapidly in Syria and the East, and after the death of Apollinaris split into two divisions—the Vitalians and the Polemeans, who carried their doctrine so far as to assert that the very body of Christ was divine. These tenets were condemned in 373, 381, 388, 397, 428 A.D., and gradually merged into the Monophysite heresy.

Apollo, one of the great gods of the Greeks, and next to Zeus the most widely worshipped; son of Zeus and Leto (Latona), and twin-brother of Artemis. He was born in the island of Delos. He was worshipped as the god of punishment, sending death by his arrows—all sudden deaths were ascribed to him; as the god of deliverance, and so the father of Æsculapius; as the god of prophecy, especially at Delphi, Delos, and Branchidæ; as the god of song and music, the patron of poets, and the leader of the choir of the nine Muses; as the god of sheep and cattle, especially in the story of his connection with Admetus; as founder of cities and political life—no Greek colony was founded except under the advice of his oracle; and as the god of the Sun—that is, the god of spiritual light. He is above all the god of the Dorians, whose predominance in Greece increased his influence. In Christian times a parallel was drawn between the relations of Zeus and Apollo and those of the first and second Persons in the Trinity. Apollo, though worshipped at Rome (his first temple was built in 430 B.C.), was not originally a Roman god. The wolf, swan, raven, hawk, cock, and crow were all sacred to him.

The Apollo Belvedere, the most famous statue of the god, discovered in 1495 among the ruins of ancient Antium, and now in the Vatican, Rome, is perhaps the noblest representation of the human form. (See illustration, p. 287.) The figure is fully seven feet high, and formerly held a bow in the left hand, which, with the right fore arm, was restored by Montorsoli, a pupil of Michael Angelo. The statue is supposed to be a Roman copy of a bronze votive statue at Delphi, probably dating from the 3rd century B.C.

Apollo, a British second-class cruiser, launched 1891; commemorates the capture of the *Apollon* from the French by Anson off Finisterre (1747). In the British service the name is associated with Rodney's victory off St. Vincent (1780), Egypt (1807), capture of the *Merinos* (1812), and China (1842).

Apollo of Rhodes. See Colossus of Rhodes.

Apollodorus. (1.) Greek painter, born in Athens (fl. B.C. 400). He is considered as the inventor of *chiaroscuro*, for he was the first to succeed in blending tones and in handling light and shade. (2.) Greek poet (300-260 B.C.), born at Carystus in Eubœa, writer of forty-seven comedies, two of which were borrowed by Terence, who fully recognized his great merits. (3.) A Greek grammarian of Athens (fl. c. 140 B.C.); wrote many works, all lost except the *Bibliotheca*, a systematic

The Apollo Belvedere, 'the noblest representation of the human form.'

account of the myths and legends of Greece as far as the time of Theseus. The work is of great value as a mythological commentary to the Greek poets. It has been edited by Heyne (1803), Clavier (with French trans. 1805), in Müller's *Fragmenta Historicorum Græcorum* (1841), and by Bekker (Teubner Series, 1854). (4.) APOLLODORUS of Damascus, architect in Rome during the reigns of Trajan and Hadrian, designed and erected the Forum Trajani and its famous column. He also built a bridge across the Danube, remains of which can still be seen near the town of Turnu-Severinu, Roumania. He is the author of a book about war-machines, entitled *Poliorcetica*, republished in Wescher's *Poliorcétique des Grecs* (1867). He was exiled and killed in 129 by order of Hadrian.

Apollonia. (1.) An important ancient town in Illyria, not far from the mouth of the Aous R. (modern Voyutsa), 7 m. from the sea. It was founded by the Corinthians and Corcyreans, and in Roman times was famous as a place of learning, the Emperor Augustus and Mæcenas among others having studied there. (2.) Ancient town of Thrace, a colony of Milesia; it held a famous statue of Apollo, which was carried to Rome by M. Lucullus in 72 B.C.

Apollonius. (1.) PERGÆUS (3rd century B.C.), known in his own age as the 'great geometer,' was born at Perga in Pamphylia. He passed his life in Alexandria, in the schools of the successors of Euclid, at the time when the Ptolemies IV. and V. were kings of Egypt. Of his many books, only the *magnum opus* on conic sections and the *De Sectione Rationis* have come down to us. The work on conics contains nearly 400 theorems, many of them original. Apollonius was the first to make use of the terms 'ellipse' and 'hyperbola,' and was the discoverer of many important qualities of curves. See Heath's *Apollonius of Perga* (1896). The chief editions are by Halley (1710) and Heiberg (1891-3). (2.) RHODIUS (c. 240-180 B.C.), born at Alexandria, was famous both as poet and scholar. He taught rhetoric at Rhodes. Returning to Alexandria, he succeeded Eratosthenes as chief librarian of the Great Library. His only surviving work is an epic poem in four books, the *Argonautica*, describing the adventures of the Argonauts. It is the work of a scholar, a learned epic as contrasted with the natural epic of Homer; but it maintains a high level of style, and is remarkable for its treatment of the character of Medea and of her love for Jason. It is, in fact, the first love poem of antiquity: Virgil imitated it freely in the 4th book of his *Æneid*; a later Roman poet, Valerius Flaccus, copied it closely in his *Argonautica*; it showed the way to the Greek romance writers; and may perhaps be considered the remote parent of the modern novel. Eds.: Text only, Merkel (Ger.), 1854; with notes and trans., in French, by La Ville de Mirmont, 1893; Eng. prose trans., E. P. Coleridge (1889). (3.) MOLON, Greek rhetorician of the 1st century B.C.; studied at Rhodes; came to Rome, where he taught rhetoric to Cicero (B.C. 88). His numerous works are wholly lost. (4.) TYANEUS 'of Tyana' (c. 4 B.C.-96 A.D.), a Pythagorean philosopher. A remarkable life of him by Philostratus (c. 200 A.D.) has come down to us. He travelled through Asia Minor, Parthia, and India, where he discussed philosophy with the Brahmins; then returned to Greece, and visited Rome. Later he went to Alexandria, where he encouraged Vespasian in his attempt to secure the imperial throne, and to Ethiopia. He claimed superhuman powers, and many miracles are ascribed to him—some so like those of the gospels that it has been conjectured that his whole story is a fabrication, intended by its author as a rival to the Christian narrative. But the evidences of his existence are too strong to be disregarded. He certainly was a man of remarkable powers and influence, and many notable sayings are attributed to him. None of his writings are extant. See PHILOSTRATUS. Froude's *Short Studies*, vol. iv. (1878-83) may be read. (5.) DYSCOLOS ('bad-tempered'), originator of scientific grammar; born in Alexandria; flourished during the reigns of Hadrian and Antoninus Pius. Bekker edited his works in 1817, the most notable of these being that *On Syntax*. See Egger's *A. Dyscole* (1854); Lange's *System der Syntax des A.* (1852).

Apollonius of Tyre, a Latin romance of the 3rd or 4th century, is undoubtedly derived from a lost Greek original. It contains the story of Antiochus, king of Syria, who, in selfish affection for his daughter Tarsia, keeps off suitors by a baffling riddle. Apollonius, king of Tyre, discovers the answer, but is obliged to save himself by flight. An abridgment is included in the *Gesta Romanorum*. The earliest English version (1510) was made from the French *Appollyn, Roy de Thire*. An ancient Anglo-Saxon translation was printed by Thorpe in 1834. The story forms the foundation of Shakespeare's *Pericles* (1609). See E. Klebs's *Die Erzählung von Ap. von Tyrus* (1899).

Apollos, a Jew of Alexandria, who, embracing Christianity, became noted, first in Ephesus and afterwards in Corinth, as an eloquent preacher of the gospel. Misinformed at first regarding the ordinance of baptism, he was set right by Aquila and Priscilla. His name became the rallying-point for one of the four parties in the Christian community at Corinth. Tradition makes him one of the Seventy; and Luther, followed by many moderns, ascribes to him the authorship of the Epistle to the Hebrews. See Conybeare and Howson's *St. Paul*, ch. xiv. (2nd ed., 1856), and commentaries on Acts (18:24*f.*) and 1 Cor. (1:12).

Apollyon, a Greek word signifying 'destroyer,' employed to translate the Hebrew word *Abaddon*, represented in Rev. 9:11 as the angel 'having dominion over the locusts which came up from the bottomless pit at the sound of the fifth trumpet.' The name *Asmodeus* (Tobit 3:8) is the Græcized form of a Hebrew word of similar meaning. He is best known as the antagonist of Christian in the *Pilgrim's Progress*.

Apologetics is the science of the Christian *apology* or 'defence.' It is well defined in the sub-title of the late Professor Bruce's work (*Apologetics*, 1891) as 'Christianity defensively stated.' Within the New Testament itself, in the Acts, we have apologetic elements—*viz.* a defence of Christianity against the charge of being politically mischievous. The Christian apologists of the early centuries, too, were largely on the defensive against the vilest charges. Since the close of the age of Christian persecution, the Christian Church has had to cultivate the apologetic appeal to conviction—always its proper method.

Four subdivisions may be named:—

1. Independently of the Christian revelation, it may be held that reason, or conscience, proves the being of God, the existence of a soul, freedom of will, and immortality. Most Christians hold that revelation presupposes a natural theology. Conceivably, indeed, Christianity might be the first distinct self-manifestation of God in the world. Yet, even if that were true, revelation must throw fresh light on the world it entered, and must gather to itself something that might be called natural religion. (See THEISM.)

2. Passing now to the Christian revelation proper, apologetics involves the truth of the broad outlines of New Testament history. (Apologists have never pledged themselves to the existence of infallible inspiration.) This is sometimes spoken of as historical evidence. But let us distinguish carefully. Historical testimony,

whether within the New Testament or outside of it, does not prove the existence of a divine revelation or redemption. It proves only that there was such a being as Jesus of Nazareth, who advanced stupendous claims. This is at most a preliminary stage in the Christian argument. The oldest Christian document is 1 Thessalonians; and the student of apologetics ought to know by heart the order of the Pauline Epistles, and the various degrees of certainty or uncertainty with which their genuineness may be asserted. But even in the New Testament we have nothing to compete with the gospels as affording information regarding Christ. Much less important, though still of great interest, are the questions of the historical value of the Book of Acts, and of the genuineness of the other books of the New Testament, or the problems of Old Testament criticism. On all these historical questions the Christian apologist holds a 'watching brief.' He cannot for a moment admit Jowett's assertion, that we know very little really about Christ; or the view of Amiel and Professor Percy Gardner, that Christianity ought to be transferred from the region of history to that of psychology. But the apologist must beware of straining the evidence. His supreme concern is the truth; and when violent attacks, like that of the Tübingen School, have been repelled, he must thankfully see the points at issue handed over for treatment to disinterested science.

3. External evidence. While some of the best work of English 18th century writers belongs to the preceding head (Paley's *Horæ Paulinæ*, 1790; Lardner's *Credibility of the Gospel Hist.*, 1727-55), their typical subject is miracle, and the typical book is Paley's *Evidences* (1794). The miracles, as a divine seal, prove that the message spoken by Christ, or by His authorized representatives, is to be received as from God. Along with miracles, prophecies are also relied on—predictions, miracles of foreknowledge. The late J. B. Mozley (*On Miracles*) represents the same point of view. On this theory, the proper proof of Christianity is external to its substance. Modern study of the Old Testament, while making the argument from prophecy more important than ever, has made it difficult to say how far we can regard prophecy as a strictly, and technical, miraculous process, or how far we can prove this to others' satisfaction. There is less uncertainty as to the nature of alleged physical miracles, but their credibility is much canvassed. Some modern theologians, in the supposed interests of science, deny all miracles. Others (*e.g.* Harnack), in the supposed interests of a deeper faith, exclude miracles from playing any part in the Christian argument. It will be best to follow the guidance of the New Testament, and to assign to miracles an important yet subordinate place as evidence (*cf.* John 14:11). Impartial study will confirm the historicity of most of the miracles of the New Testament record.

4. Internal evidence. The appeal to this form of evidence was introduced into Great Britain by Thomas Erskine of Linlathen, and by Chalmers. The phrase is, unfortunately, ambiguous. Even Paley, in *Horæ Paulinæ*, may be regarded as discovering internal evidence in the 'undesigned coincidences' between Acts and Epistles. We mean something different—the evidence of Christian experience; the evidence found in what Christianity is, not in anything 'external' to it, however closely associated. (Rothe and the best modern apologists regard even the Christian miracles, not as an external 'seal,' but as part of the revelation.) Another misapprehension must be guarded against. We do *not* mean to transfer Christianity from history to psychology. We mean experience of the historical Christ; and the topics of importance will be the character and sinlessness of Jesus—the *Gesta Christi*, or His influence in history—the testimony of the Christian Church and of Christian believers—all leading up to the final evidence described in 2 Cor. 4:6. On this view we cannot *prove* the truth of Christianity to others, or even to ourselves, but we can bear witness to God's voice. This internal evidence furnishes the proper and supreme reason for believing in Christ; while it has its roots in the conscience of every man.

Besides books already mentioned, Bruce's *Chief End of Revelation* (1881) may be specially commended, and a reference may be added to Row's *Manual of Christian Evidences* (1887), to Dr. Newman Smyth's *Old Faiths in New Light* (new ed. 1882), and other books, to R. Mackintosh's *First Primer of Apologetics* (1900), to the *Apologetics* of Delitzsch (1869), and (trans.) of Ebrard (3 vols. 1886-7); also the translation of Luthardt's *Apologetic Lectures on Fundamental Truths of Christianity* (2nd ed. 1869), and other works.

Apologia pro Vita sua, religious autobiography by Cardinal Newman (1864), explaining his position in the Oxford movement, and his reasons for joining the Roman Catholic church; and incidentally refuting Kingsley's accusation that 'truth for its own sake need not be, and on the whole ought not to be, a virtue of the Roman clergy.'

Apologue (Gr.), a fictitious narrative used to convey moral lessons; it is a general term of which fable, parable, etc., are the varieties. For the differences between apologue and allegory, see ALLEGORY. One of the shortest and best examples is the scornful Biblical apologue of the cedar and the thistle (2 Ki. 14:9). In English literature the most noteworthy apologues are, perhaps, Robert Henryson's *Town Mouse and Country Mouse* (1621); the fable of the rats and mice who resolved to bell the cat, in Langland's *Piers Plowman;* and the apologue of the Bee and the Spider at the commencement of Swift's *Battle of the Books*, from which last Matthew Arnold derived his famous phrase, 'sweetness and light.'

Apomorphine, HYDROCHLORIDE OF, is produced by heating morphine or codeine in sealed tubes with hydrochloric acid. It appears as small, grayish needles, turning to green in the presence of air and light. It is the most powerful and certain of all emetics, and is given as a hypodermic injection.

Aponeurosis, a broad, fibrous expansion of a tendon, attaching a muscle to its origin or insertion.

Aponogeton. See PONDWEED.

Apophysis, a prominent elevation or process of a bone which has no independent centre of ossification, being thus distinguished from an *epiphysis.* A slender apophysis is termed a 'spine;' blunt, a 'tubercle;' a tubercle with broad base, a 'tuberosity.' In botany, a swelling under the base of the spore-case of some mosses.

Apoplexy, the state of insensibility caused by the rupture of a cerebral vessel, or the blocking of one by an embolus. The term apoplexy is disused by modern writers; the disease is described as cerebral hæmorrhage, cerebral effusion, and so on. The predisposing conditions which produce lesions in the blood-vessels of the brain are usually connected with kidney diseases, abuse of alcohol, syphilis, and the degeneration of blood-vessels in advanced life. Violent muscular exertion, mental excitement, or anything that throws an increased strain upon degenerated vessel walls, may cause a rupture. An apoplectic seizure is often preceded by premonitory symptoms, such as giddiness, loss of memory, headache, tingling in some part of the body, or some local loss of muscular power. The attack is more or less sudden in its onset. The patient may fall down suddenly, utterly motionless and unconscious; or he may feel powerlessness and lethargy slowly creeping over him. The blow may fall chiefly on the mental faculties, or it may be felt most in the muscles and in the nerves of sensation. The patient may die at once, or he may recover, with impaired powers. The extent of permanent paralysis sometimes cannot be determined for some weeks after an attack. With slight lesions it may pass off entirely. There are, however, several other conditions with which apoplexy may be confounded: for instance, drunkenness, other narcotic poisoning (*e.g.* by opium), epilepsy, syncope or fainting, and uræmic convulsions, all have their points of likeness. Unequal pupils are strong evidence in favour of apoplexy.

Treatment.—After an attack absolute stillness is needed in bed, with the head a little raised, and with hot bottles to the feet if they are cold, blister to the nape of the neck, and ice to the head if the face shows much flush. Stimulants should not be given unless the pulse is failing, and then only in small quantities. Croton oil or calomel is often given as a purge, if the pulse is strong enough; and venesection is also used, to lower the blood pressure.

Aposiopesis (Gr.), an abrupt breaking away from a sentence, and leaving it unfinished, for the sake of greater effect.

Apospory. See FERN.

Apostasy, originally a soldier's desertion in war; later, in early Christian times, the desertion or perversion from the true faith, Christian conduct, and the discipline of church or order.

A posteriori. See A PRIORI.

Apostle (Gr. 'ambassador'—*i.e.* not merely the *messenger* but also the *representative* of the sender) was the name applied by Jesus to those disciples whom He specially commissioned to preach the gospel and heal the sick. They received a second commission after the resurrection (Matt. 28 : 19). Their names are found in Matt. 10, Mark 3, Luke 6 (see also Acts 1): note that Simon Zelotes and Simon the Canaanite denote the same individual, while Judas (not Iscariot) seems to be the Lebbæus (Thaddeus) of other lists. Their number, twelve, corresponding to the twelve tribes of Israel, does not seem, after Christ's departure, to have been regarded as fixed; for though Matthias was elected to fill the place of Judas (Acts 1 : 26), thereby maintaining the sacred number intact, we find later that the name apostle is applied to Paul, Barnabas, James the Lord's brother, and even to an Andronicus and a Junias in Rome (Rom. 16 : 7). The qualifications for the office were—(1) having seen the Lord (Acts 1 : 22, 1 Cor. 9 : 1); (2) possession of the signs of an apostle (2 Cor. 12 : 12); and (3) inspiration and a direct call from above (John 16 : 13; 1 Cor. 12 : 28). To the apostles alone seems to have belonged the power to ordain (Acts 6 : 6); while, as regards the determination of disputed points of doctrine and practice, the decision of those resident in Jerusalem was evidently regarded as of paramount authority (Acts 15). In their apostolic labours their field was the world. See Lightfoot's *Comm. on Galatians* (10th ed. 1890).

Apostle Jug, a stoneware jug with or without a lid, and with the images of the twelve apostles in relief all round it. This was much in vogue in the 16th and 17th centuries.—APOSTLE SPOONS, spoons which terminated in an image of one of the apostles, usually made in sets of thirteen.

Apostles, TEACHING OF THE TWELVE. See DIDACHE.

Apostles' Creed. See CREEDS.

Apostles' Days, the days on which the memories of the several apostles are specially celebrated by the church—*e.g.* Matthew on September 21 (Greek Church, November 16); John, December 27 (Greek Church, September 26); Peter and Paul, June 29; Thomas, December 21 (Greek Church, October 6); Philip and James, May 1 (Greek Church, October 9); Simon (the Canaanite) and Jude, October 28; Bartholomew, August 24 (Greek Church, August 25); Andrew, November 30; Matthias, February 24 (Greek Church, August 9); James, the son of Zebedee, July 25 (Greek Church, April 30).

Apostles' Islands, in Wisconsin, U.S.A., a cluster of 27 islands, area 125,000 acres, in Lake Superior, covered with valuable timber. The Jesuits have several mission stations here.

Apostolic Acts, APOCRYPHAL BOOKS OF. In the early Christian centuries, from the 2nd onwards, there arose an extensive literature purporting to set forth the labours of the apostles. Much of this fantastic work is attributed to one Leucius, who, according to the Latin version of the *Gospel of Nicodemus*, was the son of the aged Simeon, and whose name bore a convenient resemblance to that of Luke (Lucas), the writer of Acts. At first the church was content simply to repudiate and condemn them; but as this did not suffice to put down the evil, it adopted the ingenious, if rather perilous, course of submitting them to an orthodox recension, so that, from being the credentials of heresy, they became the religious 'chapbooks' of the faithful. According to their contents, these documents were known as acts (*praxeis* or *acta*), travels (*periodoi* or *itinera*), miracles (*thaumaseis* or *miracula*), or martyrdoms (*marturion* or *passio*). Many of these *Acta* have disappeared; of those that have survived, the following—attached to the names of the various apostles—is a fairly full list.

PETER.—*Martyrium Petri, Acta Petri cum Simone* in Latin, also a *Martyrium* in Greek—all of Gnostic origin; the *Acta Petri et Pauli* and the *Passio Petri et Pauli* (Gr.) are Christian redactions. In these occur the famous *Quo Vadis* legend, and the disputes of Peter with Simon Magus; *cf.* the *Clementine Homilies* (see CLEMENT). The interrelation of these writings is a perplexing subject; see Lipsius, *Apoc. Apostelgeschichten* (1883-90), vol. ii.

PAUL.—Besides the above-cited works which refer to Paul, there is the noteworthy *Acts of Paul and Thekla*, known also as the *Martyrdom of St. Thekla*, an original Gnostic work, ascribed by Tertullian to a presbyter of Asia who was deposed for his forgery. In its orthodox form it can be traced to the 4th century. It narrates the adventures and sufferings of a virgin, Thekla of Iconium, a convert of Paul. There are versions in Syriac, Arabic, Ethiopic, and Slavonic. See Schlau, *Acten des P. und der Th.* (1877).

ANDREW and MATTHEW.—A book of *Acta*, which relates that Matthew, while labouring in the country of the Anthropophagi (cannibals), was captured, then rescued by Andrew, who overwhelmed the city with a flood. There are also *Acta* of Andrew and Bartholomew in Ethiopic; and in Greek and Coptic, *Acts* and *Martyrdom* of Matthew, from which have sprung most of the later traditions about Matthew.

THOMAS.—His *Acta*, originally Gnostic, by Leucius, narrate the labours of Thomas in India; also a *Passio Thomæ* and *Miracula Thomæ* of the 6th century in Latin.

THADDÆUS (Lebbæus or Judas, not Iscariot), called Addai in Syriac.—*Acta* in Greek of the 5th century, which goes back to the Syriac *Doctrine of Addai*, and contains the spurious correspondence between Jesus and Abgar, prince of Edessa. See edition by Philipps, in Syriac, with English trans. (1876).

PHILIP.—*Acta Philippi* in various Greek recensions, and one in Syriac; also a *Passio Philippi*.

JAMES.—The *Martyrdom of James* in Greek; in Latin as the *Passio Jacobi Majoris*.

JOHN.—His *Acta* are mentioned by Eusebius, Epiphanius, and Augustine—fragments relating his miracles, exile, and death. There are also a *Historia Joannis* (Syr.), *Virtutes*, *Passio*, and *Vita*. See under names of the various apostles; and for literature, the end of article APOCRYPHA; especially the works by Lipsius, Bonnet, Malan, and Wright.

Apostolic Fathers, a name applied to the authors of an important group of writings dating from the transition period between the apostles proper and the theological apologists of the 2nd century A.D. Those usually included under the term are Clement of Rome (*I. and II. Eps.*), Hermas (*Shepherd*), Barnabas (*Ep.*), Ignatius (*Eps.*), and Polycarp (*Ep. to Philippians*). But the designation, so used, is arbitrary. See Donaldson's *Apostolic Fathers* (1874); Möller's *Church History*, i. 108 *f.*; and articles in this book on all names given above. Editions, Gebhardt, Harnack, and Zahn (1876 *ff.*; smaller issue, 1901); F. H. Funk (1901); Clark's *Ante-Nicene Christian Library*.

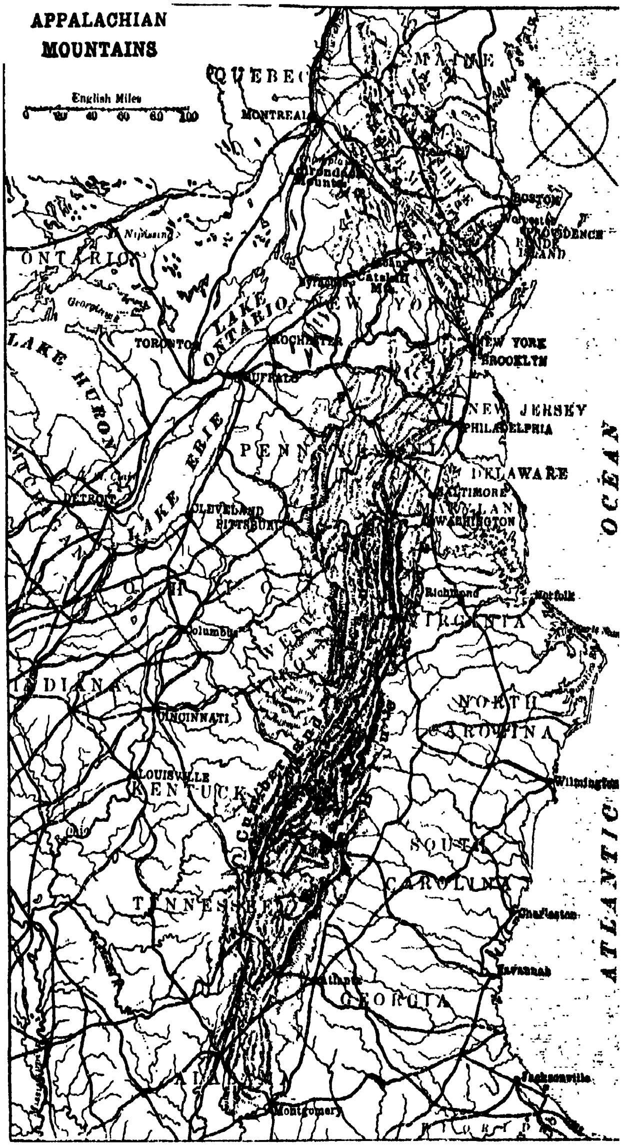
Apostolic Majesty, title of the kings of Hungary, conferred by Pope Sylvester II. (999 1003) upon the first Christian king, Stephen I., for his zeal in converting the Hungarians. Pope Clement XIII. reconfirmed it in 1758 to Maria Theresa and her successors.

Apostrophe. (**1.**) A grammatical sign (') denoting the omission of a letter or letters in a word—*e.g.* ne'er, don't. In the genitive singular of nouns it is used to indicate the suppression of the vowel in the old termination *es*—*e.g.* son's in place of sones. The apostrophe in the genitive plural (as in sons') has no etymological justification. (**2.**) A rhetorical figure of speech by which the speaker addresses his remarks directly to the object of them. A more intense form, in which the speaker actually seems to see the object addressed, is termed 'vision.'

Apothecary, a medical practitioner of lower grade than a physician or a surgeon. Apothecaries are distinguished from chemists in that they may prescribe drugs, while chemists may only compound them. They are governed by the Apothecaries Acts, 1815 and 1874, which prohibit, under a penalty of £20, any person from practising as an apothecary in England or Wales unless he holds a certificate from the Apothecaries' Society of London, or the Apothecaries' Hall in Ireland. Uncertificated apothecaries cannot recover any charges by law. See also MEDICAL PRACTITIONER. For apothecaries' measure, see WEIGHTS AND MEASURES.

Apothegm, or APOPHTHEGM (Gr. 'from a word'), a short, pithy, and sententious saying, as distinguished from a maxim, which is a truth useful for practical guidance in life, and from an aphorism, which contains a statement of some abstract truth. The most famous collection in our literature is Bacon's *Apophthegms New and Old* (1625).

Apotheosis, the deification of mortals. Originating in ancestor-worship, its later development among the higher races, as the Greeks and Romans, was due to the desire of men in power to add divine attributes to their honours. Thus, Julius Cæsar caused his statue to be worshipped in every Roman temple. Augustus was deified in every city of the empire except Rome, and his successors claimed deification as their right.



Appalachians, the easternmost mountain system of N. America, separating the basin of the Mississippi from the streams flowing directly into the Atlantic. It extends from S.E. Canada in a S.W. direction through the United States as far as N. Georgia and Alabama, a distance of some 1,300 m., through New England, New York, New Jersey, Pennsylvania, Maryland, Virginia, W. Virginia, Kentucky, Tennessee, N. Carolina, Alabama, and Georgia. The average elevation may be given at about 2,500 ft. The more important ranges are the Adirondacks of New York (highest summit, Mt. Marcy, 5,344 ft.); the Taconic Range and the Berkshire Hills of Massachusetts; the Green Mts. of Vermont (Killington Peak, 4,241 ft.); the White

Mts. of New Hampshire, culminating in Mt. Washington (6,293 ft.); the Blue Ridge, stretching s. from Maryland, and rising to 4,000 ft. at Stony Man and the Peaks of Otter, midway across Virginia, and broadening in N. Carolina into a plateau that bears irregular ranges such as the Great Smoky Mts. and the Black Mts., the latter having Mt. Mitchell (6,711 ft.), the highest point E. of the Rockies. The Alleghany Mts. are three parallel ranges s. of New York, and their name is often applied to the Appalachian system as a whole. The Cumberland Range is separated from the S. Appalachians by the headwaters of the Tennessee. The White and Green Mts., the Berkshire Hills, and the Adirondacks are health resorts. West of the Blue Ridge is the Appalachian valley, known as the Shenandoah valley in N. Virginia, and the Tennessee valley farther s.

The rocks of the Alleghany-Cumberland plateau are of Carboniferous age, and coal of bituminous quality is found in abundance from Pennsylvania to Alabama, while petroleum and natural gas are obtained in vast quantities. See B. Willis, 'The Northern Appalachians,' and Hayes, 'The Southern Appalachians,' in *The Physiography of the United States* (1895).

Appalachian Tea, also known as CAROLINA TEA and BLACK DRINK, a mixture of leaves of two N. American plants, *Prinos glaber* and *Viburnum cassinoides*, is used as a substitute for tea.

Appanage, more correctly APANAGE, originally, in French feudal law, grants made to the sons of the sovereign for their support, such as lands or feudal superiorities; these, in the absence of male issue, reverted to the crown. In Scotland the term was applied to the patrimony of the king's eldest son. Since the Union (1603) the Duchy of Cornwall, supplemented by money grants, is the appanage of the Prince of Wales.

Apparitions. See PSYCHICAL RESEARCH.

Appeals. (1.) HOUSE OF LORDS. As a tribunal of appeal, the constitution of the House of Lords is regulated by the Appellate Jurisdiction Acts, 1876 and 1887. At least three Lords of Appeal must attend at the hearing of a case. Lords of Appeal are the Lord Chancellor, the four Lords of Appeal in Ordinary, and peers of Parliament who hold or have held high judicial office. Other peers are not excluded, but by custom they neither attend nor vote. In the case of Bradlaugh v. Clarke, in 1882, Lord Denman, a lay peer, voted with the minority. The House of Lords may sit to hear appeals during a prorogation of Parliament, and also during a dissolution if authorized by the King under the sign-manual. Appeals lie from the Court of Appeal in England, the Court of Session in Scotland, and the Court of Appeal in Ireland. They are brought by petition to have an order or judgment reviewed by the King in Parliament. English and Irish appeals must be brought within a year, and Scotch appeals within two years. After the hearing the theory is that the Lords debate the question and put it to the vote, but the speeches made are judgments. If the house is equally divided, the judgment of the court below stands affirmed, and no costs are given.

(2.) THE PRIVY COUNCIL. As an appellate tribunal, the Privy Council acts through the Judicial Committee, constituted under an Act of 1833, as amended by later acts. The committee consists of Privy Councillors who hold or have held high judicial office, and two other Privy Councillors (in 1903 Lord Hobhouse and Lord James of Hereford). In addition there may be two paid members who have been judges in India or the colonies; and, by an Act of 1895, the judges of the self-governing colonies become members if they are made Privy Councillors. They must not exceed five. In 1897 the Chief-Justices of Canada, Cape Colony, and S. Australia were in this way made members of the Judicial Committee. Appeals lie from India and all the colonies. The committee also hears appeals in certain ecclesiastical cases (see PUBLIC WORSHIP REGULATION), and appeals under the Naval Prize Acts.

(3.) THE COURT OF APPEAL (in England). This court consists of the Lord Chancellor, the Lord Chief-Justice of England, the Master of the Rolls, the President of the Probate Division, and five Lord Justices of Appeal, but no judge may hear on appeal a case in which his own decision is under review. The Court of Appeal generally sits in two courts, the Master of the Rolls presiding in Court No. 1, and the senior Lord Justice in Court No. 2. Appeals must be heard by three judges at least, unless the parties consent to a hearing by two judges; but interim or interlocutory orders may be made by two judges, and interim orders in the vacation by one judge. The court hears all appeals from the High Court of Justice, from the Palatine Courts of Lancaster and Durham, and from the Liverpool Court of Passage, and all appeals in lunacy and bankruptcy proceedings, and in registration cases and election petitions. There is no appeal in criminal cases, except on points of law, where there is an appeal to the Court for Crown Cases Reserved. By certain Acts of Parliament an appeal is either forbidden, or only allowed by special leave—*e.g.* election appeals and appeals from the Court of Passage. The court may review a finding of fact as well as a decision on a point of law; but it is naturally reluctant to reverse the findings of fact of a judge who has seen the witnesses, and when a case has been tried by a jury, if the court thinks the verdict is against the weight of the evidence, the usual course is to order a new trial. The court may, but seldom will, admit fresh evidence on appeal. It has absolute discretion as to costs.

(4.) DIVISIONAL COURTS. These courts consist of two judges of the High Court, either of the King's Bench Division or the Probate Division. They hear practically all appeals from quarter sessions, county courts, and other inferior courts, but in some cases leave to appeal must be given by the inferior court; and an agreement not to appeal is binding on the parties to a county court action. An appeal from a divisional court (but only by leave of that court) lies to the Court of Appeal.

(5.) QUARTER SESSIONS hear appeals from all courts of summary jurisdiction when imprisonment without the option of a fine is the sentence (see SESSIONS).

(6.) In SCOTLAND, besides the final appeal to the House of Lords, there is an appeal—(1.) From the Outer to the Inner House of the Court of Session. It is by reclaiming note, and lies from all interlocutors of the Lord Ordinary, though in some cases leave is required. (2.) From the sheriff court to the Court of Session when the value of the case exceeds £25, and the interlocutor appealed against is one sisting process, or giving interim decree for money, or disposing of the whole merits of the case. An appeal also lies to have a case tried by a jury, and in some cases to have the process removed. The appeal may be either from the sheriff or direct from the sheriff-substitute. (3.) From the sheriff-substitute to the sheriff-principal in many cases under the Sheriff Courts Act. (4.) To the High Court of Justiciary from all inferior courts of criminal jurisdiction when a question of law is involved. (5.) To the Circuit Courts of Justiciary from inferior courts in criminal cases not involving death or demembration (generally offences under special statutes); and in civil cases up to £25. (6.) To quarter sessions from special and petty sessions. There is no appeal from the High Court of Justiciary to the House of Lords.

Appearance. (1.) In law. Within eight days of the issue of a writ of summons in an action, the defendant, if he means to defend the action, must deliver a 'memorandum of appearance' at the central office of the supreme court or the district registry, as the case may be, saying, 'Enter an appearance for A. B. in this action,' and containing the name of his solicitor, etc.; and notice of the appearance must be given to the plaintiff. This procedure is substituted for the old form requiring the defendant to appear in person. (2.) In philosophy. See PHENOMENON.

Appellants, or LORDS APPELLANT, the name given to Thomas, Duke of Gloucester, uncle of Richard II., and his associates, the Earls of Derby, Arundel, Nottingham, and Warwick, who in 1387-8 'appealed' of or impeached for treason the king's advisers, notably De Vere and De la Pole (Suffolk). They controlled the deliberations and shaped the vindictive action of the 'Merciless' Parliament of 1388. In May 1389 Richard declared himself of age, and capable of governing; and in 1397 he suddenly seized the appellants, *i.e.* Warwick, Arundel, and Gloucester, of whom the first-named was imprisoned, the second executed, and the third died in prison, probably by violence.

Appendant and **Appurtenant.** These words are applied to incorporeal hereditaments. A right is appendant when it is attached by implication of law and is suitable to a holding: *e.g.* common appendant is a right of common attaching to arable land. Advowsons can be appendant to a manor, common of turbary to a house, lands to an office. A right that is appendant can only be created by prescription, while a right which is appurtenant may be created by grant or prescription. See APPURTENANCES and INCORPOREAL CHATTELS.

Appendicularia, a minute tunicate, often found in great abundance at the surface of the sea. It is free-swimming, and periodically forms and throws off a delicate investment which is carried about by the animal. The special point of interest is that the large tail contains a distinct, persistent notochord and a dorsal nerve cord, structures which occur in the larvæ only of the sedentary ascidians, and are a proof of the vertebrate affinities of those remarkable animals. The little appendicularia is, in consequence, often regarded as a permanently larval form.

Appendix and **Appendicitis.** The appendix vermiformis is a slender, round, tapering process given off from and opening into the inner and back part of the cæcum, near the ileo-cæcal valve in the human intestine. It is usually 3½ in. long, though it varies greatly; its diameter is about equal to that of a goose quill. It is a rudimentary organ; hence its vitality is low, and it is liable to inflammation (appendicitis). Appendicitis occurs at all ages, most frequently between twenty and thirty. It is started most commonly by the irritative action of substances passing through the bowel. It may be acute or chronic, with consequent ulceration and perforation, leading to peritonitis and various complications, resulting from the spread of inflammation to neighbouring organs. The usual symptoms are pain and tenderness. The temperature usually rises, in very severe cases reaching 104°-105°; it is rarely normal. With early care recovery is the rule; but recurrence is common, and neglect may easily lead to complications, such as peritonitis, followed by death. The treatment of slight cases, taken in hand early, consists in rest for the part, ensured by fluid diet limited in quantity, opiates to ease the pain and to restrain the muscular spasm of the bowel, with poultices. Early operative treatment for removal of the appendix is necessary if the inflammation proves uncontrollable. The critical illness of King Edward VII. in 1902 was a form of appendicitis. See *Brit. Med. Jour.*, Sept. 21, 1901.

Appenzell, canton in N.E. of Switzerland. Its name (*Abbatis Cella*) indicates its former possession by the abbots of St. Gall. In 1401 and 1405 the victories of Vögelinseck and the Stoss freed it from the rule of the abbots; in 1411 it became an ally, and in 1513 a full member, of the Swiss Confederation. In 1597, owing to religious disputes, it was divided into half cantons—Inner Rhodes (cap. Appenzell; pop. (1900) 4,574) being Romanist and pastoral, and Outer Rhodes (cap. Trogen) Protestant and industrial. Inner Rhodes (in which rises Mt. Sentis, 8,216 ft., the culminating point of Appenzell) has an area of 61 sq. m., of which 55½ sq. m. are productive; pop. (1900) 13,499. Outer Rhodes has an area of 100½ sq. m., of which 98 sq. m. are productive; pop. (1900) 55,281. Both halves are practically entirely German-speaking, and have preserved their primitive democratic assemblies, which meet annually. Many spots in Inner Rhodes are resorted to in summer for the whey cure; while in Outer Rhodes the muslin and cotton industry is the chief occupation. The largest town in the canton (Outer Rhodes) is Herisau; pop. (1900) 13,497.

Apperception, a term introduced by Leibniz to denote 'perception of which we are conscious, as distinguished from the multitude of perceptions which pass without any notice. This use of the word forms a point of departure for two later modes of usage—(1) the logical or Kantian, in which the term 'synthetic unity of apperception' signifies the logical unity of all knowledge, the principle that all partial knowledges must be coherent—*i.e.* must be capable of taking their place in a single system of knowledge; (2) the psychological usage, in which the term 'apperception' signifies the process of mental assimilation, the process in which a new presentation receives significance by virtue of being referred to already existing knowledge—*e.g.* certain motions of a flag become a signal for one who knows the code. By some psychologists apperception is used as equivalent practically to attention.

Apperley, CHARLES JAMES (1779-1843), English writer on sport; contributed popular articles to *The Sporting Magazine* (1821) over the name 'Nimrod,' and published 'The Chase, the Turf, and the Road' (in *Quart. Review*, 1827), *Memoirs of the Life of John Mytton* (1837), *Nimrod Abroad* (1842), *The Life of a Sportsman* (1842, with biography 1874), and *Hunting Reminiscences* (1843).

Appert, BENJAMIN NICOLAS MARIE (b. 1797), French philanthropist, who interested himself especially in soldiers and prisoners, and in education in the army. In 1822 he was convicted of assisting the escape of political prisoners, and was imprisoned. He travelled all over Europe, visiting schools, hospitals, and prisons, and published his observations in his *Journal des Prisons* (1825-30). Besides philanthropic works, he wrote *Dix Ans à la Cour du Roi Louis-Philippe* (1847).

Appiani, ANDREA (1754-1817), nicknamed 'The Painter of the Graces,' a famous Italian fresco painter; born and died at Milan. He was patronized by Napoleon. His best works are a series of frescoes (*Amor and Psyche*) at Monza, and those in the Royal Palace at Milan.

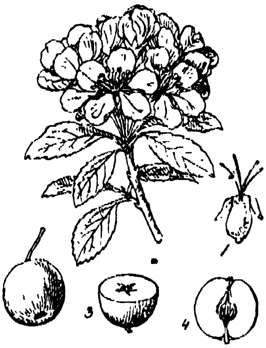
Appianus, or APPIAN, the historian of Rome, was born at Alexandria, but lived in Rome from about 100-140 A.D. His history was written in Greek, and gave a separate account of each district until it became part of the Roman empire. The subjects of the different books were—(1) the Kingly Period of Rome; (2) Italy; (3) the Samnites; (4) the Gauls; (5) Sicily and the other Islands; (6) Spain; (7) Hannibal's Wars; (8) Libya, Carthage, and Numidia; (9) Macedonia; (10) Greece and Asia Minor; (11) Syria and Parthia; (12) Mithridates; (13-21) the Civil Wars from Marius and Sulla to Actium; (22) the Hundred Years from Actium to Vespasian's Accession, 69 A.D.; (23) Illyria; (24) Arabia. Only eleven books are extant—6-8, 11-17, and 23—with some fragments of the others. Appian is merely a compiler from previous writers; he cannot claim any excellence of style or historical acumen; yet his authority for the civil wars, in the absence of other histories, is of great value. Editions: Text, Bekker (1852-3), Mendelssohn (1879-81)—both German. See Hannak's *A. und seine Quellen* (1869).

Appian Way (Lat. *Via Appia*), Italy, an ancient Roman military road which connected Rome with Alba Longa, and thence led on to Capua, Beneventum, and Brundusium. It was called 'the queen of roads' (*regina viarum*), and was begun by the censor Appius Claudius in 312 B.C. Immediately outside Rome it is lined with interesting memorials of the past, chief among which are the church Domine quo vadis, the temple or rather tomb of the Deus Rediculus, the ancient tomb known as the temple of Bacchus, the catacombs and the church of St. Sebastian, the circus of Maxentius, the round mausoleum of Caecilia Metella, the tomb of M. Servilius Quartus, and various other tombs, the reputed Villa Quintiliana, the tomb known as Casale Rotondo, the 12th century tower called Torre di Selce, and the ruins of the old Latin town of Bovillæ.

The new Appian Way runs from Rome to Albano, parallel to the above; it was made by Pope Pius VI. in 1789. Beside it stand the ruins of the basilica of St. Stephen (4th century), and the Acqua Santa baths.

Appin, dist. and vil. on the E. shore of Loch Linnhe, Argyllshire, Scotland, 15 m. N. of Oban. Two m. N. is the castle of Stalker, the seat of the Stewarts of Appin.

Apple, the fruit of a tree (*Pyrus malus*) which grows wild throughout the British Isles, continental Europe except in the extreme north, Asia Minor, and Persia. All cultivated varieties have been derived from the wild (or crab) apple. Its cultivation has spread over the whole world, except where extremes of heat and cold prevent its growth. In Britain the tree flowers in May, following the blossoming of the pear, and generally escapes the earlier frosts. After the flowers have been fertilized by bees the anthers and petals fall, and the fleshy receptacle swells up to form the main part of the fruit, enclosing the ovary, which becomes the core of the apple. At the depressed apex of a ripe apple the persistent calyx of five withered sepals may be seen, around a canal which leads down past the old filaments of many of the stamens to the bases of the five styles, which stand up freely in the canal. Since more than the pistil enters into the composition of the apple, the fruit is known as a *pseudocarp*, or 'false fruit.' There are over 1,500 varieties of apples in cultivation. After numerous experiments a coreless and seedless variety has been developed in Colorado, specimens of which reached this country in 1905.



Crab Apple, Inflorescence.
1, Seed vessel; 2, fruit; 3 and 4, sections.

According to its use, the fruit is classified as dessert (or eating) and kitchen (or cooking) apples. The trees are trained as full, half, and dwarf standards, espaliers, and wall trees. Propagation is by means of seeds, grafts, and cuttings. This fruit was in Greek mythology the symbol of love, because it was given by Dionysus to Aphrodite; of strife, because it was an apple that Eris threw amongst the guests at the wedding of Peleus and Thetis; and of fruitfulness, because Gæa gave golden apples to Hera upon her marriage to Zeus. The apple, further, tempted Atalanta to lose her race for liberty against Hippomenes; and is traditionally believed to have been the fruit which caused the fall of Eve in paradise. In Scandinavian mythology apples were the food of the æsir or gods; and in Teutonic mythology, again, the apple was the symbol of sustaining (mother's) love. See FRUIT FARMING; also De Candolle's *Origin of Cultivated Plants* (1872).

Apple of Sodom, or DEAD SEA APPLE, the fruit of a tree said to grow on the site of Sodom; according to Josephus and other ancient writers, it was beautiful to the eye, but turned to ashes when plucked. It is sometimes identified with the *Solanum Sodomeum* of N. Africa, which has poisonous effects.

Appleby, munic. bor. and mrkt. tn., on the Eden, Westmorland, England. The castle is mainly of the 17th century, with a fine collection of portraits and antiquities. The grammar school was founded by Elizabeth, and the church of St. Michael in Bongate is said to be Saxon. Of importance in Roman times, the town was destroyed by William of Scotland in 1176, and was again laid waste in 1388. During the civil war it was garrisoned for the king by the Countess of Pembroke, but after Marston Moor it fell into the hands of the Parliament. Pop. (1901) 1,764.

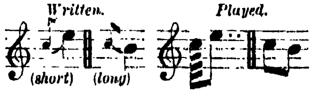
Appleton, city of Wisconsin, U.S.A., at the foot of Lake Winnebago, 95 m. N.W. of Milwaukee; manufactures paper, etc. Pop. (1900) 15,085.

Appleton, CHARLES EDWARD (1841-79), a student of philosophy, on which he lectured at Oxford; moved to London in 1872. He was founder of *The Academy* (1869), of which he was editor until his death. See *Life* by John Appleton and Sayce (1881).

Appleton, DANIEL (1785-1849), American publisher, founder of 'D. Appleton and Co.,' was born at Haverhill, Mass. He went to New York (1825), and began to publish in 1831. He made from the first a speciality of the importation of English books.

Appleton, THOMAS GOLD (1812-84), American author and amateur painter, born in Boston, Mass.; published *A Nile Journal* (1876), *Syrian Sunshine* (1877), *Windfalls* (1878) in prose; and *Faded Leaves* in verse. He is author of the witticism, 'Good Americans, when they die, go to Paris.'

Appoggiatura, an ornamental note in musical score used to embellish a melody, is a small note prefixed to a principal note, and may be long or short; in the latter case it is generally termed an *acciaccatura*, and has an oblique line across the end of its stem. The short appoggiatura must be heard distinctly, but takes little appreciable time value from the principal note. In its most common form the long appoggiatura takes half the value of the note to which it is prefixed, unless when placed before a dotted note, when it is given two-thirds of the value; in either case the long appoggiatura receives the accent.



Appomattox Courthouse, vil., Virginia, U.S.A., 24 m. E. of Lynchburg. Here, on April 9, 1865, General Lee and the Confederate army surrendered to Grant, and thus ended the civil war.

Apponyi, ALBERT, COUNT APPONYI (1846), Hungarian politician, famous for his gift of oratory, has sat in the Hungarian Parliament almost continuously since 1872, and since 1878 has been the acknowledged leader of the National Party.

Apportionment. Periodical payments in the nature of income, such as rents, annuities, and dividends, are, under the Apportionment Acts, treated like interest on money lent, and considered as accruing from day to day, and apportionable accordingly. Thus, if A and B are successively entitled to a certain income payable quarterly, and A dies between two quarter days, the current quarter's income is apportioned between A's estate and B, instead of the whole belonging to B, as it would by the common law. So, if the reversion to a lease is assigned between two quarter days, the assignor is entitled to the proportionate part of the rent which has accrued due up to the date of the assignment, the remainder belonging to the assignee. Again, if the reversion to part of the land leased is assigned, the assignee gets only a proportion of the whole rent reserved by the lease.

Apposition, a grammatical term expressing the relation between a noun or a pronoun and an explanatory noun or noun clause which agrees with it in case without being a predicate. Thus, in the sentence, 'John the smith came home,' the words 'the smith' are in apposition to John. The tendency in modern English is to regard all appositional adjuncts as part of the subject, and to add the inflections at the end. Hence we say, 'John the smith's wife,' and not 'John's wife, the smith,' as an older writer might have said, or 'John's the smith's wife,' as a precisian might contend for.

Appraisement, in English law, denotes the valuation by two sworn licensed 'appraisers' of goods taken under a distress for rent, such appraisement being necessary before the landlord can sell the goods. The duty payable on a legal appraisement ranges from 3d. for £5 or under, to £1 for £500 or over. The cost of the annual license for an appraiser is £2, auctioneers and attorneys being exempt.

Apprehension. See ARREST.

Apprentice, a person who is bound for a term of years to serve a master in some trade or calling in which the master is bound to instruct him. As the apprentice is usually under age when the agreement is made, his father or some other person is made a party to it to guarantee its due performance. The apprenticeship, the term of which cannot legally exceed seven years, must, if it is to be for more than one year, be in writing. Indentures—*i.e.* agreements under seal—are not essential. The stamp on an apprenticeship agreement, whether a premium is paid or not, is 2s. 6d.; but indentures of parish apprentices and apprentices to sea service are exempted. The master can be sued for not properly instructing the apprentice. He is bound to provide an indoor apprentice with proper food, and, if he is ill, with medical attendance, and he is criminally responsible for breach of duty in this respect. Under the Employers and Workmen Act, 1875, which only applies to workmen apprentices in respect of whom a premium of less than £25 has been paid, if a master illtreats an apprentice, a magistrate may order the discharge of the apprentice and the return of any premium that has been paid. On the other hand, if the apprentice absents himself from his duties, a magistrate has power to order him to perform them, and to imprison him for fourteen days in default of his so doing. And in case of disobedience on the part of the apprentice, or wilful misconduct by either party, the agreement may be ordered to be cancelled. In the city of London, the city chamberlain has concurrent jurisdiction as to all apprentices, without regard to the amount of the premium. An apprenticeship agreement may, at the option of the parties, be terminated by mutual agreement, by the death of either master or apprentice, a master's bankruptcy or relinquishment of his trade, the expiration of the term agreed upon, or the coming of age of the apprentice; but an apprentice who does not repudiate his indentures on coming of age will be held to have confirmed them. The illness of an apprentice, if it is such as to permanently incapacitate him, would be a good defence to any action by the master for breach of service. The agreement between master and apprentice is personal, and cannot be transferred to another. A master may inflict moderate corporal punishment on an apprentice who is under age. Apprentices to the sea are governed by the Merchant Shipping Act, 1894. See *Austin's Law of Apprentices* (1890).

Approaches, in military tactics, trenches dug by an attacking body, by which they may advance, under cover, against a fortified position.

Approbate and reprobate, the Scottish equivalent of the English equitable doctrine of election.

Appropriation. (1.) OF ECCLESIASTICAL BENEFICES, means the annexing of them to the perpetual use of a religious house or order. Before the reformation, livings were often appropriated to monasteries. After the dissolution, the persons to whom the monasteries and their lands were granted by the king took those livings also which had been appropriated to them, and thus were called lay impropriators. (2.) OF PAYMENTS. When a debtor owes different debts to the same creditor, and makes a payment on account, he is entitled at the time to appropriate the money paid to any debt he chooses; but if he pays the money generally, without making any appropriation, then the creditor may appropriate the payment to the discharge of whichever debt he likes. If neither the debtor nor the creditor makes any appropriation, the law will appropriate the payment, generally, to the discharge of the earliest debt unpaid. When a current account is kept at a bank, the earliest drawing is appropriated to the earliest payment. (3.) OF SUPPLIES. Except sums directly charged upon the Consolidated Fund, such as judges' salaries, no payment of public money can legally be made without the express sanction of a vote of the House of Commons. The practice is to pass two Consolidated Fund Acts each year, one at the beginning of the session and one later, by which money for current expenditure is authorized to be issued out of the Consolidated Fund. Towards the end of the session the estimates are introduced, and the sum required for each purpose is voted. The Appropriation Act then authorizes the issue out of the Consolidated Fund of the balance of the money required, and it appropriates that money, and also all the money authorized to be issued by the two Consolidated Fund Acts of the session, to the particular services for which it has been voted.

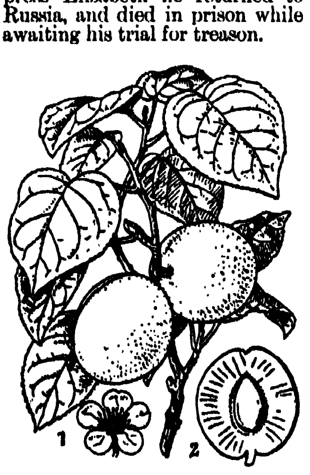
Appropriation Clauses, certain clauses of parliamentary bills, which had for their purpose the commutation of Irish tithes into a rent charge, the reduction of the number of sinecures in the Irish Episcopal Church, and the 'appropriation' of the surplus revenues to the education of the whole people. Various unsuccessful attempts were made from 1833 to 1837 to carry these measures; in 1838 they were passed.

Approver, a legal term formerly applied to one who, being charged with others with the commission of a treason or felony, turned accuser of his accomplices in order to save himself. See KING'S EVIDENCE.

Approximation, in mathematics, denotes a result which, though not rigorously accurate, is sufficiently accurate for the end in view. Tables of logarithms are approximations accurate to a certain number of decimal places, and many equations can only be solved approximately. It is often possible to find, by plotting on squared paper (see GRAPHS), a simple expression to represent approximately a complex mathematical expression.

Appurtenances, strictly, rights which appertain to and pass under a conveyance of real property without being specifically mentioned—*e.g.* easements. But the term is often loosely applied to those things which are generally enjoyed with the principal thing—*e.g.* a grant of a house with its appurtenances may pass the garden. See APPENDANT and APPURTENANT.

Apraxin. (**1.**) FEODOR, COUNT (1671-1728), founder of the Russian navy, was made general-admiral of the navy by Peter the Great. He took a successful part in the expedition against Sweden in 1710, and in 1713 he was in command of the fleet against Finland, and forced Sweden to conclude the treaty of Nystad, which gave to Russia the Baltic provinces. (**2.**) STEPHAN FEODOROVITCH, COUNT (1702-58), nephew of the above, fought under Münnich against the Turks. In 1757 he was appointed commander-in-chief of the army invading Prussia, and gained the battle of Grossjägersdorf (Aug. 30, 1757). Hearing of the illness of the Empress Elisabeth he returned to Russia, and died in prison while awaiting his trial for treason.



Apricot in Fruit.
1. Flower; 2, section of fruit.

Apricot (*Prunus armeniaca*), a species of the plum division of the Rosaceæ, supposed by De Candolle to be a native of China, although it is now naturalized in Syria, Armenia, and Egypt. From its abundance in Palestine, Canon Tristram supposes it to be the apple of the Bible. The fruit is variable, about the size of a peach, single-stoned, with a sweet or bitter kernel (seed); golden or orange fleshed; velvety skin of similar colour, with pink or red on the sunny side: a distinct shallow groove runs down one side. The Persian name, *misch-misch*, is applied to the sweetest variety of apricot exported from the Levant, and commonly known as 'musch-musch,' which is often dried and rolled into cakes. The plant has been grown out of doors in Britain for over three and a half centuries, and is usually budded on the stocks of plums. Candied apricots come from the south of France. The older English name of 'apricock' is reminiscent of the Latin name *præcoqua*, 'early ripe.' See De Candolle's *Origin of Cultivated Plants* (1872).

April, MONTH OF. See YEAR.

April Fools' Day. See ALL FOOLS' DAY.

A priori and **a posteriori.** The antithesis of *a priori* and *a posteriori* knowledge has passed through various modifications of meaning. In earlier usage it expressed the contrast between knowledge through causes and knowledge through effects; then, later, the contrast between rational and empirical knowledge. The Kantian usage connects itself with the latter contrast. *A priori* principles are for Kant those that are independent of experience, in the sense that their truth is not proved by a collection of empirical instances, but is seen to be presupposed in the very nature of a connected or intelligible experience: *e.g.* 'Every event must have a cause' is such a principle. *A posteriori* knowledge, on the other hand, must be referred to particular experience for its proof—*e.g.* the proposition, 'Arsenic is poisonous.' But the expression *a priori* is commonly applied to any knowledge which is general in its character, and thus independent of particular verifications: *e.g.* a general proof of the impossibility of squaring the circle makes it needless to examine particular attempts to solve the problem.

Apron, in engineering, a covering built to protect a surface from the action of flowing water or from heavy shocks.

Apsaras, a race of female beings in Hindu tradition who form attachments with the Gandharvas, and bear a strong resemblance to the swan-maidens and seal-women of European folklore. They were originally water-sprites. Probably the best known is Urvaçi, who figures in one of Kalidasa's dramas.

Apse, in ecclesiastical architecture, the easternmost portion of a church; the recess at the end of the chancel. It is semicircular, or, more commonly, consists in plan of five sides of an octagon. It is supposed to represent the raised platform of the secular *basilica* or public hall; though others maintain that it was borrowed from the presidential platform of the meeting-room of the early Christian guilds. See BASILICA.

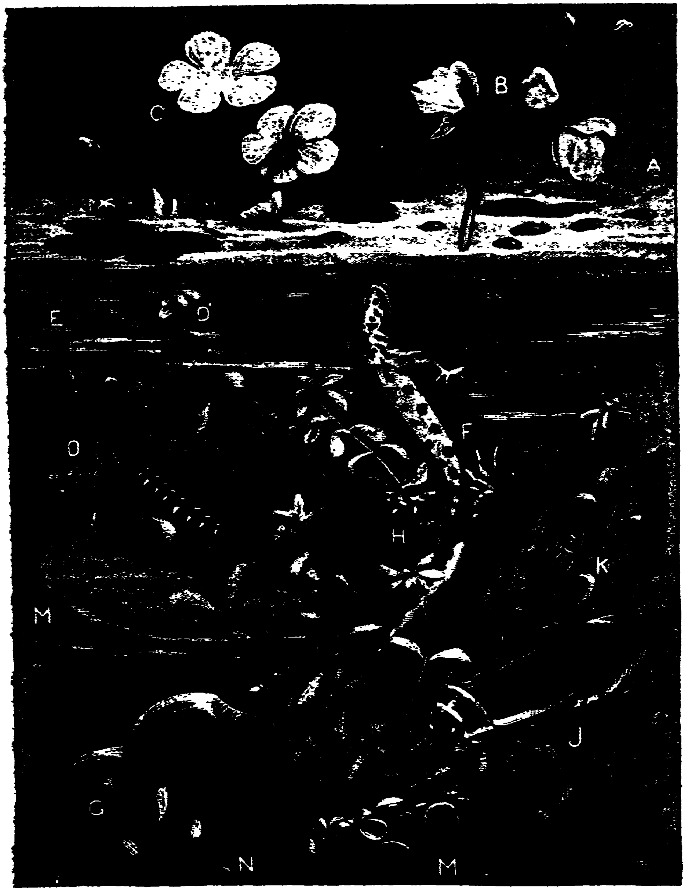
Apsheron (Per. 'sweet water'), a peninsula at the extremity of the Caucasus range, jutting out for 30 to 40 m. eastwards into the Caspian. Geologically it is composed of limestone and sandy clay, and contains saline lakes, petroleum wells (see BAKU), and mud volcanoes.

Apsides, two points in the orbit of a planet or satellite where the curvature is circular, the moving body there crossing the major axis at right angles. These points are at aphelion and perihelion, and the 'line of apsides' is, therefore, equivalent to the major axis, and since it shifts forward through the effects of perturbation, the anomalistic year or month is longer than the corresponding sidereal period.

Apsley House, at the corner of Hyde Park, London, was built by Baron Apsley, Lord Bathurst, in 1785, on the site of the Hercules' Pillars Inn mentioned in Fielding's *Tom Jones*, and in 1820 was presented by the nation to the Duke of Wellington. He resided there until 1852.

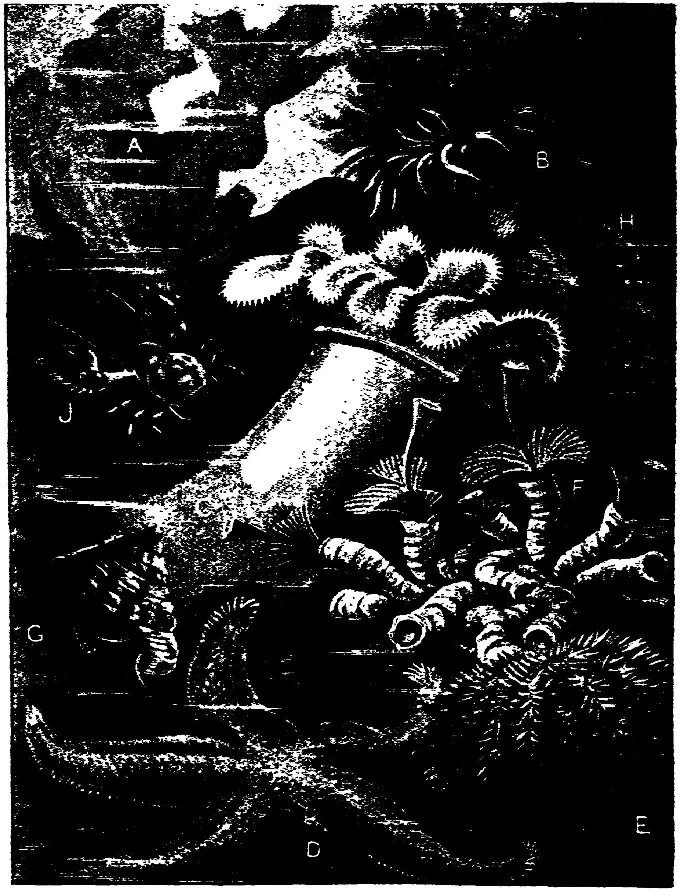
Apt (anc. *Apta Julia*), tn., dep. Vaucluse, France, 31 m. E. of Avignon. It contains a cathedral (10th to 11th century), and has some trade in fruits, truffles, etc. Pop. (1901) 5,948.

Aptera, or APTERYGOTA (Gr. 'wingless'), a primitive order of insects, including those forms which have apparently never possessed wings. The absence of wings occurs in parasitic forms (*e.g.* fleas and lice), in larval forms (*e.g.* maggots and caterpillars), in the workers of ants and termites, in the females of some cockroaches, and so on; but in all these cases the life-history, or a comparative study of allied insects, shows that the loss of wings is secondary—a derived character. In the Aptera, on the other hand, there is nothing to suggest that wings were ever present, and the insects remain permanently at the larval level. As in many larvæ, the regions of the body, especially the thorax and abdomen, are not well marked. The Aptera are all small, delicate insects, and are divided into two sub-orders, Collembola and Thysanura. A good example is the little 'silver-fish' (*Lepisma*), common in kitchens.



Fresh-water Aquarium.

A, Duckweed; B, Bladderwort (*Utricularia*); C, Water buttercup; D, Water starwort; E, Hornwort; F, Newt; G, Snail (*Limnæa stagnalis*); H, Snail (*Planorbis corneus*); J, Beetle (*Dytiscus marginalis*); K, Beetle (*Acilius sulcatis*); L, Beetle (*Gyrinus natator*); M, Caddis larvæ in cases; N, Bloodworms (larvæ of gnatlike flies); O, Pupa of large dragon-fly.

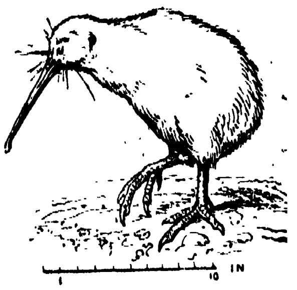


Salt-water Aquarium.

A, *Ulva latissima*; B, Beadlet (*Actinia mesembryanthemum*); C, Plumose anemone (*Actinoloba dianthus*); D, Common starfish; E, Purple-tipped urchin; F, *Serpula contortuplicata*; G, Top-shell; H, Limpet; J, Broad-claw crab.

These plates show animals and plants which may be easily kept in the home aquarium. There is no more delightful means of studying nature.

Apteryx, or Kiwi, a bird peculiar to New Zealand. It is very much smaller than its nearest allies, the extinct Moas, but, like them, is without obvious wings. The feathers are hair-like in appearance, and the beak is long and curved, with the nostrils nearly at its extremity. The food consists chiefly of earthworms, and the birds are entirely nocturnal in habit. Kiwis breed slowly, one or two very large eggs only being laid during the season, and as yet there is no record of the successful rearing of young in captivity. Though now carefully protected, it is to be feared that their extermination is only a matter of time.

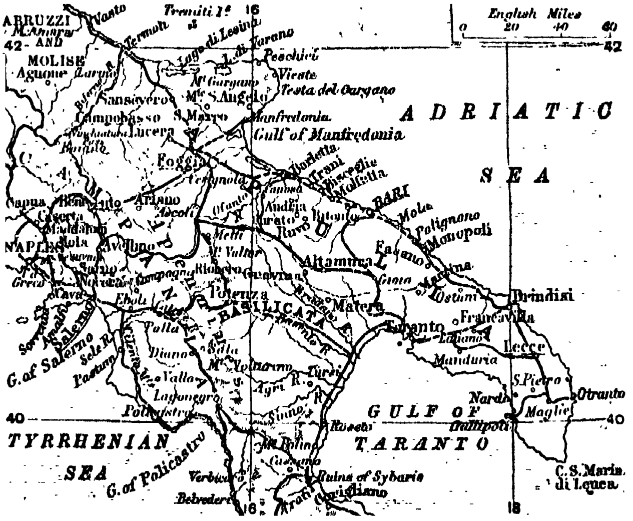


The New Zealand Kiwi.

Aptornis, a genus of recently extinct wingless birds, probably of the family Rallidæ, the fossil remains of which are found, along with those of the Moa, in the recent formations of New Zealand.

Apuan Alps, in Italy, lie between the Ligurian Alps and the Mediterranean, parallel to the former, and reach an altitude of 6,385 ft. in Monte Pisanino. They are outliers of the Apennine system. Their length is about 30 m., and they descend steeply to the sea on the w. Their upper layers are composed of some of the finest white marble in the world, which was known to the Romans, and was rediscovered by Michael Angelo. (See Carrara and Massa.)

Apuleius, Lucius, Roman rhetorician, b. c. 130 a.d. in Madaura, N. Africa; educated at Carthage and Athens. On the death of his father, who left him a large fortune, he travelled extensively, visiting Italy and Asia. The knowledge he thereby acquired of priestly irregularities forms the groundwork of many of the stories in his *Golden Ass*. On one of his journeys he was hospitably entertained during an illness by a young man, whose mother, a rich widow named Pudentilla, married him. Her relatives accused him of gaining her affection by witchcraft; and the defence spoken (173) by Apuleius is still extant, under the title *Apologia*. His later life was spent as a rhetorician at Carthage. His most important work is known as *Metamorphoseon, seu de Asino Aureo, libri xi.*, the 'Metamorphosis of the Golden Ass.' It is a romance; the autobiography of an imaginary Lucius who was turned by an enchantress into an ass, in which shape he observed the follies of men, until the priests restored him to his own form; a satire on the morality of the society of his day, particularly on that of certain orders of priests. The story of Cupid (Amor) and Psyche, in the 4th, 5th, and 6th books, forms the most interesting part of the work. This served as a basis to Raphael for his beautiful frescoes, *Story of Psyche*, in the Villa Farnesina in Rome. Some other writings, mostly philosophical, and of less interest, are still extant, besides the 'Defence' already mentioned. The latest and best edition is J. van de Vliet's *Metamorphoseon* (1897) and *Apologia and Florida* (1900). English translations are: *The Golden Ass*, by Sir G. Head (1851), and by Adlington (1566; new ed. 1892); and *Eros and Psyche*, by R. Bridges (1885). See also J. G. Frazer's *Golden Bough*.

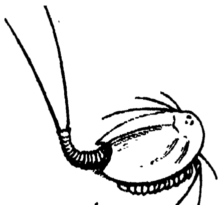


Apulia.

Apulia (Ital. *Puglia*), a territorial div. (compartimento) of S. Italy; stretches along the Adriatic from the river Fortore (w. of the lofty Gargano promontory) to the extreme s.e. corner of the peninsula, C. Santa Maria di Leuca, and thus embraces the three provinces of Foggia, Bari, and Lecce. Its total area is 7,380 sq. m., and its pop. (1901) 1,949,423. Apart from Monte Gargano (5,120 ft.), the n. part of the territory is a level plain—a rich grazing ground in winter, when it supports thousands of sheep, but in summer it is parched and dry. The s. part, between the Gulf of Taranto and the Adriatic, is in part a low, dry limestone plateau, but yields excellent wheat, which is used in the manufacture of macaroni, also barley, maize, beans, lentils, pease, and good olive oil. Wine is generally produced—good, high coloured, and full of body. Other products are fruits (figs, oranges, lemons, olives, etc.) and salt, besides a little cotton, flax, tobacco, and silk. Marble is quarried on Monte Gargano. The people live, for the most part, in large towns, which are, as a rule, situated either on the Adriatic coast or on the edge of the limestone plateau. Among the former are Barletta, Bari, Monopoli, and Brindisi; among the latter, Andria, Bitonto, Putignano, Lecce. The chief ports on the Gulf of Taranto are Taranto and Gallipoli. The summers are hot, and malaria clings to certain swampy tracts along the coasts. For centuries this part of Italy was dominated by Greek civilization, disseminated from the cities of Magna Græcia; but, opposing Rome, it suffered severely in the social war of 90-88 b.c., and again after the failure of Hannibal's designs, which it had supported. After Rome's supremacy crumbled to pieces, the region was divided between the Eastern empire and the duchy of Benevento. During the 11th and 12th centuries it was overrun and subjugated by the Normans, and so passed under the crown of the Two Sicilies. See Gregorovius's *Apulische Landschaften* (4th ed. 1897). See also Italy; and for history, Naples.

Apure, riv. in Venezuela. See Orinoco.

Apurimac. **(1.)** River, S. America, rises about 15° s. in the Peruvian Andes, and is a head stream of the Amazon. After its union with the Pirene, it flows under the name of Tambo, and after a course of 500 m. it joins the Ucayali. **(2.)** Department, Peru, S. America. Area, 8,187 sq. m.; pop. (1896) 177,387. Its cap. is Abancay (pop. 3,000).



Apus.

Apus, a fresh-water crustacean, about one inch in length, nearly related to the small brine-shrimps. Its interest lies in its primitive structure, which has led zoologists to regard it as near to the extinct ancestors of the Crustacea.

Apus, 'the bird of paradise,' sometimes called Avis Indica, a southern constellation, published by Bayer in 1603 from the observations of Petrus Theodorus. It lies south of Triangulum Australis, within about 13° of the Pole, and includes two variable stars, R and S Apodis.

Aqua fortis. See NITRIC ACID.

Aquamarine, those varieties of beryl which are bluish-green or sea-green. As compared with the pure green beryl or emerald, it is of little value; yet it is used as a gem. It is found in many places, but comes chiefly from Brazil and the Urals. Some specimens weigh as much as 15 lbs. See Streeter's (6th ed. 1898) or A. E. Church's *Precious Stones* (1883).

Aqua regia (Lat. 'royal water,' because it dissolves gold), a mixture of nitric acid with from two to four times as much hydrochloric acid, which sets free chlorine; to this its solvent action is due.

Aquarium, one or more tanks or vessels containing aquatic plants and animals, living as nearly as possible under natural conditions. The basis of the modern aquarium is the mutual dependence of animals and plants, a principle not fully worked out until the earlier half of the 19th century. The fact that plants absorb the carbon dioxide generated by animals, and liberate the oxygen necessary for their respiration, was first definitely formulated by C. G. B. Daubeny (1833); but the interdependence of animals and plants is not limited to that relation, for plants are able to utilize the waste materials of animals. The popularity of aquaria was at first largely due to the publications of P. H. Gosse, especially his *Aquarium* (1853). Subsequent experience has, however, shown that, except on a small scale, the condition of balance is difficult to preserve; and almost all recent aquaria, whether those of the marine stations or those for public exhibition, have mechanical arrangements for aerating or renewing the water. It is now recognized that, under natural conditions, the wind and waves have much to do with the aeration of water, and in the aquarium the difficulties greatly increase with the depth.

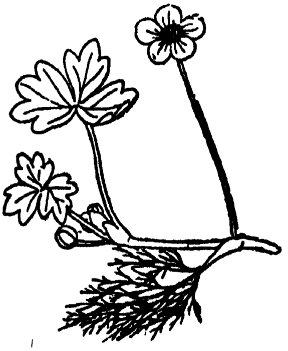
The relative simplicity of the fresh-water aquarium is largely due to the fact that many fresh-water plants are easy to obtain, and grow readily, especially if planted in submerged flower-pots. The Canadian water-weed (*Anacharis*) will grow and flourish without soil, if a few young shoots are thrown into the water. Various species of duckweed (*Lemna*) can similarly obtain all the food they require from water; but as their fronds float at the surface, their aerating value is slight. An interesting plant is the somewhat rare bladderwort (*Utricularia vulgaris*), which, like many other aquatic forms, develops in autumn 'winter buds,' laden with food material, which sink to the bottom of the pond. In spring they rise towards the surface, and unfold into a trailing mass of stems with threadlike leaves and remarkable bladders. These bladders serve as traps for minute aquatic animals, the bladderwort making up for its lack of roots by its carnivorous habit. If a few winter buds of *Utricularia* are dropped, in spring, into an open shallow pan of water, the vessel will serve as an aquarium in which tadpoles, caddis-worms, and larval beetles may be reared. In addition to its larger inmates, such an aquarium will also contain a number of minute forms, such as Rotifera and Protozoa, which are beautiful microscopic objects. Many other aquatic plants grow readily in aquaria, such as the very common water buttercup (*Ranunculus aquatilis*), water starwort (*Callitriche verna*), hornwort (*Ceratophyllum demersum*); and dealers also supply interesting exotics, such as *Vallisneria spiralis* and water chestnut (*Trapa natans*). Of the animal inhabitants, by far the easiest to keep alive are those capable of breathing both air and water, such as the aquatic amphibians, especially newts, axolotls and larval forms, molluscs such as the water snails, and larvæ of aquatic insects. Fish require care; the beginner is most likely to be successful with sticklebacks and minnows. If the water becomes contaminated with surplus food, the fish are liable to attacks of 'fungus' (*Saprolegnia*). If noticed in time, this may be cured by transferring the affected forms to running water; but if the disease once obtains a hold, there is no cure except the removal of all the inhabitants, and the thorough disinfection of the aquarium.

The salt-water aquarium presents more difficulties than the fresh, as it is not easy to repair damage wrought by inattention or accident, and an unnoticed death may poison all the other inhabitants. Nor are seaweeds so easy to grow as fresh-water plants. Sea lettuce (*Ulva*) is as good a plant as any, and should be obtained attached to a stone or piece of rock. Of animals, the beautiful anemones, some of which *e.g.* *Actinia mesembryanthemum* and *Actinoloba dianthus*- are hardy in captivity; the echinoderms - starfishes, sea urchins, brittle stars, etc.; marine worms, such as *Sabella*, *Serpula*, and others; and the marine representatives of molluscs and crustaceans, are well worth cultivation. There are marine aquaria attached to the biological stations of Naples and Plymouth. Other notable aquaria exist at Brighton (England), Berlin (1869), Hamburg, New York, and Washington. See Taylor's *Aquarium* (1881), also J. G. Wood's *Common Objects of Seashore, including Hints for an Aquarium* (1886).

Aquarius, a southern zodiacal constellation, and the eleventh sign of the zodiac, symbolized by the hieroglyph for water, . The sun enters the sign on January 21, but reaches the formerly coincident asterism only on February 14. None of its stars are of the third magnitude, but it includes the fine binary ξ Aquarii, to which Doberck has assigned a period of 1,625 years, a magnificent globular cluster (Messier 2), and the 'Saturn' nebula (N.G.C. 7009), a pale-blue planetary with ringlike appendages.

Aquatic Animals. It has become almost an axiom of modern science that life originated in the water, and numbers of animals, especially the simpler forms, still inhabit that medium. This is true of the vast majority of the Protozoa, sponges, Cœlentera, and echinoderms. It is the rule for unsegmented worms, except where these are parasitic; and, among annelids, the earthworms and land-leeches are obviously forms which have later acquired a terrestrial habit. Though, among arthropods, the great groups of insects, myriapods, and arachnoids are typically terrestrial, yet the Crustacea are almost all aquatic. Among molluscs, only the gasteropod class includes land forms.

In vertebrates, the line which separates the typically aquatic and typically terrestrial forms passes through amphibians, which may, as in the frog, be water animals in youth and land animals in adult life. Nevertheless, the crocodiles, turtles, and water snakes among reptiles, many birds, the sirenians, cetaceans, and seals among mammals, illustrate the fact that members of typically terrestrial groups may return to a purely aquatic life. An important point in these cases is that the aquatic reptile, bird, or mammal retains its terrestrial habit of breathing air by lungs, and shows no tendency to reacquire gills. In general we may say that above amphibians the aquatic habit, when present in a vertebrate, has been secondarily acquired. The adaptations to the aquatic life are therefore usually more easily studied in such vertebrates than in invertebrates, where the aquatic habit is often the primary one. The whale, for example, as contrasted with an ordinary terrestrial mammal, shows some very striking modifications of structure. The spindle-shaped form, repeated in fish, is less an adaptation to the aquatic life in itself than to swift movement in water. To a similar cause the absence of the hair and of the hind limbs is to be assigned.



Water Buttercup.

Water Lily.

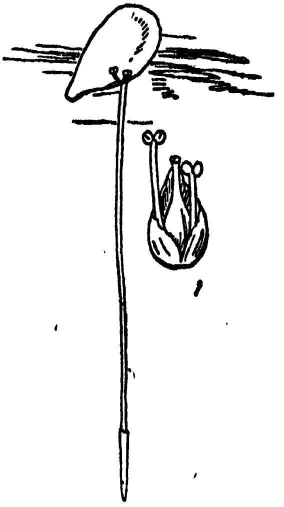
The use of the tail as the main organ of propulsion is common among aquatic animals; while the fact that the body loses in water a large proportion of its weight sets the limbs free from the supporting function which they must perform in land animals.

A very common structure in those aquatic animals which are capable of rising and sinking in the water is some form of hydrostatic organ, or internal reservoir of gas. All air-breathing vertebrates have these in their lungs, which were perhaps themselves in origin merely hydrostatic organs; fish have usually a swim-bladder; many cuttles have air-spaces in their 'bone' or float; the pearly nautilus has its chambered shell filled with gas; even many of the Protozoa have bubbles of air in their soft bodies. While many aquatic animals are swift swimmers, and others creep passively at the bottom, the fact that large bodies of water are themselves always in motion renders life in water possible for two sets of animals to whom terrestrial life would be impossible. There are, first, the drifters or 'plankton,' animals which can make no headway against currents, but float idly with them. This fauna consists largely, though not exclusively, of the simpler forms of animal life. Secondly, among aquatic forms there are numbers which are fixed to the ground or to other animals, and depend upon the movements of the water itself for food.

In general we may say that, owing to the physical conditions, simple animals are more abundant in water than on land; but in addition to this primitive fauna, many complex forms have returned from the land to the sea, and such forms often display remarkable modifications of structure associated with the aquatic life.

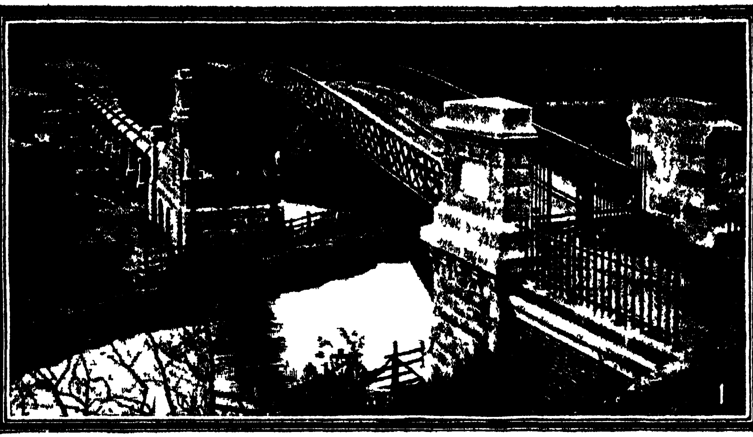
Aquatic Plants, or HYDROPHYTES, are wholly or partially submerged, but do not include marsh plants. Seaweeds and freshwater algæ are aquatic. Many of the former are left exposed to the air at low tide, but are prevented from drying entirely by the presence of mucilage, which enters into the composition of their cell-walls. The sliminess of water plants is due to a secretion of mucilage over the surface. The better-known examples of aquatic flowering plants are the water buttercups (*Ranunculus*), some of them with all the leaves submerged, and repeatedly divided into linear segments which enable them to yield readily before currents, and also to increase the absorptive area; others with similar leaves to these, and also floating leaves with the blade in one piece, lying flat on the water; water lilies (*Nymphæa* and *Nuphar*), with large, elliptical, undivided leaves floating on the surface; and the pondweeds (*Potamogeton*), with submerged and floating petioled leaves, or with ribbon-shaped leaves. The Cape pondweed (*Aponogeton*) and Canadian pondweed (*Elodea*) are other examples; but there are many more. The majority of water plants are fixed in the soil, but some, like duckweed (*Lemna*) and water soldier (*Stratiotes*), float, or at least are free from the soil. The whole surface of a water plant in contact with the water absorbs liquid and gaseous food, and, in the case of flowering plants, such absorptive surfaces are almost or entirely devoid of the stomata and cuticle which are commonly found in the epidermal surfaces of land plants; but both stomata and cuticle occur on the upper surfaces of floating leaves. The vascular and fibrous tissues of the stems and leaves are poorly developed, since

Pondweed.

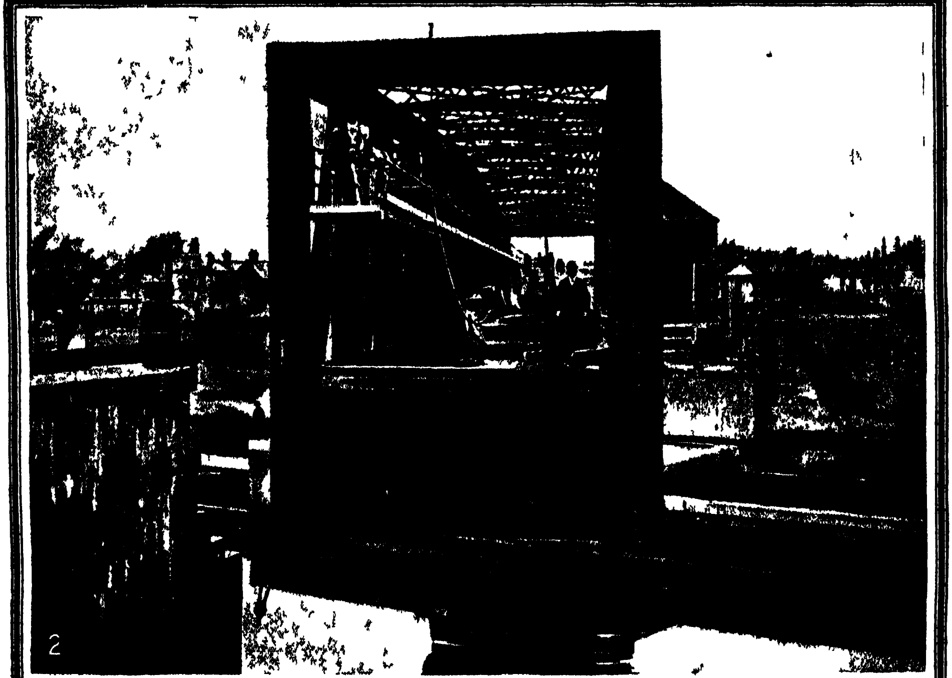


Duckweed, with Flower enlarged.

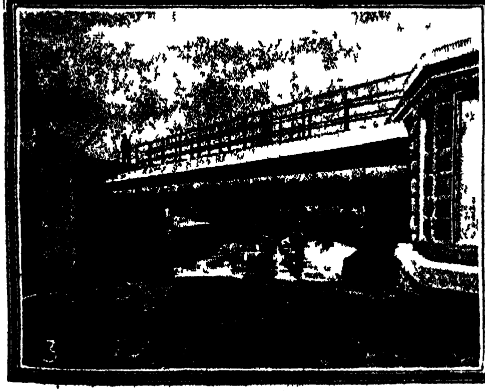
Water-Soldier.



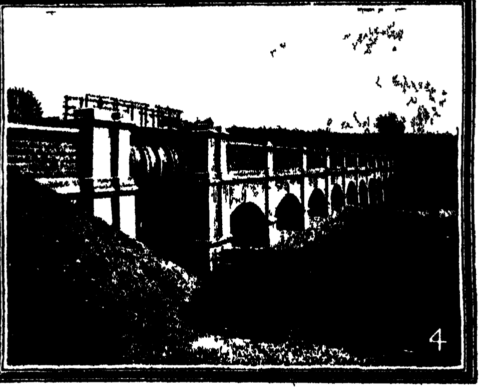
1



2



3



4

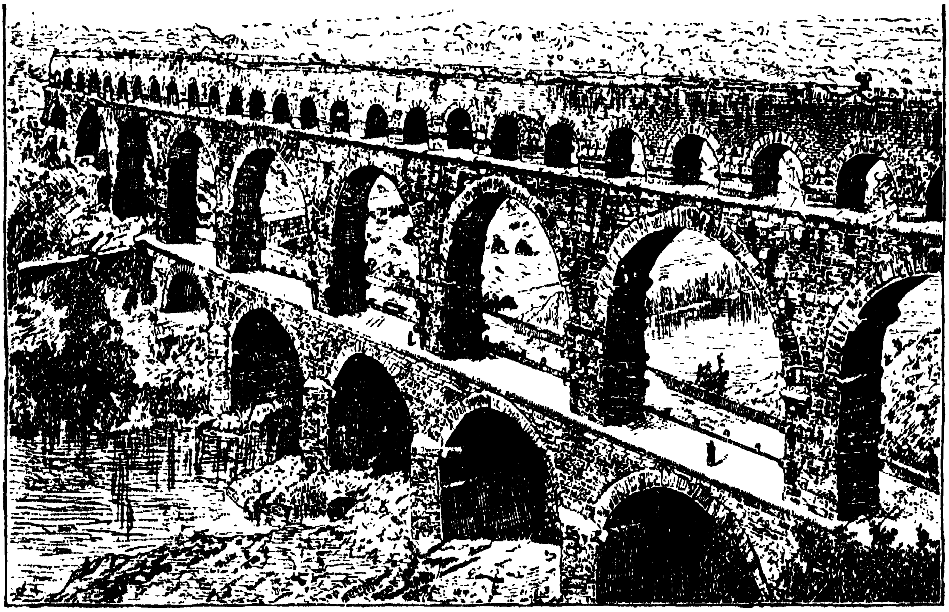
Modern Aqueducts

1. Steel Aqueduct over Staffordshire and Worcestershire Canal near Kidderminster (Birmingham Water Works). 2. Aqueduct carrying Bridgewater Canal across Manchester Ship Canal, shown in act of swinging—waterway closed. 3. Aqueduct over river Rea, near Cleobury (Birmingham Water Works), longest unsupported steel pipe yet made. 4. Masonry and steel Aqueduct, Carmel, near Llandrindod (Birmingham Water Works)

they are scarcely required, and the roots are reduced. Large air-spaces occur in the cellular tissue of most water plants, and these become filled with oxygen, for the better respiration of the plant. Most aquatic plants expose their flowers above the surface, and thus are subject to the same means of pollination as land plants. A few only have entirely submerged flowers, as in sea wrack (*Zostera*), which, like very few other plants, is submerged in sea water. Most aquatic plants are perennial. Some—*e.g. Utricularia* (see AQUARIUM)—form dense terminal winter buds in autumn: these drop off, rest at the bottom during the winter, and then develop during the following spring. Others perennate by means of fleshy rhizomes, which store up food. See Willis's *Flowering Plants and Ferns*, vol. i. (Camb. Univ. Press, 1897); Cook's *Fresh-Water Algæ*.

Aquatint, an etching process on copper by which prints are produced imitating the broad effects of India ink and sepia drawings. In this process, areas, not lines, are bitten in by dilute acid on a copper plate covered with black resin, on which the design has already been traced. Devised by Abbé St. Non in the 18th century, and perfected by Jean Baptiste le Prince (1733-81), the process has now fallen into disuse, except for the tints printed in some coloured pictures.

Aqua Tofana, a poisonous liquid, invented by a woman named Teofania di Adamo, who died at Palermo in 1633. Her reputed daughter, Giulia Tofana, afterwards sold the liquid at Rome and Naples in vials, under the title 'Manna of St. Nicholas of Bari.' It was a clear, colourless, tasteless, and odourless liquid, of which only a very small quantity was sufficient to produce death, under symptoms which did not readily arouse suspicion of poisoning. It is supposed to have been a preparation of arsenic, antimony, and lead. See Ademollo's *I Misteri dell' Acqua Tofana* (1881).



Roman Aqueduct at Pont du Gard, Nîmes.

Aqueduct, an artificial channel for conveying water. The term is not applied to pipes working under pressure, but only to channels in which the water flows with a free surface; in popular language, refers specially to a channel raised above the level of the ground. The term 'pipe aqueduct' refers to a pipe with water under pressure, not sunk in the ground, but acting as a bridge to span some hollow. The piers and arches of an aqueduct may be of stone, brick, or concrete. The water channel, if of masonry, must be made water-tight with cement or clay puddle. An iron or steel water channel is often used. In America many of the aqueducts carrying irrigation water across valleys are timber structures; trestle bridges are largely used, and the timber channels are called *flumes*. The Romans made little use of pipes under pressure; they raised the channel on arches to keep it at the proper gradient. Where the height was great, they built two or three tiers of arches one above another; and to make the channel impervious to water, the masonry was coated with stucco. Hewn masonry was generally used, but the Tepula aqueduct at Rome was largely constructed of concrete. Some of these early aqueducts are still in a good state of repair, and continue to carry water; a good example is that at Segovia in Spain, built about 100 A.D.

Before the end of the 1st century A.D. Rome was supplied by nine aqueducts, with a total length of over 270 m., of which about 35 m. was raised above ground on arches. The last of these to be built, the Anio Novus, at one point is 109 ft. above ground-level. It is built above the Aqua Claudia, the two waters flowing in separate conduits on the same arches. The aqueduct *Delle Torri Spoleto* (Umbria) dates from the 7th or 8th century, and is about 300 ft. high, with two series of pointed arches. In the Roman provinces there were the incomparable aqueducts at Nîmes, at Segovia and Tarragona, at Metz and Mainz, at Antioch, and at Pyrgos, near Constantinople. The ancient Greek world possessed famous aqueducts at Athens (made *c.* 560 B.C.), at Samos (*c.* 625), and at Syracuse (still in use). In France, the aqueduct of Maintenon was constructed in Louis XIV.'s time, to bring water to Versailles; it is 4,400 ft. long, over 200 ft. high, and has three tiers of arches of about 50 ft. span. The first aqueducts of importance in Britain were built towards the end of the 18th century to carry canals. They were of masonry, with the bottom and sides of the canal puddled. The Barton aqueduct, built by Brindley, carries the Bridgewater Canal over the Irwell; the canal water-level is 39 ft. above the river. On the construction of the Manchester Ship Canal in 1887-94, Brindley's aqueduct had to be altered. The Bridgewater Canal did not allow the necessary headway for ships' masts, and a swing aqueduct, pivoted at its centre, was constructed. The aqueduct carrying the Ellesmere Canal across the Dee has a length of 1000 ft., with a height from water to water of 126 ft. In connection with water supply few aqueducts (in the sense of bridges) of any length have been made in recent years, as an inverted siphon of pipes serves the purpose, and is much less costly. Where the valley crossing is short, however, bridge aqueducts are formed. These are generally built of masonry, with a water channel of concrete, iron, or steel, and examples of these are to be seen on all the large water-works of the present day. See further under Water; also Herschel's trans. of Frontinus's books about *Water Supply of Rome* (1899); Turneaure and Russell's *Public Water Supplies* (1901).

Aqueous Humour. See Eye.

Aqueous Rocks, a term applied to all rock masses which have been laid down beneath water, whether in the form of sedimentary deposits, of accumulations of shells and other animal or plant remains, or of crystalline masses due to concentration by evaporation. See Sedimentary Rocks.

Aquifoliaceæ, an order composed of evergreen trees and shrubs, represented in Europe by one species, the holly. A South American species yields *maté* or Paraguay tea, and a North American species Appalachian tea. Most of the plants of the order are bitter, tonic, and astringent.

Aquila, an ancient constellation placed S.E. of Lyra, and traversed by the Milky Way. A supposed Euphratean representation of it dates back approximately to 1200 B.C. Some of its southern stars were separately grouped in honour of Antinous (130 A.D.), but the arrangement is now discarded. Nova Aquilæ, photographically discovered by Mrs. Fleming in April 1899, was then of seventh magnitude. Its bright-line stellar spectrum became nebular as it faded. One of the best known short-period variables is η Aquilæ, which fluctuates from 3·5 to 4·7 magnitude in 7 days 4 hours, and was found by Bélopolsky in 1895 to be a spectroscopic binary.

Aquila, Caspar (1488-1560), the Latin name of a German theologian, Adler, who, after suffering imprisonment in 1519-20 for his advocacy of the reformed doctrines, became professor of Hebrew at Wittenberg (1524), and aided Luther in translating the Old Testament. Becoming Protestant pastor of Saalfeld (1527), he was outlawed by Charles V. (1548), but was restored to his pastorate in 1552. He left sermons and controversial works.

Aquila, Ponticus, a native of Sinope in Pontus, flourished about 130 A.D. He made a translation of the Old Testament into Greek, of which a few fragments survive in Origen's *Hexapla*. He is said to have been successively a pagan, a Christian, and a circumcised Jew.

Aquila degli Abruzzi. (1.) Province, Italy, in territorial div. Abruzzi and Molise, between the two main chains of the Central Apennines. Cereals, flax, hemp, and fruits are the chief productions. Area, 2,485 sq. m. Pop. (1901) 397,645. (2.) Chief tn. of above; episc. see, and summer resort; stands on a plateau at the foot of the Gran Sasso d'Italia, the culminating knot of the Central Apennines, 55 m. N.E. of Rome (135 m. by rail *viâ* Terni). The citadel was built by the Spaniards in 1535 43. The cathedral, first built in the 13th century, has been more than once injured by earthquakes, and has been recently restored. Saffron is extensively grown in the vicinity. Lace-making gives employment to many of the women. Aquila was founded by the Emperor Frederick II. in 1240, on the ruins of the ancient *Amiternum*. Pop. (1901) 21,261.

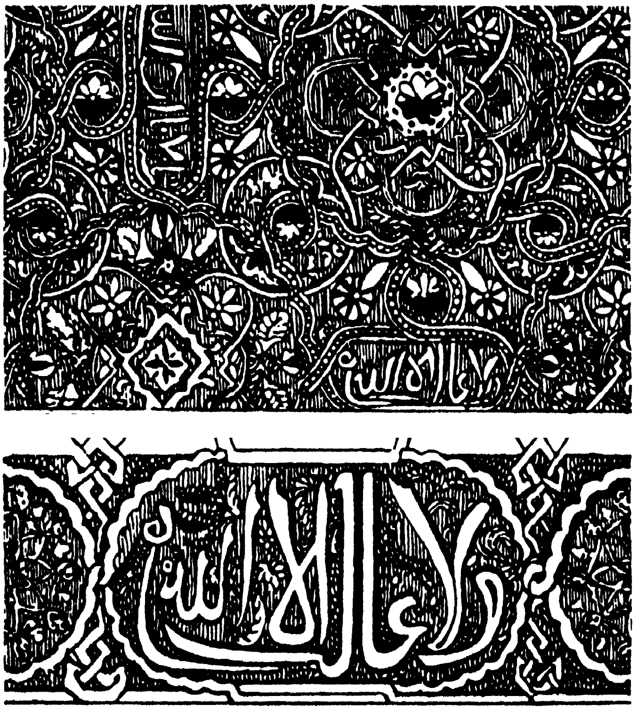
Aquilegia. See Columbine.

Aquileia, or Aglar, vil., Austria, in Görz and Gradisca, at the head of the Adriatic, 26 m. by rail N.W. of Trieste. It was in ancient times strongly fortified, and, owing to its position at the foot of several Alpine passes, and on the Via Æmilia, was the principal bulwark on the N.E. frontier of Italy. It was an important commercial centre, having access to the sea by means of a lagoon now silted up. It was founded in 182 B.C., was strongly fortified by Marcus Aurelius, and in the 4th cent. A.D. was the fourth city in point of size and population in all Italy; but in 452 it was captured by Attila, who razed it to the ground, the inhabitants escaping to the lagoons in which Venice was afterwards built. In the 6th century (the town having been rebuilt by the Ostrogoths) it became the seat of a patriarch of the church, who wielded great political power; but the dignity was suppressed in 1750. Aquileia still possesses an 11th century cathedral, and has a museum full of valuable Roman antiquities. Pop. (1900) 2,319.

Aquinas, Thomas, 'the angelic doctor,' was the son of the Count of Aquino, near which town, situated between Rome and Naples, he was born about 1226. Having received the elements of his education in the monastery of Monte Cassino, he proceeded to the University of Naples, and in his seventeenth year joined the Dominicans. He afterwards studied under the celebrated Albertus Magnus at Cologne; accompanied his master in a three years' sojourn at Paris (where he graduated bachelor of theology); then returned with Albert to the school of Cologne as second teacher and *magister studentium*. The University of Paris having assumed a bitter hostility to the mendicant orders, Thomas sprang to the defence of the latter with tongue and pen; and having received the Pope's special commission to act as the champion of the Dominicans, he vindicated their position with such acumen and address that he procured the discomfiture of their chief opponent, William of St. Amour. Although this strife somewhat delayed his academic progress, so that he was over thirty before Paris granted his doctorate, the career of Aquinas was thenceforward a triumphal march. Called to Italy by Pope Urban IV. in 1261, he lectured with signal success on behalf of the church and his order; in 1272 he was made a professor in Naples; and so great was his devotion to learning, and, be it also said, his modesty, that when the highest ecclesiastical preferments, such as the archbishopric of Naples and the abbacy of Monte Cassino, were offered him, he felt it his duty to decline them one and all. He continued his labours in church statesmanship, public lecturing, and writing till 1274, when he was summoned by Pope Gregory to assist in the settlement of the dispute between the Eastern and Western Churches at a council to be held at Lyons. While on the way his overwrought frame collapsed, and he was carried to the Cistercian monastery of Fossa Nuova, near Terracina, where he died, March 7, 1274. His remains were deposited at Toulouse. He was canonized in 1323, and made a doctor of the church in 1567.

Aquinas's greatest work is the *Summa Theologiæ*, which exercised an immense influence in his own and later times, and which even to-day forms the main doctrinal standard of Catholicism. It is designed on a magnificent scale; and its great purpose is to exhibit theology as the synthesis and embodiment of all human knowledge, whether of faith or of reason; in a manner it seeks to realize the famous tenet of Scotus Erigena—namely, the identity of philosophy and theology. The ostensible antagonism between natural and supernatural knowledge formed the problem of Aquinas, as of the scholastics generally; and Aquinas, following in the wake of his master, Albertus Magnus, tasks himself to fuse the two, and to show that they are but supplementary aspects of the one indivisible truth, the natural world and the Christian religion being but the twin channels of the Divine self-manifestation. But it was only after Thomas had, with tireless industry, made himself master of both provinces of learning that he projected their synthesis in his *magnum opus*, and his other works may be regarded as only marking stages on the two converging lines by which he proceeded to the consummation of his labours. Thus, on the one hand, we have his volumes on 'disputed questions,' and his Scripture commentaries (Psalms, Isaiah and Jeremiah, Gospels, Epistles), in which he draws mainly from the fathers; and, on the other, his *De Ente et Essentia*, his *Summa Philosophica contra Gentiles* (dealing with natural religion, and of scarcely less importance than the *Summa Theologiæ*), and his commentaries on the writings of Aristotle. Thus equipped, he proceeds to his crowning work, the *Summa*, a complete system of human knowledge, the intellectual antitype of the universal empire and the universal church. The *Summa* is in three great divisions, treating respectively of God, Man, and the God-Man, the last having been left incomplete at his death.

It should be noted that by revelation Aquinas understands the delivery of a definite body of doctrines, not the actual presence of a divine life in the world; and that with him faith is an intellectual acquiescence in this system of revealed truth, not a personal trust in a divinely-commissioned Saviour. Aquinas marks the zenith of scholasticism. His great opponent was Duns Scotus, the Franciscan doctor, who, taking the will (*voluntas*) as his principle (as Aquinas had taken *intellectus*, the understanding), really transferred theology to the sphere of practice, and so, separating again the provinces of reason and faith, inaugurated the decline of scholasticism, and prepared the way for modern philosophy and the reformation. See R. B. Vaughan's *Life of St. Thomas of Aquin* (1872) and Histories of Philosophy by Erdmann and Ueberweg.



Moorish Arabesque Ornament (*Hall of Crowns, Alhambra*).

Aquincum, a Roman citadel, near the site of Budapest.

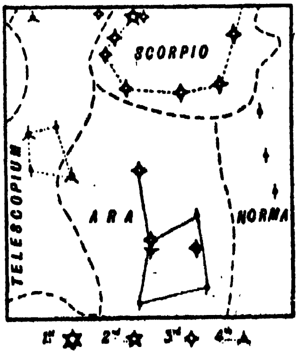
Aquino, tn., Italy, prov. of Caserta, 78 m. S.E. of Rome, stn. on the Rome-Naples Ry., is the anc. *Aquinum*, ruins of which remain; birthplace of Thomas Aquinas. Pop. (1901) 2,746.

Aquisgranum, anc. name of Aachen.

Aquitania, a dist. of Gaul, lying between the Garonne and the Pyrenees. Its inhabitants were one of the three races which originally inhabited Gaul; they were not Celtic, but were more akin to the Iberians in Spain, a pre-Aryan population now represented by the Basques, though the modern inhabitants of Aquitaine are probably to a large extent true descendants of the Aquitani. The district was conquered (57 B.C.) by Cæsar's lieutenants; and again, after a revolt, in the reign of Augustus. The Roman province of the same name was bounded (from 37 B.C.) on the N. by the Loire, on the E. by the Cevennes, on the S. by the Pyrenees, and on the W. by the Atlantic Ocean. The Visigoths, the Merovingians, and the Carlovingians successively possessed the district, and its name in the 10th century became corrupted into Guienne. In 1137, by the marriage of Louis VII. with Eleanor, daughter of William X. of Guienne, it became attached to the French crown. After Eleanor's divorce she married Henry II. of England, and brought him the possession as her dowry. It remained in English hands until the battle of Castillon in 1453, after which it was finally restored to France.

Aquitanus Sinus, anc. name of Bay of Biscay.

Ara, an ancient constellation situated to the S. of Scorpio, and possibly embodying a reminiscence of the mound-altar of the Tower of Babel. (R. H. Allen's *Star Names and their Meanings*, 1899, p. 63.) Among the stars composing it are S Aræ, a short-period variable, and R Aræ, undergoing eclipses once in 4 days 10 hours.



The Constellation Ara.

Arabesque, a fantastic scroll and floral decoration employed in the architecture of the Arabs and of the Moors in Spain. The finest examples are to be seen in the palace of the Alhambra, and in the work of Raphael in the Vatican.

Arabi, Ahmed, Pasha (1839), leader of the military insurrection in Egypt in 1882. He organized a secret society among the native officers, and headed a revolt, compelling the Khedive, Tewfik Pasha, to dismiss his ministry, and to grant a liberal constitution. Arabi became chief secretary for war, and subsequently minister of war. In this position, being practically dictator, and supported tacitly by the Sultan, he adopted a policy which the British government had to meet by armed force. Alexandria was bombarded by the British fleet, July 11, 1882; and on September 13, Arabi and his army were defeated at Tell-el-Kebir by the British troops under Sir Garnet Wolseley. Arabi fled to Cairo, and, surrendering, was banished to Ceylon (1883). In May 1901 he was released, and granted a pension of £600 a year. See *Annual Register* for 1882, and article by Wilfrid S. Blunt in *Celebrities of the Century*.

Arabia, known to its inhabitants as *Jezirat-al-Arab*, and to the Turks as *Arabistan*, is a massive quadrangular peninsula of Asia in the S.W. of the continent, lying between the Persian Gulf and the Gulf of Oman on the E., and the Red Sea on the W., with no natural frontier on the N., the conventional boundary being roughly the parallel of 30° N. Length N. to S., 1,500 m.; average breadth, 800 m.; area, 1,200,000 sq. m., or about one-third of Europe. The Red Sea coast, which is extremely deficient in harbours, is fringed with shoals and coral reefs; and there are a few small islands as the Strait of Bab-el-Mandeb is approached, the British island of Perim, at the entrance to the strait, being the most important. The S. coast presents a convex shore to the Indian Ocean, and has a number of good harbours, such as Aden, Dafar, and Keshin. The Oman coast, on the E., has the deep and almost landlocked harbour of Maskat (Muscat); but the sandy shores of the shallow Persian Gulf, to the E. and N. of the Strait of Ormuz, possess no harbour of importance until El Kuweit (Koweit), at its head, is reached. This place has been mentioned as the terminus of the proposed German railway from Constantinople through Bagdad. Turkey claims that the port is within the sphere of her administration, but this Great Britain will not admit. The viceroy of India visited Koweit, Nov. 28, 1903. The gulf contains numerous islands, the chief being Bahrein, which is the centre of the gulf pearl fisheries, valued at £300,000 annually. British influence is predominant in the gulf.

Ptolemy's divisions of the country were *Arabia Petræa* (N.W. and the peninsula of Sinai), *Arabia Felix* (W. and S. coasts), and *Arabia Deserta* (all the rest). The modern divisions are the Sinai Peninsula, between the Gulfs of Suez and Akabah; El Hejaz (Hedjaz, 'the barrier'), fronting the Red Sea, and succeeded by the fertile, well-watered, and well-cultivated country of El Yemen, the littoral from 20° N. to 15° N. being the low-lying sandy strip, covered with coral débris, of Et Tehama; Hadramaut and Mahra, fronting the Gulf of Aden and the Indian Ocean respectively; the mountainous kingdom of Oman, comprising the horn of Arabia; El Hasa, fronting the Persian Gulf; and El Nejd, the oasis-studded middle portion of the interior. In relief Arabia is a table-land (average elevation, 3,500 ft.), sloping steeply to the W. and S.W. and gently in other directions, and bordered by highlands which attain their greatest elevation, and are often precipitous and rugged, in Yemen, Hadramaut, and Oman (9,900 ft.). The mountain mass of Mount Sinai, on the N.W., is only 365 ft. lower. A low and mainly fertile coast strip lies between the highlands and the sea. The peninsula thus consists of a coastal plain, coast ranges, and a central plateau. El Nejd, 'the true home of the Arab,' with grassy slopes and narrow productive valleys, is joined to the coast range by the ridge of Jebel Aarud or Imarieh, and is bordered by largely unexplored deserts—the simoom-swept sands of the Nefud and the stony Syrian desert lying to the N., and the arid waste of the Roba'a-el-Khali to the S.

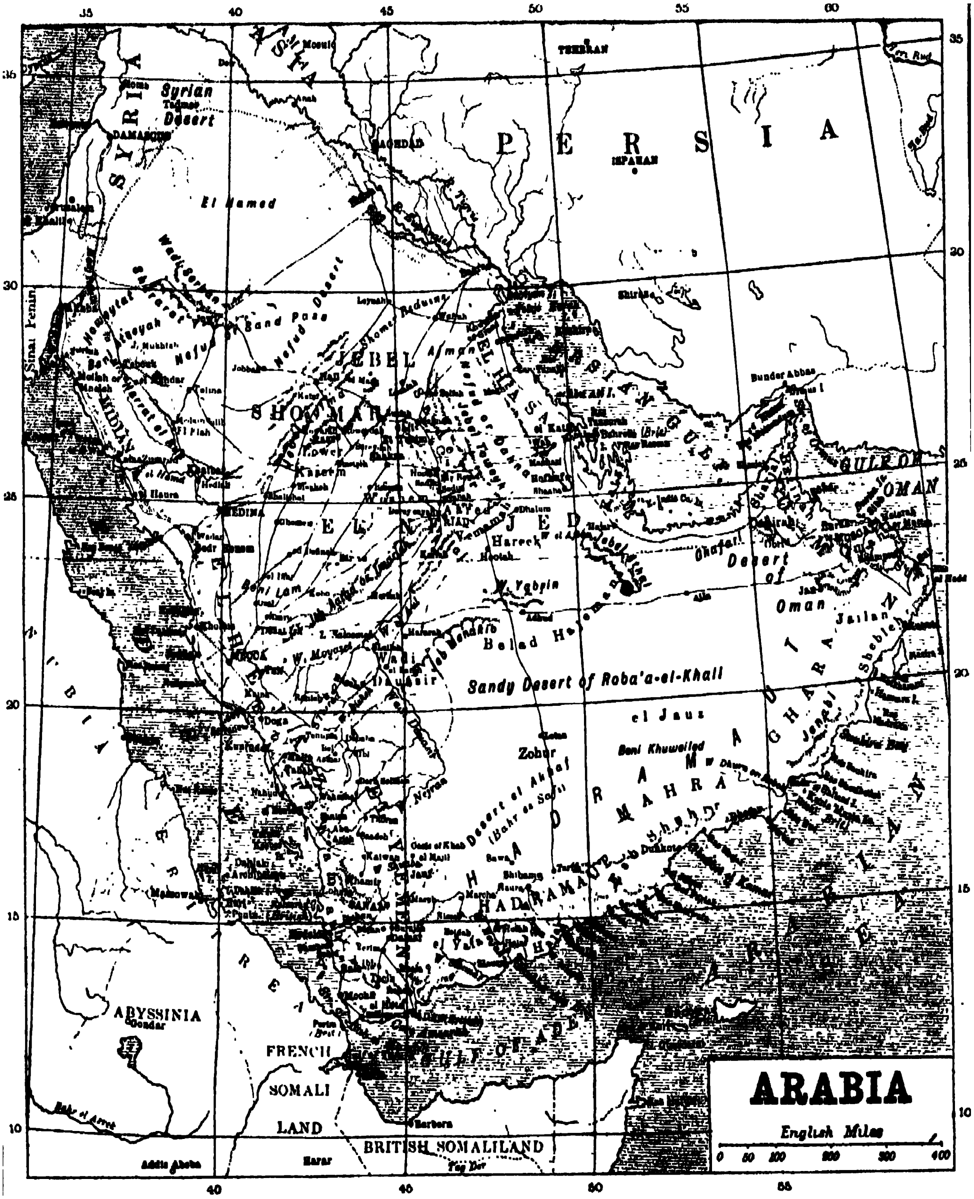
The coasts of Arabia are among the hottest regions of the world. The mean temperature of Aden varies from 75° F. in Jan. to 85° F. in July; but the higher parts of the plateau, which have a great range of temperature and almost no rainfall, experience intense cold on winter nights. Scanty winter rains fall in the N., but in the S. the rains occur in summer or early autumn. In some of the mountains of Yemen there are spring rains.

The coffee tree flourishes in Yemen and elsewhere on the coastal escarpment from 1,200 to 4,000 ft.; also the acacia, which yields gum-arabic; spice and incense trees (Hadramaut), date palms, cotton, maize, and rice, are grown elsewhere, especially in Yemen. Senna is cultivated in S. Hejaz and the Tehama, balsam near Mecca, henna on the W. coast, and indigo on the Persian Gulf. Horses and dromedaries are reared in the Nejd, and command high prices; camels, large white donkeys, fat-tailed sheep, goats, and cattle are largely bred. Among wild animals are the ostrich, tiger, panther, lynx, hyæna, and gazelle. Precious stones, silver, lead, and other minerals, are found.

The people (estimated at 3½ millions) are mainly Arabs (Bedouins on the borders of the deserts) and followers of Mohammed. The tribes of the Nejd, Hadramaut, Oman, Mahra, and Kara are practically independent. The sultan of Oman, however, is recognized by the British government. He was visited by the viceroy of India on Nov. 18, 1903, and was invested with the order of G.C.I.E.

The chief centres of Hejaz (approx. area, 96,500 sq. m.; pop. 300,000), through which pass the pilgrim routes from Syria and Egypt, are Medina, the city of Mohammed's flight and death; Yambo, its port; and Mecca, the prophet's burial-place, annually crowded by pilgrims, most of whom disembark at Jidda, the seat of government. A telegraph line has been laid along the caravan route from Damascus to Medina and Mecca, and the Sultan is credited with a desire to construct a railway along this route. The cap. of Yemen (approx. area, 77,200 sq. m.; pop. 750,000) is Sana'a, and its port is Hodeida, which exports the coffee and hides of the province. The latter place has now superseded Mokha. In Hadramaut the cap. is Shibam, lying in a broad valley parallel to the S. coast. Frankincense is exported from Mokalla. The chief towns of the once splendid kingdom of Oman are Muscat, the cap., and Oman, the port on the gulf of the same name. See W. S. Blunt's 'A Visit to Jebel Shammar,' in *Proc. R.G.S.* (1880); Lady Anne Blunt's *Pilgrimage to Nejd* (1881); C. M. Doughty's *Travels in N. Arabia in 1876-7* (1886), and *Travels in Arabia Deserta* (1888); Theodore Bent's 'Southern Arabia,' in *Geog. Jour.* (1895), and 'Hadramut,' in *Geog. Jour.* (1894); Eduard Glaser's 'Journeys in Arabia,' in *Proc. R.G.S.* (1889); W. Harris's *A Journey through the Yemen* (1893); L. Hirsch's *Reisen in Süd-Arabien* (1897); Hull's *Geology and Geography of Arabia Petræa* (1886); and Zwerner's *Arabia the Cradle of Islam* (1900).

History.—Arabian history is divided by Islam into two epochs, each with different characteristics. Of the pre-Islamic period only a few facts stand out with any distinctness; one is, that the Romans tried in vain to subdue the peninsula. Arab historians distinguish—(1) Extinct Arabs of prehistoric times; (2) Arabs proper, or the inhabitants of S. Arabia, who are said to be the descendants of Kahtan (the Biblical Joktan); (3) Mostarabs, or Ishmaelites, who entered the country from the N., and became gradually amalgamated with the natives. The beginning of Arab history proper is commonly dated from the breakdown of the great dyke at Mareb, in Yemen, which forced many tribes to seek new habitations in the north. There they founded a number of small states. One of these tribes, Thamud, settled in the Hejaz (N.W. coast strip). Traces of their existence are still found at the ruins of Al Hijr (Al Ola), the inscriptions on which have been deciphered by European scholars — Doughty, *Documents Epigraphiques* (1884); Euting, *Nabatäische Inschriften* (1885). Little is known of the history of Mecca prior to the epoch of Mohammed. The town enjoyed a certain superiority over the rest of pagan Arabia on account of the Kaaba, or ancient shrine of the national deities. This was a source of much wealth to the town, as it attracted many pilgrims. The care of the Kaaba was in the hands of the family of Koreish. Not far from Mecca was Okaz, where yearly fairs were held, at which poets competed for prizes. In 612 Mohammed proclaimed his new faith. The opposition he encountered was not only of a religious character, but also political; because the wealth of the town, which depended largely on the worship at the Kaaba, was threatened. After ten years' struggle he retired to Medina with a small band of followers. This journey is known as the Hijra or Hegira (erroneously translated by 'flight'), which begins the Moslem era. Through Islam, Arabia entered upon the second or political period of its



history. Mohammed founded a theocratic state, as chief of which he united in himself the highest secular and ecclesiastical powers. Only the first four caliphs (lieutenants of Mohammed)—*viz.* Abu-Bekr, Omar, Othman, Ali (632–660)—held sway over all believers. More from political than religious reasons, a schism arose, which henceforth separated Sunnites (conservatives) from Shiites (sectarians). The dynasty of the Ommiads (661–749) represents the old aristocratic party of Mecca. Through the removal of the court from Medina to Damascus, Mecca and Medina sank to the position of religious centres only, whilst the history of Arabia became merged in that of the Moslem empire. The great reactionary movement of the Wahhabites, at the beginning of the 18th century, made the peninsula again the area of an independent realm, which lasted about one hundred years. Although the Wahhabite armies were eventually defeated by the Turkish and Egyptian troops, they are still powerful in Central Arabia. In 1897 the Wahhabite tribes, under Abdul-ben-Metaah, advanced on Koweit, and this led to a retaliatory raid, followed by much fighting in Jebel Shomar.

Language and Literature.—Arabic forms a branch of the Semitic languages, and belongs to the southern group of the same, which also includes Ethiopic. It would be more correct to say North Arabic, since the southern dialect bears the name Himyaritic. Through the Koran, Arabic was spread over large tracts of Asia, Africa, several islands of the Mediterranean Sea, and Spain. Although it has disappeared from the last-named country, the Spanish language has retained a large number of Arabic words and formations (see Dozy and Engelmann's *Glossaire des Mots Espagnols et Portugais dérivés de l'Arabe*, 1869). Maltese is an Arabic dialect, though much influenced by Italian. In spite of the very numerous dialects, Arabic has retained a certain unity, due to the retarding influence of the Koran and the old poetic literature. As the language remained for many centuries secluded in the Arabian desert, it preserved down to the 7th century much of its originality. It approaches primitive Semitic speech more nearly than any other member of the family. Its importance for the study of the Semitic languages is therefore apparent. The gradual decay of the language into 'vulgar Arabic' is particularly interesting, as it developed many forms and characteristics peculiar to the northern Semitic languages, classical Hebrew in particular. The ramifications of Arabic grammar are much more numerous than in any kindred tongue. Its possession of terminations of inflection not only secures to its morphology a great variety of forms, but endows it with a syntax to which none of the other Semitic languages can show a parallel. Its capacity of adding short vowels makes it capable of much flexibility, and particularly suitable for metric style. Arabic prosody alone forms a vast chapter in the history of the language. Its vocabulary also is enormous, although as regards its wealth of synonyms some wrong notions are abroad, because many poetic epithets recorded by the old lexicographers are taken literally. The language has preserved roots lost in the other Semitic dialects. Many obscure words in the Old Testament receive light from Arabic. Persian and Turkish teem with Arabic words. There are also more Arabic words in European languages than most people are aware of. Mediæval Arabs were zealous prosecutors of several branches of study. In astronomy many technical terms and names of stars are Arabic.

The classical period of Arabic literature is pre-Islamic, and consists throughout of poems which lived in the mouths of the people. Beginning with short ditties and epigrams of impromptu character, it soon developed more artistic forms, and about one hundred years before Mohammed we encounter a fine array of stately metres. These poems are called *kasidas*, each line consisting of two half-verses, with the rhyme repeated in the second half of each. Although the productions of this period were in later centuries collected, annotated, and edited by men who loved their native tongue, the texts of many of the poems, as handed down to us, are anything but in a sound condition. The same men also discoursed on the lives of the poets, and arranged their works in groups according to their pre-eminence. One of these are the seven famous *Moallakat* ('the suspended ones'), a name which gave rise to the legend that these poems, having won the prize, were woven in gold brocade and suspended in or on the Kaaba. The truth of this tale has, however, been disproved (Nöldeke, *Beiträge zur Kenntniss der Poesie der alten Araber*, 1864, pp. xviii. *et seq.*), the above term being only a simile for a necklace of pearls which one would hang round the neck. The number 'seven' must, of course, be taken *cum grano*, as the actual number of classical poets is much greater—*viz.* Amraalkais or Imrulkeis, Zoheir, Al-Nabigha, Al-Asha, Tarafa, Amr-ben-Kalthum, Labid, Antara, Alkama, Harith-ben-Hilliza, and others. The first prose composition is the Koran, and it marks the most important epoch in Arab literature. The Koran, which represents the Bible of Islam, consists of about 200 speeches by Mohammed, compiled in 114 chapters (*suras*), according to their length. The attitude of the Koran is, on the whole, hostile to ancient poetry, on account of the pagan and fictitious character of the latter. Yet the proneness of the language to poetic speech is so conspicuous that, in the older portions of the Koran, the exertions of the speaker not to discourse in verse are plainly visible. He could not, however, dispense with rhyme altogether. The Koran was so little able to alter the old poetic traditions that they remained alive for about two hundred years after Mohammed. Islam, however, added religious subjects to those of the old poetry, which chiefly consisted of wine, the chase, woman, family pride, satire, the sword, the horse, and the camel. The Koran gave an impetus to the compilation of the traditional lore that was needful to establish the minutiæ of the Moslem Church, to fix or rather embellish incidents in the life of the prophet, and to collect his real and alleged sayings. This is called the Sunna, and it forms an enormous chapter in Arab literature. The Sunna was followed by writings on the history of the Koran, its reading and exegesis, and biographies of the prophet. At about the same time the Arabs became acquainted with the gist and method of Greek thought, and employed their knowledge to construct a scholastic theology. They philosophized on the nature of God, and the question whether the Koran was eternal or created. The great philosophers Al-Kindi, Al-Farabi, Avicenna (-ibn-Sina), and Averroes (-ibn-Roshd) had no mean influence on the spread of Aristotelian philosophy in Europe. The mere necessity of understanding the Koran awakened linguistic studies, which were subsequently taken up for their own sake, and resulted in compendia of grammar astounding in their hair-splitting elaboration. Dictionaries were compiled, which, in our time, are indispensable to the European student of Arabic. There is hardly any branch of human thought to which the Arabs did not devote their pens. Mathematics, astronomy, and medicine, history, geography and cosmography and their kindred subjects, had their full share of attention. In spite of the Koran, poetry, proverbs, elegant prose, and fiction flourished everywhere, and shot forth new branches. The tales of the *Arabian Nights* belong to the world's literature. The *Séances* of Hariri have been translated into various European languages, and imitations of the ancient forms of Arab songs may be met with in the works of many modern European poets. See *Abulfedæ Historia Anteislamica*, Ar. et Lat., ed. Fleischer (1831); *Hamsæ Ispahanensis Annales*, Ar. et Lat., ed. Gottwaldt (1844-9); A. P. Caussin de Perceval, *Essai sur l'Histoire des Arabes avant l'Islamisme* (1847-8); Muir, *Life of Mahomet* (3rd ed. 1894); Weil, *Geschichte der Chalifen* (3 vols. 1846-51); Silvestre de Sacy, *Grammaire Arabe* (2 vols. 1831); W. Wright, *Arabic Grammar* (2 vols. 3rd ed. 1896-8); Flügel, *Die Grammat. Schulen der Araber* (1862); *Sibawaihi's Buch über die Grammatik*, Ger. ed. by Jahn (1894); Hammer-Purgstall, *Literaturgeschichte der Araber* (7 vols. 1850-7), not very reliable; Brockelmann, *Geschichte der Arab. Literatur* (2 vols. 1899-1902); Ahlwardt, *Poesie und Poetik der Araber* (1856); Freytag, *Darstellung der Arab. Verskunst* (2nd ed. 1838); *Hamasæ Carmina* (Abu-Tammam), Ar. et Lat., ed. Freytag (2 vols. 1828-51); Guidi, *Tables Alphabétiques du Kitab al Agani* (1895), a great poetic anthology; Arabic text (20 vols. Bulak, 1869). See also the translations of the Koran by G. Sale (ed. Wherry, 1882-6) and E. H. Palmer (1880); and Hirschfeld, *New Researches into the Composition and Exegesis of the Qoran* (1902).

Arabian Nights Entertainments (Ar. *Alf Laylah wa Laylah*, 'A Thousand Nights and a Night') is believed to be in form and substance the Arabic translation of a Persian book, *Hazár Afsánah*, or 'Thousand Tales.' Mohammed-ibn-Ishak states that the book was compiled by or for Humai, daughter of Bahman Ishak (Artaxerxes), whose mother, according to Al-Masudi, was the Jewess Esther of Old Testament history.

Much difference of opinion exists regarding the authorship and the date of composition of the *Arabian Nights*. Lane maintains that the people, the dress, and the buildings are mainly Arabic, particularly Egyptian; that the social state depicted in each of the stories is the same; and that the book was begun not earlier than 1475, and finished before 1525, by one or two authors, probably Egyptian. Burton, the translator of the whole text, believes that the oldest tales may have been written in the reign of Caliph Al-Mansur (754-775 A.D.); that the thirteen stories common to all the MSS. may belong to the 10th century A.D.; that the work received its present shape in the 13th century, but that the most modern tales were added in the 16th century; and that the book had no single author. Lane's incomplete version (1840) is based upon the Bulak edition; while the edition of Macnaghten (1839-42) was used by Burton.

Arabian Sea, the *Erythræan Sea* of the ancients, is the N.W. part of the Indian Ocean, stretching from India to Arabia. Its N.W. extension, between Persia and Arabia, leads through the Strait of Ormuz into the Persian Gulf. Its S.W. extension is known as the Gulf of Aden, and has connection through the Strait of Bab-el-Mandeb with the Red Sea. See INDIAN OCEAN.

Arabin, or ARABIC ACID, a constituent of gum-arabic, and probably of other similar gums. Ordinary gum consists mainly of calcium, magnesium, and potassium salts of arabic acid; the latter being separated by the addition of hydrochloric acid to mucilage so as to set free the arabin, which is then precipitated by alcohol. It is obtained in the form of a brittle vitreous mass, soluble in water, with an acid taste, and is capable of forming salts with bases and decomposing carbonates.

Arabis, a genus of the order Cruciferæ; a dwarf perennial of various colours. The most common is the *Arabis albida*, white rock-cress, whose masses of white flowers are excellent for garden surfaces or borders.

Arabkir, or ARABGIR, tn., Asia Minor, 107 m. N.W. of Diarbekir, on the trade route between Aleppo and Trebizond; manufactures cotton goods. Pop. 30,000.

Aracaju, cap. of Sergipe, a state of Brazil, on the r. bk. of the Cotindiba R., 10 m. from the mouth. Iron foundries, soap and cloth factories. Pop. over 6,000.

Aracan. See ARAKAN.

Aracati, port of Ceará, Brazil, 75 m. S.E. of Ceará. Large trade in cotton, cattle, and hides. Pop. about 10,000.

Araceæ, or AROIDEÆ, an order of tropical plants represented in Britain by cuckoo pint (*Arum*) and sweet flag (*Acorus*). The spadix is often protected by a spathe. The juices of many species are poisonous, and the stems rich in starch. Cooking dispels the former, and makes the latter edible.

Arachis. See GROUND-NUT.

Arachnoidea, a large group of arthropods, including spiders, scorpions, and mites, and differing from insects in having four pairs of legs instead of three, and in the absence of antennæ, or feelers. Near the mouth there are two pairs of appendages, known as cheliceræ and pedipalpi; and, as in the scorpion, there may be abdominal appendages in addition. The eyes are generally simple. There are, indeed, few resemblances to insects, save in the frequent presence of air-tubes or tracheæ, which may be functionally replaced by the lung-books of the scorpion. The arachnoids are ill-defined, and there is doubt whether the king crab (*Limulus*), the parasitic *Pentastomum* (order Linguatulida), and the water bears (order Tardigrada) come under this group. Apart from these, the following are the orders usually recognized:—(1) Scorpionidæ, the true scorpions; (2) Pseudoscorpionidæ, the book scorpions; (3) Pedipalpi, the whip scorpions; (4) Phalangidæ, the harvestmen; (5) Solpugidæ; (6) Araneidæ, or spiders; (7) Acarina, or mites and ticks.

Arachnoid membrane, the fine, cobweb-like, serous membrane situated between the dura mater and the pia mater of the brain and spinal cord, both of which it covers. It is a closed sac, disposed in two layers.

Arachosia, name of a prov. of the old Persian empire, occupying the basin of the Helmand R. (anc. *Etymander*); corresponds to the S.E. part of Afghanistan. Its capital was Arachoton, or Alexandreia Arachoton (now Kandahar), founded by Alexander the Great.

Arad. (**1.**) Comitat, Hungary; area, 2,488 sq. m.; pop. (1900) 329,400, mostly Roumanians. The E. part is occupied by the Bihar Mts.; the W. part is a fertile plain traversed by the White Körös and the Maros. Produces cereals, wine, tobacco, and iron. (**2.**) OLD ARAD, tn., cap. of the above, on the r. bk. of the Maros, is the see of a Greek Orthodox bishop, and has a Greek seminary. It is an important railway centre, being the junction of the Transylvanian railway system, and on the line Budapest-Temesvar. Active trade; important distilleries. Pop. (1900) 53,903. The fortifications round the town were several times captured and destroyed by the Turks in the Hungarian-Turkish wars of the 17th century, but were rebuilt in 1763, and played an important part in the Hungarian revolution of 1848. Arad was the second seat of the National Assembly, and from here Kossuth issued the famous proclamation of Aug. 11, 1849. On August 17 of the same year the town was surrendered to the Russians by Görgei. (**3.**) NEW ARAD (Uj-Arad), tn., Hungary, on the l. bk. of the Maros, opposite Arad. Pop. (1900) 6,124.

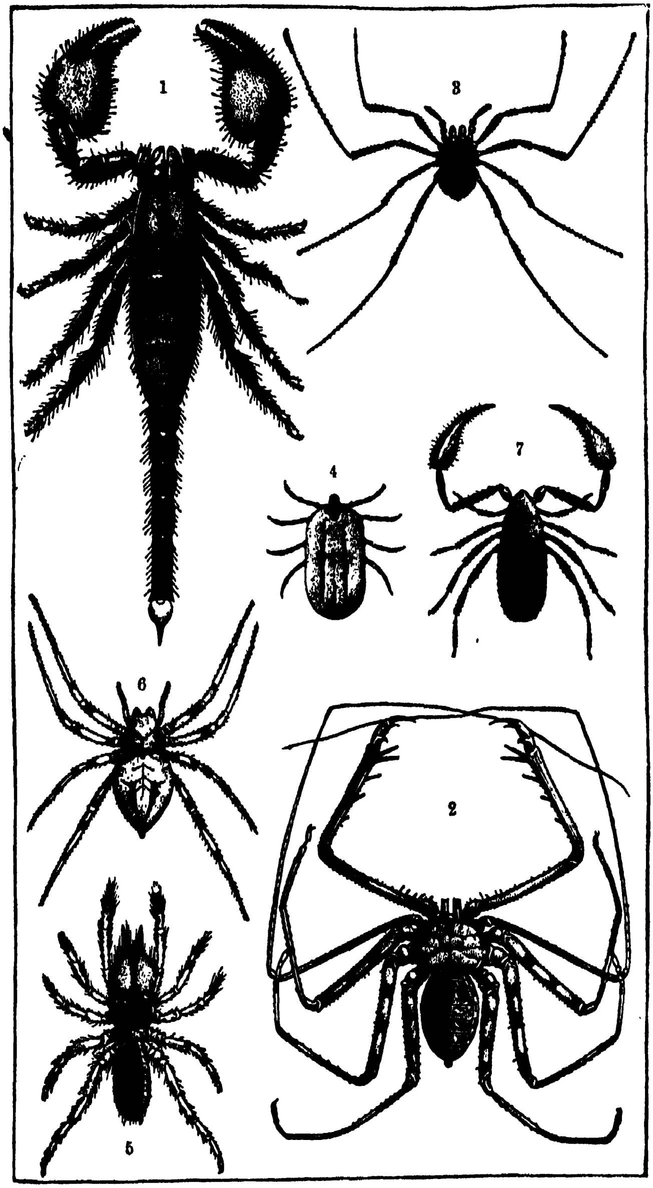
Araf (Ar. *Al-Araf*), the Mohammedan purgatory, a raised wall of separation between heaven and hell. There is great variety of opinion as to who are admitted to Araf, and whether their abode there is temporary or permanent.

Arafat, or JEBEL-ER-RAHM ('Hill of Mercy'), a granite hill (about 250 ft. high) 15 m. S.E. of Mecca. An important duty of Mohammedan pilgrims is to stand on this hill on the ninth day of the pilgrimage month, or last month (Dhu'l Hijja) of the Mohammedan year, the day being spent in prayer and religious exercises. Mohammedans believe Arafat to be the place where Adam and Eve met after their expulsion from Paradise. Adam, they also maintain, built the chapel on the summit. See Burton's *Pilgrimage to Mecca and Medina.*

Arafura or ALFURA SEA, the division of the Pacific lying between the N. of Australia and the W. half of New Guinea.

Arago, DOMINIQUE FRANÇOIS (1786-1853), French astronomer and physicist; born near Perpignan; was appointed secretary to the Bureau des Longitudes at the age of nineteen, and in 1806 assisted Biot in measuring an arc of the meridian. While engaged in taking observations in Majorca, Arago was mistaken for a spy. After a series of adventures, he returned to France in 1809, was elected a member of the Institute, and appointed professor of analytical geometry in the Ecole Polytechnique. Arago filled that chair for twenty years, and did much to popularize scientific discovery, especially in optics, astronomy, and magnetism. He confirmed the undulatory theory of light (1816), and for his discovery of rotatory magnetism received (1825) the Copley medal from the Royal Society of London. In 1830 he was appointed director of the observatory in Paris, and perpetual secretary to the Academy of Mathematical Science. After taking part in the revolution of that year, he opposed the presidency of Louis Napoleon, and refused to take the oath of allegiance (Dec. 1851); but his position and character had such weight that the new government refrained from prosecuting him. Among his best-known works are his *Autobiog.* (trans. Powell, 1858); *Lectures, etc.* (trans. Smyth and Grant, 1855); *Astronomie Populaire* (1834-5; Eng. ed. 1855-8). A complete edition of his works was published in 1854-62; 2nd ed. 1865, etc. See Audiganne's *François Arago* (2nd ed. 1869).

Aragon, an ancient kingdom and former province of Spain, with an area of 17,976 sq. m. and a pop. (1900) of 912,711; bounded on the N. by the Pyrenees. Cap. Zaragoza. It is now divided into the three provinces of Huesca in the N., Zaragoza in the middle, and Teruel in the S. The soil is sterile, though intersected by the Ebro, but is rich in minerals of almost every kind. The inhabitants are characterized by intense nationalistic conservatism, and by vindictiveness and bigotry, but are patriotic, intrepid, and energetic. Aragon was a county from the 9th century, and a kingdom from the middle of the 11th century. By the marriage of its ruler's daughter in 1137 it acquired the county of Barcelona, and under Jaime the Conqueror (1238) annexed the Moorish kingdom of Valencia. It became the most powerful maritime state in Spain, and aspired to found a great Romance kingdom on the Mediterranean; but the growing power of France made this impossible. The marriage of King Ferdinand with Isabella of Castile united the two crowns. From 1282 to 1730 it also embraced Sicily, and from 1416 to 1713 Sardinia. The CANAL OF ARAGON was first projected by the Emperor Charles V. (1528), but was not seriously taken in hand until the accession of Charles III. (1760). Pignatelli, the Italian engineer, constructed it from Zaragoza to Tudela. *Map, p. 310.* See SPAIN.

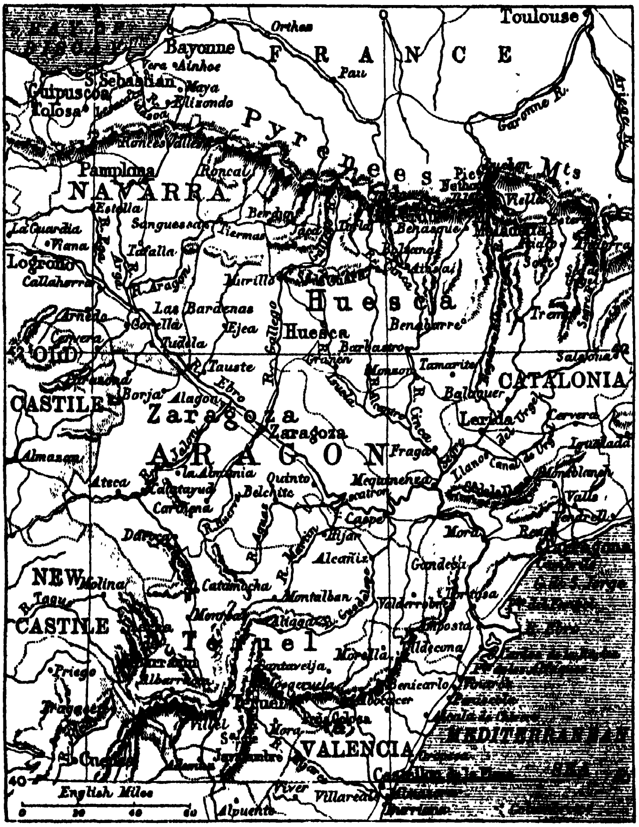


Arachnoidea.

1. SCORPIONIDÆ—*Scorpio indicus* (Linn.), ½ nat. size. 2. PEDIPALPI—*Titanodamon Johnstonii*, ½ nat. size. 3. PHALANGIDÆ—*Phalangium copticum.* 4. ACARINA—*Rhypicephalus annulatus.* 5. SOLPUGIDÆ—*Rhax brevipes* (Gervais), ½ nat. size. 6. ARANEIDÆ—*Araneus tarnensis*, nat. size. 7. PSEUDOSCORPIONIDÆ—*Chelifer sesamoides* (Sairguy). (No. 4, somewhat enlarged; 3 and 7, greatly enlarged.)

Aragona, tn., prov. Girgenti, Sicily, 10 m. by rail N. of Girgenti. Has important sulphur mines. Pop. (1901) 14,126.

Aragonite, a variety of carbonate of lime, first found in Aragon. It crystallizes in six-sided prisms, or in long, narrow, pointed forms, and has the same composition as calcite, though differing from it in specific gravity, crystalline form, and physical properties. (See DIMORPHISM.) Many fossil shells, which at first consisted of aragonite, have had their substance replaced by calcite, the more stable mineral. Satin spar is a fibrous variety of aragonite.



The Kingdom of Aragon.

Araguaya, or RIO GRANDE, a riv. of Brazil, rises in the Serra Cayapo, and joins the Tocantins near São Francisco. It flows N.E., and has a length of 1,300 miles, one-half of which is navigable.

Arahal, EL, tn., prov. Seville, Spain, 24 m. S.E. of Seville. Pop. (1900) 7,981.

Arakan, or ARACAN, the N.W. division of Lower Burma, on E. shore of Bay of Bengal; ceded to Britain (1826); cap. Akyab. Area, 18,540 sq. m. Pop. (1901) 762,102.

Aral, SEA OF (*Aralskoye More*), the second largest sheet of inland water in Asia, fills the lowest part of the W. Turkestan depression, between 43° 40′ and 46° 45′ N. and 58° 20′ and 61° 45′ E. It lies 160 ft. above sea-level, and 245 ft. above the level of the Caspian; measures 280 m. from N. to S., and 140 m. to 190 m. in breadth, and has an area of 26,000 sq. m. On the N. and W. are plateaus of clay formation about 230 to 330 ft. high, including that of Ust-Urt, which separates the Sea of Aral from the Caspian; and on the E. is a sandy desert, broken only by the Syr Daria. Evaporation being in excess of precipitation, the sea is gradually drying up. As late as the middle of the 18th century it extended 50 m. farther to the N.E. than it now does; and the Aibughir Gulf, in the S., has disappeared since the middle of the 19th century. The average depth is less than 100 ft.; the deepest part, 220 ft., is towards the N.W. Its water is only slightly saline, and every winter it freezes for several miles all round its shores. Its fish, of which it yields a rich harvest, are fresh-water species. The two great desert streams of W. Turkestan, the Syr Daria (Jaxartes) and the Amu Daria (Oxus), both pour their waters into this sea. There exists very conclusive evidence that at a comparatively recent geological period the Sea of Aral and the Caspian Sea both formed part of a much more extensive basin or inland sea.

Aralia, a genus of the ivy order, natives of the temperate and tropical regions. The greenhouse plant, commonly called *A. Sieboldii*, now known as *Fatsia japonica*, was introduced from Japan in 1858. Its large, round leaves are often mistaken for those of the castor-oil plant. The roots of another species, *A. edulis* (*cordata*), are eaten by the Japanese. A species in Formosa produces pith which the Chinese make into rice-paper. Ginseng is produced by yet another species of the order.

Aram, an old Semitic geographical term which included Syria and Mesopotamia, but excluded Palestine. It gave name to a division of the Semitic family of speech, Aramean or Aramaic, the dialects of which formed the group of North Semitic, as distinguished from Middle Semitic (*i.e.* Hebrew and Phœnician) and from South Semitic (*i.e.* Arabic and Ethiopic). Aramaic was divided into two main branches—Chaldee and Syriac. Large portions of the Books of Daniel and Ezra are written in the former, which was, for this and other reasons, taken to have been the language of ancient Babylonia. But this is an error; even the Semitic dialects employed in the Assyrian and Babylonian cuneiform inscriptions are not Aramaic. During the rule of the Persian dynasties Aramaic was a sort of official language and commercial *lingua franca* for the provinces of the empire which stretched W. and S.W. from the Euphrates to Egypt. In this way Aramaic is believed (the fact is not definitely known) to have supplanted the Hebrew of the Old Testament as the everyday speech of the people of Palestine. At any rate, Aramaic was the vernacular of Palestine in the time of Christ, and it is Aramaic that is meant when the New Testament speaks of 'Hebrew.' Chaldee (Aramaic) is the language of the Targums and Talmuds of Jerusalem and Babylon. Syriac, a literary language, embraced the Peshito version of the Bible, and was extensively used from the 4th to the 13th century, though it is now superseded by Arabic. The ancient Samaritans, the Nabatæans (though Arab by blood), and the Mandeans all spoke Aramaic dialects. See Nöldeke's *Die Semitischen Sprachen* (1887).

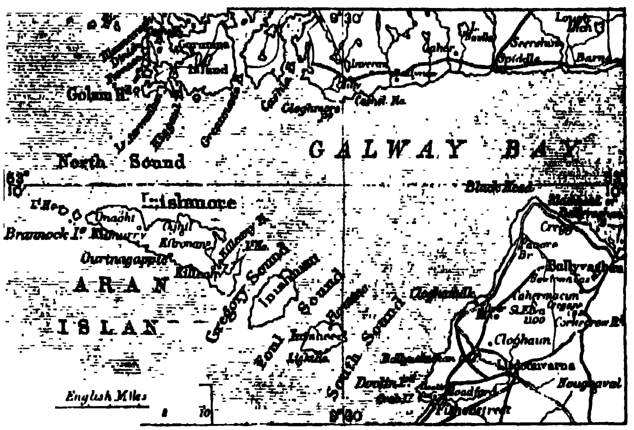
Aram, Eugene (1704-59), an English felon; born at Ramsgill, Yorkshire. Though wholly self-educated, he was the first to grasp clearly the affinity of the Celtic to the other Indo-European languages. He became a schoolmaster at Knaresborough, where he was intimate with a man named Daniel Clark, who soon after disappeared. A man named Houseman, who was apprehended on the charge of murdering Clark, gave evidence against Aram, who was tried, and after an able self-defence convicted. After an unsuccessful attempt at suicide, he was hanged at York. The interest attaching to Aram's crime is mainly due to Bulwer Lytton's novel and Hood's poem on the subject of the murder. See Scatcherd's *Memoirs of Eugene Aram* (1838); also the *Annual Register* (1759).

Aran, or Arran Isles, a group of small islands at the entrance to Galway Bay, about 4 m. off the w. coast of Ireland, and 27 m. s.w. of Galway city. The chief islands are named Inishmore, Inishmaan, and Inisheer. The Congested Districts Board has made them the headquarters of the mackerel fishing of that part of the coast. The isles are rich in archæological remains, one of which, Dun Ængus, a cyclopean fort of unhewn stone, is described by Dr. Petrie as 'the most magnificent barbaric monument now extant in Europe.' They were anciently the seat of a monastic school, and their old shrines attract many visitors to 'Aran of the Saints.'

Aranda, Pedro Pablo Abarca y Bolea, Count of (1718-99), Spanish statesman, born at Saragossa of a noble family, was sent in 1759 as ambassador to the Polish court, and in 1766 was made prime minister and military governor of Castile. His home policy was very liberal, and much influenced by the ideas of the French philosophers. He suppressed many abuses of the church, restrained the Inquisition, and procured the expulsion of the Jesuits from Spain (Apr. 1, 1767). He took many measures for the well-being of the people, organized the police and justice of the country, and encouraged arts and sciences. In his foreign policy he was a great adversary of England. The clergy worked for his downfall, and at their instigation he was sent as ambassador to Paris (1773). In that capacity he took an active part in the conclusion of the treaty of Paris (1783). Recalled in 1787, he was in 1792 for a short time prime minister, until supplanted by Godoy.

Aranjuez (anc. *Ara Jovis*), tn., prov. Madrid, Spain, on l. bk. of Tagus, 21 m. by rail s. of Madrid. It is the spring residence of the Spanish court, and has a beautiful castle built by Philip II., containing many art treasures. Here took place the insurrection which forced King Charles IV. to abdicate in favour of Ferdinand (Apr. 18, 1808). Aranjuez provides Madrid with asparagus, strawberries, and other fruits. Known to Germans from Schiller's *Don Carlos*. Pop. (1900) 12,670.

Arany, Janos (1817-82), Hungarian poet, born in Nagy-Szalonta, Bihar, won in 1845 a prize of the Kisfaludy Society of Budapest with a humorous epic, *Az Elveszett Alkotmany* (The Lost Constitution). His epic poems, *Toldi* (1847) and *Murany Ostroma* (The Conquest of Murany) (1847), made him the favourite poet of the Hungarian nation. In the revolution of 1848 he held an appointment in the national government, and after the defeat of Kossuth returned to poverty in his native town until 1854, when he became professor at the college of Nagy-Körös, whence he passed (1860) to Budapest as director of the Kisfaludy Society. Elected member of the Hungarian Academy in 1859, he became its perpetual secretary in 1865. Among his other works are *Toldi Esteje* (Toldi's Evening) (1854), and *Toldi Szerelme* (Toldi's Love) (1879); *Buda Halala* (The Death of Buda) (1864), and the humorous epic, *Nagyidai Cziganyok* (The Gypsies of Eida) (1852). Arany is the most popular and important modern poet of Hungary.



Aran Isles.

Arapahoes, North American aborigines, a western branch of the Algonquin family; are supposed to be the *Gros Ventres* of early French writers, but in later times withdrew beyond the Mississippi to the state of Colorado. They are tall, well-shaped, of a coppery-red colour, with long, black hair of the horse-tail texture, large nose, and somewhat regular features. In 1820 they numbered about 10,000, but are now (1900) reduced to 2,000.

Arapaima, a genus of tropical fresh-water fishes—the largest existing—with bony, compound scales. *A. gigas* of S. America attains 15 ft. in length. They are highly coloured, and their flesh is greatly esteemed.

Ararat. 'Mount Ararat' is a misnomer, Ararat being a region or country (Armenia), as may be seen even from Gen. 8:4, 'The ark rested . . . upon the mountains of Ararat' (*cf.* 2 Kings 19:37; Isa. 37:38; Jer. 51:27). The Babylonian account of the flood makes the ark take ground upon the 'mountain of Nizir,' in E. Assyria; while Nicolaus Damascenus states that its resting-place was 'a great mountain in Armenia . . . called Baris' (Josephus, *Ant.*, I. iii. 6), or Lubar, between Armenia and Kurdistan. The tradition which identifies 'Mount Ararat' with Mt. Massis, a double volcanic (eruption 1840) peak (16,950 and 13,220 ft.) in the N. of Armenia, is modern, and we cannot now determine which (if any) particular range was in the mind of the scriptural writer. See Professor Bryce's *Transcaucasia and Ararat* (4th ed. 1897); Dillmann's *Genesis* on Gen. 8:4; also Armenia and Deluge.

Ararat, tn., Victoria, Australia, near the river Hopkins, 115 m. N.W. of Melbourne. Near it are famous vineyards and good timber. Pop. (1901) 3,580; of the district (1901), 8,450.

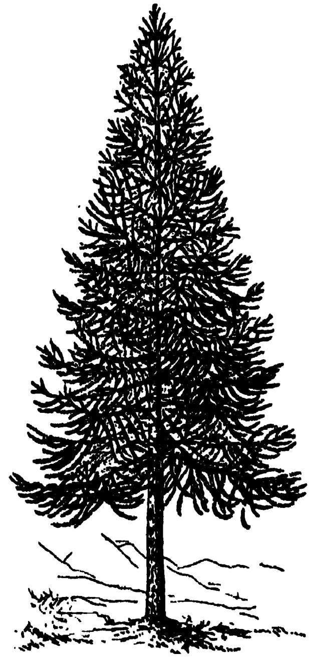
Aras (*Araxes*), large riv. of Armenia; rises in Erzerum vilayet. For the greater part of its course of 600 m. it forms the boundary between Russia (Cis-Caucasia) and Persia. It formerly joined the Kura 60 m. w. of its mouth; but in 1897 it changed its lower course, and now flows direct into the Caspian Sea at Kizil Agach Bay.

Aratus of Sicyon (271-213 B.C.), a Greek general and statesman. In 251 B.C. he expelled the tyrant Nicocles, and united (251) Sicyon to the Achæan league (see ACHÆI), and in 245 B.C. was chosen general of the league, which office he held for many years. He also obtained the accession to the league of Megara, Argos, and other cities; but this aroused the jealousy of the Ætolians and of Cleomenes, king of Sparta, and Aratus was obliged, for safety, to secure an alliance with the king of Macedonia. Ptolemy, king of Egypt, joined the Ætolians and Cleomenes, and in a succession of battles Aratus and the Achæans were defeated. At this crisis Antigonus of Macedon arrived with his army to assist Aratus, and defeated the Spartans at the battle of Sellasia (222 B.C.). But finally the relations between Antigonus's successor, Philip, and Aratus became so strained that the king procured the death of the latter by poison in 213 B.C. Aratus left thirty books of memoirs (now lost), which were drawn upon by Polybius and Plutarch.

Aratus of Soli, Cilicia, a Greek poet and astronomer, flourished about 270 B.C., only two of whose works are extant, the *Phænomena* and the *Diosemeia.* The former treats of astronomy, and the latter of the weather. Cicero and Germanicus translated them, and Virgil made use of them in the *Georgics.* Editions: Bekker (1828); Köchly's *Poetæ Bucolici et Didactici* (1851, 2nd vol.); *Phænomena* (with Latin notes), by Maass (1893); *Diosemeia* (trans. and notes in English), by Poste (1880).

Arauca, tn., Boyaca, Colombia, on r. bk. of the Arauca R., 370 m. from Bogota. Alt. 590 ft.

Araucanians, a historical S. American nation, whose territory comprised that part of Chile which lies between the Bio-Bio and Valdivia Rs., and bordered N. on the Peruvian empire. The national name was *Molu-che* (Men of War), a name fully justified by an indomitable courage, which enabled them to stem the southward advance of the Incas and hold out for centuries against the Spaniards. Their prowess was the theme of Ercilla's epic poem *Araucana* (1597), and Alvarez de Toledo's *Curen Indomito* (1861); and in 1773 Spain recognized the independence of their four confederate states. The pure Araucanian population is now estimated at less than 50,000. Between 1861 and 1870 a French adventurer of the name of Tounens (1820-78) proclaimed himself king of the Araucanians, under the title of Orelio Antonio; but he was deposed by the Chilean government and sent back to France. Since then the rule of Chile has been recognized. The Araucanians are an undersized but vigorous race. Their chief industry is the breeding of cattle and vicunas. All are polygamists, and their religion is based on the principle of good and evil (*Apo, Pillan*). They are perhaps the most democratic of all peoples, even the father possessing little control in the household, while the authority of the tribal chiefs is recognized only in time of war or of national danger. Araucan, a language of high polysynthetic type, has been reduced to written form, and in it are embodied a large number of myths and national legends. See Tounens's *L'Araucanie* (1878); Lenz's *Araukanische Märchen* (1896).



Araucaria imbricata.

Araucaria, a genus of Coniferæ with evergreen leaves, of a singularly geometrical habit of growth, is considered the oldest of the conifers. A feature of the genus is the appearance of male and female flowers on separate trees. The only species that grows well in Britain is the *A. imbricata,* popularly called the monkey puzzle or Chile pine, which grows to a great height if protected from wind and frost, and is used for the masts of ships. In its native country, Chile, the tree produces a seed which is used for food, and also a fragrant resin. The *A. excelsa,* or Norfolk Island pine, attains a height of 200 ft.

Arauco (4,248 sq. m.), prov. on the Pacific slope, 40 m. S. of Concepcion, Chile; has coal mines. Pop. (1895) 59,237. Cap. Lebu.

Araujo e Azevedo, ANTONIO DE, COUNT DE BARCA (1754-1817), Portuguese statesman, ambassador at the Hague (1789), Paris (1797), and St. Petersburg, after the peace of Amiens. In 1803 he became Minister of Foreign Affairs at Lisbon; but upon Napoleon's invasion he fled (1807) with the royal family to Brazil, where in 1814 he was made Minister of Marine and the Colonies.

Araujo Porto Alegre, MANOEL DE (1806-79), Brazilian poet and architect, born in Rio Pardo, state of São Pedro, Brazil; completed his artistic training in Paris (1831) and in Italy (1835). In 1837 he became professor at the Academy of Arts, Rio de Janeiro, and a little later at the military college. He was the founder of the national theatre, for which he wrote several plays with a patriotic tendency. His principal poetical works are *Colombo* and *Brasilianas* (1863).

Araure, tn., Venezuela, 170 m. S.W. of Caracas. Pop. over 4,000.

Aravali Hills, India, extend from Gujarat, in Bombay Presidency, for 300 m. N.E. through Rajputana. Mount Abu is the highest point.

Arawaks, S. American aborigines who formerly ranged over a great part of N. Brazil, the Guianas, and Venezuela, and appear to have formed the chief element in the W. Indies and Bahamas. They are still numerous on the mainland. In the Arawak family two distinct types have been noticed—one marked by short, thick-set frames, broad and rather flat features, retreating forehead, slightly oblique eyes, small nose, and yellowish skin; the other with tall, slim figures, straight eyes and nose, more regular oval features, reddish-brown complexion, and bright, animated expression. All alike are rude, uncultured tribes, who have nowhere advanced beyond a low grade of social organization, but are mostly of a peaceful disposition, the chief exception being the Goajiros of Venezuela.

Arbaces, the Mede, who, according to the historian Ctesias, overthrew the Assyrian empire in the seventh century B.C. by defeating Sardanapalus, and founded the Median. Another of the name was a general of Artaxerxes Memnon in his war with his brother Cyrus (401 B.C.).

Arbe (in Slavonic, *Rab*), an island of Austria, lying between the Quarnerolo and the coast of Croatia. It is hilly (1,340 ft.) but fertile, and produces wine, maize, millet, salt, and sheep. Area, 45 sq. m. Pop. (1900) 4,441. Chief town, Arbe (pop. 850), on the W. coast.

Arbela, city of Adiabene, Assyria, famous as a centre for the worship of Istar, and as the headquarters of Darius before his defeat by Alexander (331 B.C.). The battle of Arbela was really fought near Gaugamela, about 50 m. w.

Arber, EDWARD, English man of letters, emeritus professor of English language and literature at the University of Birmingham. His chief works are: *English Reprints* (14 vols. 1868-71), *British Anthologies* (10 vols. 1899-1900), *English Garner* (8 vols. 1877-96), *English Scholar's Library* (16 vols. 1878-84), Tyndale's *New Testament, 1525* (1871), *A Transcript of the Stationers' Registers, 1554-1640* (5 vols. 1875-94), and *The Term Catalogues, 1668-1709* (2 vols. 1903-5, 3rd in preparation).

Arbitrage, in stockbroking, the buying and selling at one and the same time, but in different markets, of stocks, bonds, bills, shares, etc., so as to derive a profit from the difference between the quotations in such markets. The term is also applied to the calculation on which such traffic is based.

Arbitration, a way of settling disputes without going to law. In England, the law on the subject is contained in the Arbitration Act, 1889; but the act does not apply to a verbal submission to arbitration. Parties may agree to submit any present or future matters of difference affecting any of their civil interests to the decision of an arbitrator, who may be an official referee, or of two arbitrators, with an umpire in case they disagree. A written submission to arbitration is irrevocable except by leave of the court. Any proceedings with respect to any matter referred to arbitration may be stayed by the court. If the parties cannot agree on an arbitrator, or if the person nominated refuses or is unable to act, either party may serve the other with written notice to make an appointment; and if the appointment is not made within seven days, the court may appoint. In case of a submission to two arbitrators, if one refuses or is unable to act, the party who appointed him may appoint another; and if one party refuses to make an appointment, the arbitrator appointed by the other party may, after seven days' notice to the party refusing, be appointed sole arbitrator, subject to the discretionary powers of the court. An arbitrator may administer an oath, and witnesses before him may be summoned on *subpœna*, and are liable for perjury as in an ordinary action. An arbitrator may state a case for the opinion of the court on any question of law arising in the course of the arbitration, and he may, on the application of one of the parties, be ordered by the court to do so. He may be removed by the court for misconduct, and his award set aside; otherwise an award may be enforced as if it were a judgment of the court. Some criminal matters, when the offence is not of a public nature, and the injured party has a remedy by action as well as by indictment, may be referred to arbitration—as, for example, cases of assault. The Arbitration Act also provides for the reference of difficult questions of fact, which cannot be conveniently dealt with by the court, to a special referee or arbitrator.

In all arbitrations, unless it is otherwise provided by the submission, the following rules apply:—(1) The reference is to one arbitrator; (2) two arbitrators may appoint an umpire; (3) the award must be made in writing within three months of the reference, but the court has power to extend the time; (4) if the arbitrators make no award, the umpire may make an award within one month; (5) the parties are examined on oath, and must produce all papers required; (6) if the arbitrators think fit, the witnesses are examined on oath; (7) the award is final; and (8) the costs are in the discretion of the arbitrator. The powers of an arbitrator are strictly limited by the terms of the reference to him.

Many statutes now provide that disputes arising under them shall be determined by arbitration—*e.g.* all questions of compensation under acts authorizing the compulsory taking of land.

In Scotland, the range of matters which can be referred to arbitration by the parties appears to be as wide as in England, and the substance of the law generally is the same; but the Arbitration Act, 1889, does not apply, and there are material differences in form and procedure. An arbitrator is called an 'arbiter,' an umpire an 'oversman,' and an award a 'decree-arbitral.' The submission and the decree-arbitral are formal deeds. The submission contains a clause by which the parties agree to the registration of the submission and the decree-arbitral; and the registration is necessary in order to enable the parties to enforce it as a judgment. Formerly a reference of future disputes to an unnamed arbiter could not be enforced; but the Arbitration (Scotland) Act, 1884, s. 1, provides that 'an agreement to refer to arbitration shall not be invalid or ineffectual by reason of the reference being to a person not named, or to a person to be named by another person, or to a person merely described as the holder for the time being of any office or appointment.' See Russell, *On Arbitration* (1900); G. I. Bell, *On Arbitration* (1877).

Arbitration, INTERNATIONAL, is an adaptation by independent nations to their own differences of the system of settling disputes between private individuals by reference to the judgment of a third party. But in a case of international arbitration there is no true legal 'sanction,' and effective compliance with the award must depend upon the national sense of honour of the beaten party.

The nearest approach to modern international arbitration which was to be found in ancient times was the inter-state arbitration occasionally resorted to by the several Greek communities. It was not, however, until the middle ages, when Europe had separated into different kingdoms with some equality of status, that opportunity was given for the application of international arbitration in something like its present form. The Pope, for instance, not infrequently acted as arbitrator or mediator in the disputes between ambitious monarchs, or between those monarchs and their more powerful and turbulent vassals. Sometimes one king adjudicated in the differences between two others. The awards given, however, were not always above suspicion; and the finding of the arbitrator was often repudiated, or became the starting-point of a fresh dispute. No sketch of the history of international arbitration would be complete without a reference to the 'Great Design' of Henry IV. of France and his minister Sully. Those two statesmen dreamed of a mighty scheme of federation for all the states of Christian Europe, under a common government, and it was an essential feature of their plan that all disputes should be settled by arbitration.

The Abbé St. Pierre at the beginning of the 18th century, and Kant and Bentham at the end, dreamed these Utopian dreams; but it was not till the middle of the 19th century that the sympathies of statesmen and politicians became at all actively enlisted in the cause. Resolutions in favour of a general and permanent system of arbitration were, after repeated failures, carried both in the American Congress and in the British House of Commons; and though, indeed, no immediate practical result was secured, still men's minds were more generally set to work upon the subject. In the early 'seventies the study of the problems involved in international arbitration received a powerful stimulus from the establishment of the Institute of International Law and the International Law Association, bodies of jurists and public men of all countries, formed for the express purpose of discussing that large and somewhat indeterminate class of questions which arise under the so-called law of nations. Another body which deserves mention is the International Parliamentary Union, instituted in 1888 with the object of promoting arbitration and peace.

Concurrently with the theoretical discussion of schemes of international arbitration, a steadily growing practice arose last century among the great powers of the world of submitting certain kinds of disputes to this method of settlement. This practice in which Great Britain has taken an honourable share—has fallen far short indeed of complete adhesion to the principle of universal and permanent arbitration. But each resort to arbitration has formed a precedent; and the obvious convenience and the comparative cheapness of this method of settling differences have more and more recommended themselves to statesmen.

A few of the leading cases in which Great Britain has been concerned during the last century may be given. Perhaps the most famous, certainly one of the most controversial, was the case of the *Alabama* claims. The British government having failed to detain the Confederate cruiser, the *Alabama*, after she had been fitted out in an English port for service against the Northern States in the American civil war, she started forth on a fatal career, which was only brought to an end after the destruction of Federal shipping and property to the total value of some millions of pounds. The American government claimed satisfaction for the damage done, and Great Britain proposed arbitration. The great difficulty in the way was that the two parties could not agree as to the actual interpretation of the rules governing the conduct of neutrals in time of war; and without some common basis of agreement on the point, arbitration was impossible. Finally, however, a special commission was appointed, which succeeded in drawing up three rules which were acceptable to both countries; and the arbitration then proceeded, the tribunal ultimately adjudging the damages due to America at £3,229,166. Another famous arbitration between this country and the United States was that upon their respective rights of fishing in the Bering Sea. The question was referred to an arbitration tribunal which sat at Paris in 1893, and the result was in favour of Great Britain on all points.

A more sensational case was the dispute as to the boundary between British Guiana and Venezuela. The attitude adopted on the question by the president of the United States at the end of 1895 provoked great excitement in this country. But Lord Salisbury, on behalf of Great Britain, consented to arbitration with Venezuela, and a peaceful conclusion of the dispute was arrived at. The award of the arbitration tribunal was again in favour of this country. The whole incident, however, suggested strongly to the statesmen both of America and of the United Kingdom the advantage of a permanent treaty of arbitration between the two powers. Great hopes, therefore, were excited when it became known that such a treaty had been successfully negotiated by Mr. Olney, the American secretary of state, and Sir Julian Pauncefote, our ambassador at Washington. Such hopes, unfortunately, were doomed to disappointment by the action of the American Senate, whose ratification of the treaty was accompanied by amendments which wholly destroyed its value, and compelled the British government to withdraw. The action of the Senate was, according to the critics in the American press, largely dictated by the dislike of the free-silver men for Mr. Cleveland and Mr. Olney.

The settlement of the Alaska Boundary dispute between the United States and Canada deserves mention here, although it does not exactly come under the head of arbitration proper. In this case the Dominion and the Imperial governments on the one hand, and the American government on the other, agreed to submit the points at issue, not to an outside arbitrator, but to a tribunal of eminent jurists and statesmen belonging to the two powers concerned, and presided over by Lord Alverstone, Lord Chief-Justice of England. Only a few days before the Alaska tribunal had finished its deliberations another triumph of the principle of arbitration was secured in the conclusion of the Anglo-French treaty, which provides for the peaceful settlement in the future of most classes of disputes between ourselves and our neighbours.

Among other recent arbitration treaties are those signed between Chile and Argentina (Aug. 12, 1902); between France and Italy (Dec. 25, 1903); between Great Britain and Germany (July 12, 1904); between Great Britain and Portugal (Nov. 16, 1904); between Great Britain and Austria-Hungary (Jan 12, 1905); and that between the United States and Great Britain (dropped in Feb. 1905). See also Dogger Bank.

The most notable advance in universal arbitration was taken in 1899. The famous rescript of the Czar, calling for a conference of the powers to arrive at a scheme of disarmament, resulted in the Hague Convention. The main project of that rescript, disarmament, was found impracticable; but the policy of the Czar was fully justified by the agreement of the powers to establish a permanent court of arbitration at the Hague. Opinion was obviously not ripe for a compulsory scheme of arbitration to meet all cases; but the formation of such a court gives the strongest encouragement to governments to submit as many disputes as possible to this process of settlement, and the success which so far has attended its operations affords much hope for the future peace of the world.

Arblay, MADAME D'. See BURNEY, FRANCES.

Arboga, tn., Sweden, prov. Vestmanland, situated on the Arboga R., affluent of Lake Mälar, 25 m. N.E. of Orebro, on the railway Köping-Orebro. It is one of the oldest places in Sweden, many Diets having been held here, especially those of 1561 and 1597. The town church has an altar-piece by Rembrandt. Pop. (1900) 5,254.

Arbogast (d. 394), a Frank by origin, who distinguished himself as a Roman general under the Emperors Gratian (367-383) and Valentinian II. (388-392). Being dismissed by Valentinian, he refused to give up his command, and a few days later the emperor was killed at Vienna (Gaul) by order of Arbogast. He did not himself ascend the throne, but made the rhetorician Eugenius emperor. But after two years (394) the Emperor of the East, Theodosius, invaded Italy, and defeated Arbogast near Aquileia. Eugenius was decapitated, and Argobast committed suicide. See Morpurgo's *Arbogaste e l'Imperio Romano, 379-394* (1883).

Arbois de Jubainville, MARIE HENRI D' (1827), distinguished French philologist and historian, born at Nancy; professor of Celtic language and literature at the Collège de France (1882); member of the Académie des Inscriptions et Belles-lettres (1884). He is the author of many important books, as *Histoire des Ducs et des Comtes de Champagne* (7 vols. 1859-69); *Les Premiers Habitants de l'Europe* (1877; 2nd ed. 1889-94); *Etudes Grammaticales sur les Langues Celtiques* (1881); *Le Cycle Mythologique Irlandais et la Mythologie Grecque* (1884), which forms part of the *Cours de Littérature Celtique* (12 vols. 1883-1903); etc.

Arbor Day, a day set apart in the United States and in Canada for the planting of trees by children, to encourage forestry in treeless districts. Arbor Day in Ireland (Mar. 17) was inaugurated in 1904, when most boards of guardians planted commemorative trees,

Arboriculture. See FORESTRY.

Arbor Vitæ, the Thuja genus in the cypress family of conifers; includes aromatic and evergreen shrubs and trees of great variety, many of which are grown in the open or under glass in Britain. See THUJA.

Arbroath, formerly Aberbrothwick and Aberbrothock ('mouth of the Brothock'), royal and parl. burgh, seapt. and manufacturing tn., Forfarshire, Scotland, 17 m. N.E. of Dundee. It manufactures linen, sail-cloth, and leather, and spins flax and jute. There are also engineering works and shipbuilding yards. The dock area is 2¼ ac.; high-water depth at entrance, 15 ft.; patent slipway, 450 ft. long. Ruins of the abbey founded by William the Lion in 1178. Arbroath is the 'Fairport' of Scott's *Antiquary*. Pop. (1901) 22,398.

Arbués, PEDRO DE (1441-85), Spanish inquisitor, born at Epila, Aragon; became an Augustine monk at Saragossa, and was appointed (1484) by Torquemada first inquisitor there. His excessive zeal in the persecution of the heretics led to his assassination in 1485. He was canonized by Popes Alexander VII. (1661) and Pius IX. (1867). He is the subject of W. von Kaulbach's *Peter Arbuës of Epila condemning a Family of Heretics to Death*. See Zirngiebl's *Peter Arbuës* (3rd ed. 1872).

Arbuthnot, ALEXANDER (d. 1585), Scottish printer, who (with Bassandyne) published the first Scottish Bible. It was a reprint of the Geneva version, and was issued in 2 vols. folio at Edinburgh in 1579. It contained a dedication, written by Arbuthnot, to James VI.

Arbuthnot, JOHN (1667-1735), Scottish author and physician, was born at Arbuthnott, Kincardineshire, and graduated M.D. at St. Andrews. He was physician to Queen Anne, a close friend of Swift, and intimate with Pope and Gay. He was the author of the famous satire, *The History of John Bull* (1712). *The Memoirs of Martinus Scriblerus* (1741), though published among Pope's works, is now ascribed to Arbuthnot. See Swift's *Journal to Stella*; Aitken's *Life and Works of Arbuthnot* (1892).

Arbutus, a genus of evergreen shrubs of the Ericaceæ or heath order. *A. unedo*, the beautiful 'strawberry' tree (20 ft.), is grown in warm districts of the United Kingdom. *A. Andrachne* (15 ft.) is hardy in S. Britain. The *A. Menziesii*, which grows to 100 ft. high, is the madroña of California.

Arc (Lat. 'bow'), a portion of any curved line. The straight line joining its ends is called the 'chord;' the bisector of the chord at right angles, passing to the arc, is the *sagitta* or 'arrow.' The length of a circular arc is given by the equation $s = r\theta$, where r is the radius, and θ the angle subtended at the centre of the circle measured in radians. (See ANGLE.) Huygen's approximation for the length of a circular arc is (8 × chord of ½ arc − chord of whole arc) ÷ 3. See CURVE and ASYMPTOTES.

Arc, JEANNE D'. See JOAN OF ARC.

Arc and **Arc Lamps.** See ELECTRIC LAMPS.

Arcachon, health resort, dep. Gironde, France, on the Bassin d'Arcachon, 35 m. S.W. of Bordeaux. The town proper is situated on the lagoon; the winter town (since 1854) is composed of numerous villas scattered among the pinewoods. The climate is mild and bracing (59° F. mean of the whole year, 48° F. mean of winter). It is visited yearly by 200,000 persons. Oysters are extensively cultivated. The Bassin d'Arcachon is a triangular lagoon, 60 sq. m. in area, communicating with the sea at Cap Ferret. Pop. (1900) 8,259.

An Arcade in the Ducal Palace, Venice.

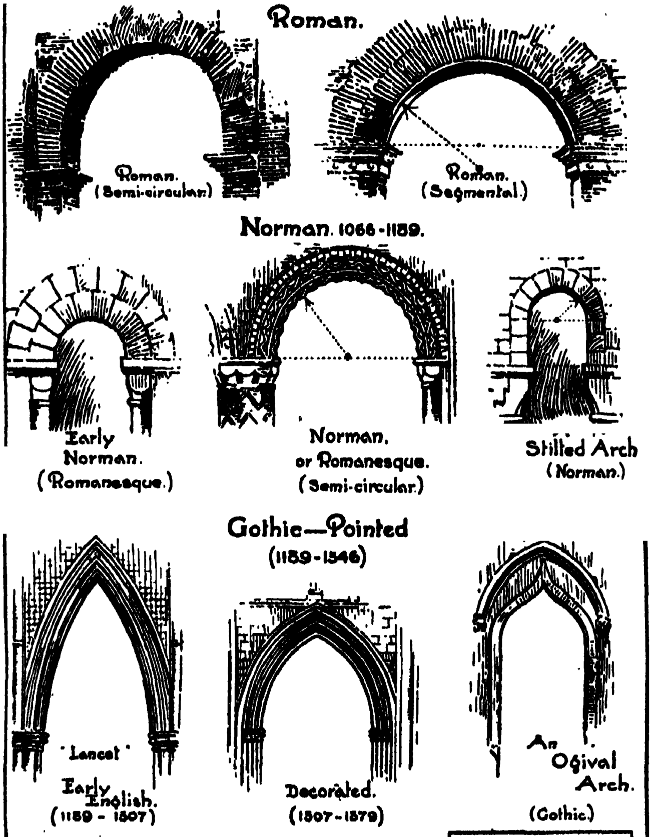
Arcade, a term in architecture very vaguely used—(1) a series of apertures or recesses with arched ceilings; (2) a single-arched aperture or enclosure, equivalent to a vault; (3) the space covered by a continued arch or vault supported on piers or columns. The first is the true arcade, behind which there is generally a walk or ambulatory. The Romans erected arcades one over the other. The piers of arcades may be decorated with various columns, pilasters, niches, and apertures. See Fergusson's *History of Architecture* (1865-76).

Arcadelt, Jacob (d. 1575), musical composer, born in the Netherlands at the end of the 15th or beginning of the 16th century. He went to Rome in 1536, and was employed as a singer at the Vatican until 1555, when he accompanied Cardinal Charles of Lorraine to Paris. He wrote many masses, over two hundred madrigals for four and five voices, and a collection of songs.

Arcadia, a mountainous and picturesque country in the centre of the Peloponnesus, Greece; bounded by Achaia on the N., by Argolis on the E., by Laconia and Messenia on the S., and by Elis on the W.; entirely surrounded by mountains. Its chief towns were Tegea, Mantineia, and, after 370 B.C., Megalopolis. The Arcadians claimed to be the most ancient people in Greece—'older than the moon,' according to the name they gave themselves. They were certainly a primitive people, chiefly occupied in pastoral pursuits and hunting. Their devotion to music is responsible for the Arcadia of modern poetry and romance. They retained their independence against the Spartans, and in the 3rd century B.C. joined the Achæan league, and, with its other members, submitted to the Romans in 146 B.C. See Grote's and Bury's *Hists. of Greece.*

Arcadius (377-408 A.D.), son of Theodosius, emperor of Rome; remarkable as (from 395) the first Emperor of the East, with his capital at Constantinople, his brother Honorius reigning at Rome as Emperor of the West. He was a ruler of no ability, led by his favourites or by his empress Eudoxia. He was succeeded by his son Theodosius II.

Arcesilaus (316-241 B.C.), Greek philosopher, founder of the Middle Academy, and opponent of Zeno, the founder of the Stoa. A true successor to Pyrrho in his antagonism to the dogmatic schools, he denied that there is any standard by which truth and error may be distinguished. Our convictions, he said, are opinion rather than knowledge; but in the practical or moral sphere we must be guided by probability. See Schwegler's *Geschichte der Greichischen Philosophie* (Eng. trans. J. H. Stirling, 1888).



Typical Forms of Arch.

Arch, a structure of brickwork or masonry, or of iron or steel ribs, whereby a load is supported over an open space, as in doorways, windows, roofs, bridges, and tunnels. The word is not applied to a straight horizontal support, such as a lintel or girder, which fulfils its purpose by its mere tensile strength and rigidity. Arches are, as the name implies, curved (or polyhedral) structures designed to receive the load equally at all points, and to transmit the pressure through elements (stones, ribs, etc.) placed in the 'line of pressure.' The latter has a definite geometrical form for every amount and distribution of load, and it is the business of the architect or engineer to calculate where that curved line of pressure will lie, and to build his arch to coincide with it. If a flexible chain be held up at its two ends and loaded, it will assume a curve corresponding to the distribution of the load upon the chain; and if the curve thus obtained be inverted, it will represent the arch necessary to support a similarly distributed load laid upon it. Limited by this principle, architects have yet given to the arch a wonderful variety of forms, and it has been the most important factor in determining the several architectural styles of history. The buildings of the Egyptian and Greek civilizations employed the lintel rather than the arch, being, in fact, developments in stone of the art of construction with timber; and the recent introduction of house-building with steel girders (which, in this respect, have the same qualities as wooden beams) has, for many purposes, eliminated the arch, vault, and dome from modern structures. But, from Roman times to the present day, the masonry arch has been used for every constructive purpose. A typical arch is supported by two *piers*, the distance between which is the *span* of the arch. Above each pier is a horizontal block, the *impost;* then the *springer*, or lowest *voussoir* of the curve; then other *voussoirs*, all wedge-shaped; until at the apex is reached the *keystone*, which is the centre of the arch. The concave side of the arch is the *intrados*, the convex the *extrados;* the *rise* is the height of the intrados at its highest point, above the middle of the line joining the top of the imposts; the *thrust* is the pressure which the arch exerts outwards. Masonry arches are built upon a wooden structure, called a centering, which is afterwards removed. The diagram shows the most notable forms of arch, indicating the style of architecture with which each is associated. The engineering questions involved are discussed under BRIDGES. See also ARCHITECTURE.

Arch, TRIUMPHAL, a monumental arch erected by the Romans in honour of an individual, or to commemorate some historical event, usually a great victory. Such structures were originally temporary wooden erections festooned with garlands of flowers, stretching across the road or street along which the victorious general and his army entered the city. Afterwards the triumphal arch became a massive, highly ornamental, permanent piece of architecture, decorated with appropriate bas-reliefs and inscriptions.

The oldest, although not now in existence, were those erected in honour of Scipio Africanus (190 B.C.) and Fabius Maximus (120 B.C.). Among surviving arches there are three at Rome—the Arch of Titus (80 A.D.), erected in honour of the conquest of Judea (it is richly sculptured, and shows reliefs of Titus in triumph, with the plunder of the temple at Jerusalem); the Arch of Septimius Severus (203 A.D.), erected in commemoration of his victories over the Parthians; and the Arch of Constantine (312 A.D.), which has a large central archway with a smaller arch on either side, and four Corinthian columns on each front. It was the greatest and most lavishly decorated of all, and was erected in honour of Constantine's victory over Maxentius. Triumphal arches existed also in all parts of the Roman empire—as at Ancona; at Benevento (114 A.D.), in honour of the Emperor Trajan; and at Saint-Rémy and Carpentras, in honour of Marcus Aurelius. In modern times there are the arch erected at Naples in honour of Alphonso of Aragon (in the 15th century); the Arco de la Pace at Milan (in the 19th century); the two arches erected by the municipality of Paris in honour of Louis XIV., called afterwards Porte Saint-Denis and Porte Saint-Martin; the Arc du Carrousel (1806), and the Arc de Triomphe de l'Etoile (1836), both at Paris, and both dedicated to the Grande Armée. The Arc de Triomphe de l'Etoile is situated at the end of the Champs Elysées, in the middle of a circus from which twelve large avenues radiate. Its erection was begun by Napoleon I. after the battle of Austerlitz (1806), and completed in 1836. It stands 150 ft. high, is 135 ft. broad, and 69 ft. deep. It is splendidly decorated and adorned with allegorical statues, and contains the names of the principal victories of Napoleon, and of 386 generals who took part in the battles of the revolution and of the first empire. Carrousel, in the square of the same name in Paris, was erected by Napoleon in 1806, after the model of the Arch of Septimius Severus in Rome. Other notable arches are the Brandenburger Thor at Berlin, the Siegesthor at Munich; and in America the Washington Arch at New York, Memorial Arch at Brooklyn, and others.

Arch, Joseph (1826), agitator (1867-1900) in favour of farm labourers, was born in Warwickshire; worked as a farm hand; became a Methodist preacher; founded the National Agricultural Labourers' Union (1872); was Liberal M.P. for N.W. Norfolk, 1885-6, 1892, and 1895-1900. See his *Autobiography*, ed. by Countess of Warwick (1898).

Arch of Titus, Rome.

Arc de Triomphe de l'Etoile, Paris.

Archæan System, a geological term including all those rocks which are believed to be older than the fossiliferous strata. The name, which means 'initial' (Gr. *archaios*), was suggested by the supposition that they were the remains of the first crust which formed on the cooling globe; but most geologists would hesitate to decide to what extent this primitive crust is exposed and can be recognized at the present day. They have also been called 'azoic' (without life, unfossiliferous); but this name is even more objectionable, as taking for granted that fossils will never be obtained from them.

At the present time the name Precambrian is generally employed; it implies that they are older than the oldest Cambrian strata. Rocks of this system are spread over wide areas of both hemispheres, everywhere exhibiting great diversity of character, and structures often intricate and difficult to decipher. As a general rule gneisses and metamorphic schists are the prevalent rock types, but sedimentary rocks and igneous masses are found in practically every area. It has generally been possible to establish a twofold subdivision of this system, there being a lower series of more highly crystalline character, and an upper series of metamorphic schists or little-altered sedimentary masses. The lower series (which, from its importance in the Outer Hebrides, has been called Lewisian, and Laurentian by Canadian geologists from its large development in the St. Lawrence basin) consists usually of gneissose rocks, such as hornblende or biotite, gneiss, hornblende schist, actinolite schist, and eclogite, mostly foliated, and lying in bands or layers which are often of very irregular thickness. It is probable that this series is of igneous origin, and that its characters are partly primary, partly the result of mechanical deformation. Mixed with these are rocks which present a normal igneous *facies*—*e.g.* granite, pegmatite, diorite, peridotite, which seem to have been injected as veins, sills, and rude sheets in fissures of the gneisses. Marbles and crystalline limestones, micaceous schists, granulites, and graphitic rocks, though usually present, play only a subordinate part in this subdivision of the system. The upper series is well developed in Scotland, forming what is known as the Dalradian series of the Geological Survey; and appears also in the Scandinavian peninsula, and, with somewhat different characters, as the Huronian of N. America. The coarsely crystalline and rudely foliated gneisses and igneous rocks of the lower group are here replaced by mica schists, graphitic schists, chlorite schists, quartzites, granulites of various types, slates, phyllites, and crystalline limestones. Much of this material was originally of sedimentary origin, and has reached its present condition as the result of extensive regional metamorphism. In N. America, the Huronian contains important volcanic rocks (diabases and tuffs). Conglomerates are also not infrequent, and indicate extensive unconformabilities. How far in every case these upper rocks are really Precambrian, or include greatly-altered members of the Cambrian or later formations, it is at the present moment impossible to decide. The search for fossils has already in some cases been rewarded, as in the mica schists of S. Norway, which are probably altered Silurian rocks. There is still another *facies* of Precambrian rocks, which in Scotland is represented by the Torridonian, in Norway by the Sparagmite beds, and in N. America by the Keweenawan beds. These are detrital sedimentary masses, sandstones, grits, arkoses, conglomerates, etc., in most cases little altered. Sheets of lava and ash beds are mingled with them in many areas, and they are often penetrated by igneous injections. These are in Scotland known to be of Precambrian age; elsewhere their true position is often uncertain. The Longmyndian and Uriconian rocks of Shropshire, which consist respectively of quartzites and volcanic rocks, as well as the Hartshill and Lickey quartzites of the English Midlands, and the slates and volcanic rocks of Charnwood Forest, may with probability be assigned to this group. Not the least interesting feature of the Archæan and Precambrian rocks is their enormous thickness, which in N. America has been estimated at from 80,000 to 100,000 ft. Although, owing to their very complex and much-folded structure, such estimates in this case are apt to be fallacious, yet they indicate how large a portion of the history of the terrestrial globe must be represented by these masses of rock. We have other evidence which leads to the same conclusion: the earliest known fauna—that of the Cambrian—has never been regarded by zoologists as in any real sense primitive, but its members are so highly developed that they must have had a long series of ancestors of whom no record has been found. It was at one time believed that in Eozoön, supposed to be a species of Foraminifera, an undoubted fossil had been unearthed from the Precambrian rocks of Canada; but the evidence of its organic structure is incomplete. In addition to those districts already mentioned, Archæan rocks are found in Brittany, Finland, Bohemia, Spain, and Portugal; in India, N. China, and over large areas in Brazil, Australia, and Africa. They outcrop very frequently along the axes of mountain chains, flanked on either side by rocks of later age, as in the Urals, Alps, Pyrenees, and Himalayas. Owing to their resistant nature they usually form elevated plateaus, or even mountainous masses. They are in many places repositories of valuable ores, as in Scandinavia, N. America, and Brazil, where they yield iron, silver, gold, copper, nickel, and often precious stones. See Sir Archibald Geikie's *Text-book of Geology*; Dana's *Geology*; Lapworth's *Intermediate Geol.* (1899).

Archæology is, as the word itself denotes, the study and discussion of matters relating to antiquity, looking from comparatively recent historical times back to the farthest conceivable limit of the prehistoric ages. By this expression, however, is not to be understood the more remote periods of geology; for, although that science lends its valuable aid to archæology, it is the aim of archæology to confine its inquiries to those geological periods which contain evidence of human and anthropoid life. But within these limits there is, it will be seen, an immense area. And the lines along which archæological study may be followed are many. The most obvious is the line of historical research, and by this method also there is probably the greatest likelihood of attaining to the knowledge of actual facts. No doubt written history is largely mixed with fable, and even its genuine records teem with inaccuracies of varying degree; nevertheless, it is by this medium that the most definite conceptions of archaic life are made possible. Thus, when two or more historical accounts are collated, such as those of the Jews and the ancient Egyptians or the Assyrians, and when it is found that these histories of diverse nations agree in their description of a certain man, race, or state of society, at a period clearly defined by them, then it is evident that for a moment the darkness of antiquity is dissolved, and an authentic picture is revealed of the actual life of the locality and epoch in question, with possibly the most minute details as to the racial characteristics of the actors in the scene, and their manners, dress, and general surroundings. And when, as sometimes happens, these records are pictorial as well as written, the result is to give the modern mind an impression of that archaic life that is almost absolutely accurate.

But while the only wholly reliable histories are those which have chronicled contemporary events, and described persons or places from the accounts of eye-witnesses, it is not to be forgotten that much of what is accepted as history was not put down in visible characters on stone or parchment until long after the date of the events described. It is quite legitimate to regard this also as history, although under reservation. For in early times, as still among primitive peoples, the chronicles of a nation were orally preserved by special castes of priests or bards, who insisted strongly on the verbal accuracy with which the tribal traditions should be carried on from generation to generation. 'Much passes for history in other lands on far slighter grounds,' observes Sir George Dasent with reference to the Norse Sagas, 'and many a story in Thucydides or Tacitus, or even in Clarendon or Hume, is believed on evidence not one-tenth part so trustworthy as that which supports the narratives of these Icelandic story-tellers of the 11th century.' More reliance, indeed, ought to be placed on the yet unwritten records of some savage races than on many genealogies which have been in print for generations, but which were deliberately manipulated by the chronicler for the purpose of enhancing the glory of his family or nation. Thus, a certain amount of respect is accorded to the Maori unwritten history, which indicates the beginning of the 11th century as the date of the arrival of that people in New Zealand. At the present day, this oral history can only be noted and no more; but it is quite within the bounds of probability that future research may prove this traditional statement to be scientifically accurate. Accordingly, while it is necessary to proceed with great caution, owing to the manifest uncertainties attaching to beliefs which, in civilized countries, are now only held by uneducated people, the study of popular tradition and folk-lore is becoming more and more a recognized phase of archæology. And this not only means the study of traditional history—of family, tribe, or nation—but also of the many customs and beliefs which still retain their hold upon the minds of the peasantry in civilized lands, and of whole races inhabiting regions as yet little affected by modern ideas. A vast deal of importance clearly attaches to such customs and beliefs; and when, by pursuing the comparative method, it is seen that people of apparently diverse race and history, inhabiting far-separated regions, follow the same practices and hold the same beliefs, the inference is obvious that these have descended to them from one common source. It is, of course, necessary to distinguish between the ordinary ideas and usages which may be justly regarded as natural to humanity, and those ideas and usages which are so specialized that there is little or no probability of their having developed sporadically in different parts of the world. For instance, such a practice as tearing off the scalps of enemies and treasuring them as trophies, once followed in Asia as well as in America, seems to indicate a common origin.

Archæology further derives aid from the study of philology, because, although linguistic affinity does not of necessity denote racial kinship, yet it is plain that nations whose languages belong to one common group must have been at one time politically, if not racially, connected. The testimony of place-names is very distinct. When it is seen, for example, that in Scandinavia, the Hebrides, the Isle of Man, and Iceland, a salmon river is called *laxey*, it is impossible to avoid the deduction that all these places must at one time have been occupied by a Norse-speaking people. That this was indeed the case is, of course, a fact well known in history.

In some respects, the most valuable of all the allies of archæology is the science of anthropology. Written records may disappear; all memories of traditional usage and language may die out; but physical characteristics—stature, the shape of the skull, the colour of the eyes, skin, and hair—all these persist in a race for ages, without any marked alteration. Even when a hybrid race is created by the intermixture of two different stocks, the pedigree of the half-breed people is at once attested by their appearance. And, indeed, it is by the evidences of craniology, by a comparison of the various skulls found in the graves of long-vanished races, that the relative position of those races is sought to be solved.

But the section of archæology which, beyond all others, occupies the minds of many, and is to them archæology itself, is the study of the tangible relics of extinct nations or communities, in the shape of buildings, weapons, and other utensils, and articles used for personal adornment or attire. Architecture forms an interesting subdivision of this section, especially those phases of it which link themselves with hitherto unsolved problems—such as the question as to who were the builders of the mysterious temples and towers of S.E. Africa (Zimbabwe), and the cities and palaces of Central America (Palenque, Copan, Uxmal, etc.), who inscribed the yet unread legends on the stones of Easter I. in the Pacific; who reared the megalithic structures scattered over a great part of the globe; who first designed the rude *brochs* of Scotland, or burrowed out the underground dwellings occasionally unearthed in Europe, and scarcely yet abandoned by the Eskimos of Greenland. All these archaic remains, and many others, offer ample material for archæological investigation. Nor do the manufactured objects found in or near these sites afford less abundant matter for inquiry and discussion. Weapons and other utensils of iron, bronze, stone, horn, bone, and jet; pottery and glass, showing various stages of culture in their makers; articles for personal use or adornment—all have engaged the attention of archæologists, notably in the 19th century. And these relics it is usual to classify and arrange according to their characteristics, separating them into products of the Stone, Bronze, and Iron Periods or Ages.

This classification was introduced by the Danish archæologists Thomsen and Worsaae, during the first half of the 19th century; and their method was soon thereafter adopted in other countries. The assumption on which the Scandinavian antiquaries proceeded was that mankind has steadily progressed from stage to stage of culture, by an even series of developments, beginning in the condition of the lowest savages. The earliest implements known to man, other than wood, bone, or horn, were of stone (usually flint), very roughly knocked into shape as spear-heads, arrow-heads, knives, hammers, etc. This stage of culture they designated the Early Stone or Palæolithic Age. And, applying their system to Scandinavia, they deduced the following sequence. By a natural process of refinement, a steady and gradual improvement in style and finish resulted in the evolution of the polished and keen-edged implements which superseded their ruder prototypes, and gave the distinctive character to the stage of culture which they designated the Later Stone or Neolithic Age. But by this time the discovery of the use of metals in more southern lands had already led in those regions to an Early Bronze Age, which at length imposed its influence on Scandinavia, and displaced the inferior Neolithic implements. This, again, was followed in succession by a Later Bronze Age, an Early Iron Age, a Middle Iron Age, and a Later Iron Age, the last synchronizing with the Viking Period—*i.e.* from about the beginning of the 8th to the middle of the 11th century of the Christian era. The earliest stage was understood to date back to an indefinite period beyond 3000 B.C. Concurrently with all the later developments, the Stone Age persisted among the Lapp population of the north.

This Scandinavian sequence was adopted, with certain modifications, by Sir John Lubbock in his *Prehistoric Times*. Owing to the fact that implements of the rudest stone type are found in the river-drift or gravel-drift stratification of Western Europe, 'when man shared the possession of Europe with the mammoth, the cave bear, the woolly-haired rhinoceros, and other extinct animals,' he placed the Drift Men in the Palæolithic

Period. The Later Stone Age or Neolithic Period, he describes as the era in which there is no trace of the knowledge of any metal except gold, and when the characteristic implements were of the finely-polished stone or flint already spoken of. Thereafter came the Ages of Bronze and Iron. In France, a similar order was followed by Mortillet and others, but with the added and still more remote Eolithic Period beyond the Palæolithic, and with a much greater elaboration of 'Epochs.' Thus, to take only the Age of Stone, we find the French *savants* dividing the *Période Eolithique* into the *Epoque Thenaysienne* and the *Epoque Ottaienne*, the first named being regarded as the earlier in time. Further, the *Période Paléolithique* is held to progress upwards through the *Epoques Chelléenne*, *Moustérienne*, *Solutréenne*, *Magdalénienne*. All these special names are derived from the places in France where stone implements of various marked characteristics have been found. It may be added that the French classification makes *all* stone implements prehistoric, while bronze and some iron objects are placed in proto-historic times. Iron alone is regarded as the metal of truly historic times—that is to say, in France.

The main idea present in these archæological schemes is extremely reasonable. That primitive races, before learning the use of metals, discovered the advantages of stone implements over those of wood, horn, or bone, is undoubted, and proof of this is everywhere found. Egypt has had its Stone Age, as the researches of Professor Flinders Petrie and others have shown; while over most of the African continent, as in various other parts of the world, many living races are found who still use implements of stone. Some of these are of rude workmanship, others polished—or, in the recognized diction, they are Palæolithic and Neolithic. Then, again, a Bronze Age is discernible in remote Siberia, evidence of which is seen in the antiquarian museum at Minusinsk, a small town to the south-east of Tomsk. And the advanced races of to-day are living in the Iron or Steel Age.

But it will be noticed that all this presupposes an unusual and incorrect use of the words 'age' and 'period.' The savage races referred to are living in the same age as those who use iron and steel, and it is a misuse of language to say that people of the 20th century are not all living in the same period of time. This misapplication of these words is, however, recognized by modern archæologists, who explain that an archæological 'age' is really a condition of culture, and not a chronological age, and that therefore there may be many concurrent archæological 'ages.' At the same time, it seems more than probable that the originators of these terms employed them in the Lucretian or chronological sense, as, indeed, the French still do. And the generation that succeeded Thomsen found it more and more necessary to give a special interpretation to his nomenclature, as they realized that what applied to Scandinavia did not necessarily apply to other lands. Moreover, a strong party of dissent arose, who protested altogether against the system of successive 'ages.' To a considerable extent the objections thus raised are nullified when it is explained that an 'age' in archæology is not a chronological age. And it ought to be remembered that even Worsaae, who did synchronize his 'ages' with periods of time, regarded the Stone Age as running on in Lapland at the same time as the Bronze and Iron Ages in Southern Scandinavia.

When an implement of stone is discovered, and assigned by archæologists to the Stone Age, it is popularly assumed to be of very ancient date. Yet, in some cases, quite the opposite deduction ought to be made. For instance, when Greenland was reoccupied by Europeans in the early part of the 18th century, the Eskimos were, archæologically speaking, living in the Stone Age, as some of their descendants still are—that is to say, a Stone Age people had succeeded an Iron Age people (the early Scandinavian settlers), and, consequently, the Iron Age relics of Greenland denote a greater antiquity than the implements of the Stone Age. A parallel situation is seen in the temporary overthrow of Roman civilization by savage and semi-barbarous nations. The Huns, who swarmed over Europe in the 5th century, used bone-pointed javelins and dug-out canoes, two indications of Stone Age culture. Yet a Roman sword of even so recent a date as the days of Julius Cæsar would be an article of much greater antiquity. In short, a primitive implement can only be interpreted to denote a primitive race. It may be of 20th century make, or it may be of vast antiquity. All depends upon the history of the country in which it is found, taken in consideration with the geological stratum in which the object may be embedded.

Bibliography.—Oriental: Tiele's *Babylonisch-Assyrische Geschichte;* Maspero's *Histoire ancienne des Peuples de l'Orient;* Oppert's *Original Inhabitants of India;* Layard's *Nineveh;* Sayce's *Hittites;* Brugsch's *Geschichte Aegyptens* (Eng. trans.); Champollion's *Monuments de l'Egypte et de la Nubie;* Wilkinson's *Ancient Egyptians;* and Flinders Petrie's many Egyptian publications (1883-1903). Central American: Charnay's *Ancient Cities of the New World*, and Holmes's *Monuments of Yucatan, Chiapas*, etc. (1895-7). North American: Rafn's *Antiquitates Americanæ* (1837). European: Collignon's *Archéologie Grecque;* A. S. Murray's *Greek Archæology* (1892); Smith's *Greek and Roman Antiqui-*

North; Norse *Eddas* and *Heimskringla;* Lubbock's *Origin of Civilization* and *Pre-Historic Times;* Boyd Dawkins's *Cave-Hunting* and *Early Man in Britain;* Evans's *Ancient Bronze Implements*, and *Ancient Stone Implements;* Fergusson's *Rude Stone Monuments;* Zeller's *Lake Dwellings;* Munro's *Lake Dwellings;* Anderson's *Scotland in Pagan Times;* Lyell's *Antiquity of Man;* O'Grady's *Silva Gadelica* (Irish traditional history); Frazer's *Golden Bough;* Tylor's *Primitive Culture;* and (philology) Fr. Müller's *Grundriss der Sprachwissenschaft.*

Fossil Archæopteryx, Berlin.

Archæopteryx, the most primitive of birds, being a link between reptiles and birds; found as a fossil in the Jurassic rocks at Solnhofen, Bavaria. About the size of a pigeon, it had strong wing and tail feathers, but the neck and bases of the limbs were covered with fine down. The small head, in which, as in modern birds, the bones were firmly united, possessed teeth; the long lizard-like tail had many vertebræ; and at the end of the wing were three long-clawed fingers. The breastbone shows, by its attachments for strong muscles, that the creature could fly. There are two specimens—*viz.* in Berlin and the British Museum.

Archangel (Gr. 'chief angel'), a superhuman being above the rank of angel. The archangels are supposed to be seven in number (Rev. 8:2), and the Bible gives us the names of two—Michael (Dan. 10:13; Rev. 12:7) and Gabriel (Dan. 8:16; Luke 1:19). In the apocryphal Book of Tobit (12:15) we find Raphael; while a fourth, Uriel, is mentioned in 2 Esdras 5:20; the remaining three being Chamuel, Jophiel, and Zadkiel. The Jews believed that these names came from the Babylonian. See ANGEL.

Archangel, the (plant) dead-nettle. See LAMIUM.

Archangel (*Arkhangelsk*), gov., the extreme N. province of Russia in Europe; area, 331,640 sq. m.; pop. (1897) 347,589 (Russians, 300,000), not including Tundra nomads (Samoyedes, etc.). The government includes Novaya Zemlya, and comprises the Arctic coast of European Russia. All the province is either tundra bordering the Arctic Ocean, or forest in the S. part. Rye, barley, oats, and potatoes are raised, mainly in the Shenkursk districts. Pasturage is fair in parts, and cattle-raising progresses. The climate presents remarkable differences, the Mûrman coast (Russian Lapland) being as mild as the Baltic; the ocean never freezes, and ice-free ports are possible. On the shores of the White Sea, and eastwards to the Kara Sea, as well as in the interior, the winter is extremely rigorous. Fishing, especially of salmon, seal, herring, cod, and flat fish, is important. The forests yield timber which supports manufactories with an output of £814,000 annually. Shipbuilding is active on the Mûrman and on the W. White Sea littoral. Coal, iron, zinc, silver, lead, copper, alabaster, marble, and gypsum are found. There is a railway (completed Nov. 30, 1897) from Vologda to Archangel, and another (finished 1898) from Perm to Kotlas on the Dwina. A new naval and commercial harbour (ice-free) at Port Catherine (or Alexandrovsk) now supersedes Kola as capital of the Lapland district. Many improvements have resulted from M. Witte's visit in 1894. See A. P. Engelhardt, in *A Russian Province of the North* (Eng. trans. by H. Cooke, 1899).

Archangel, a city at the mouth of N. Dwina, chief Russian port on Arctic Ocean, terminus of the Moscow-Vologda Ry. (since 1897); 750 m. N.E. of St. Petersburg; pop. (1897) 20,933. Principal exports—wood, cereals, hemp, wax; imports—coal, salt, wine, fruit, cement, machinery. In 1903 the imports were valued at over £778,535; but the exports (timber alone £1,097,914) amount to £1,500,000. The harbour has been deepened from 12 to 22 ft., and now covers 12 miles of the Dwina bank—'one of the best and largest ports in Europe.' A large river traffic descends the Dwina, and a fair is held in September. Archangel was founded in 1584, and was the chief port of Russia until Peter the Great's foundation of St. Petersburg (1703). Lomonosov, the Russian poet, was born here in 1711. The town contains two cathedrals (of 1766 and 1805), one an extremely effective specimen of the Russian ecclesiastical style.

Archbishop (Gr. 'chief overseer'), first applied by Athanasius to Alexander, patriarch of Alexandria, and subsequently given to prominent ecclesiastics of the highest rank, some of whom were afterwards styled patriarchs. In the Eastern Church it was given to the exarchs and metropolitans of certain great sees, such as those of Jerusalem, Antioch, Ephesus, Alexandria, Constantinople, and Rome, the last of whom finally developed into the Pope. In the Western Church the title has been given from the 8th century to metropolitans generally. By canon law the dignitaries of the Anglican Church are divided into patriarchs, archbishops, metropolitans, and diocesan (suffragan) bishops. In early church times the archbishop had two separate functions: (1) to perform the ordinary episcopal duties of his diocese—symbolized by his bishop's crook; and (2) to supervise the suffragan dioceses as to liturgy, discipline, and conduct of the respective bishops—exemplified by his metropolitan cross, and by the wearing (in the Roman Catholic Church) of the pallium. His special powers included calling together and presiding over provincial synods, enforcing church discipline, and dispensing indulgences. For twelve centuries England has been divided into two archbishoprics—Canterbury and York. The Archbishop of Canterbury, the Primate of *all* England, has as his province (containing twenty-four dioceses) the whole of England except the six northern counties and Cheshire—the province (containing nine dioceses) of the Archbishop of York, or Primate of England. The former is, after the royal princes, the first peer of England, with the right of placing the crown on the sovereign's head at the coronation; the latter has precedence after the Archbishop of Canterbury and the Lord Chancellor, and claims the right of crowning the queen-consort, whose perpetual chaplain he is. In Ireland there are two Anglican archbishops—the archbishop of Armagh and the archbishop of Dublin. Of the Roman Catholic archbishops, there is one in England (Westminster), two in Scotland (St. Andrews and Edinburgh, and Glasgow), and four in Ireland (Armagh, Dublin, Cashel, Tuam). In the British colonies the Church of England has five archbishops—*viz.* Sydney, who is primate of Australia and Tasmania; Rupertsland, who is primate of all Canada; Montreal; Cape Town; and Jamaica. In the same colonies the Roman Catholic Church has twenty-one archbishops: six in Australasia—Sydney, Adelaide, Brisbane, Hobart, Melbourne, Wellington; eight in America—Quebec, Halifax, Kingston, Montreal, Ottawa, Toronto, Port of Spain, and St. Boniface; and seven in Asia—Agra, Bombay, Calcutta, Colombo, Cyprus, Madras, and Verapoly. In the United States there are no Protestant archbishops, but there are fourteen Roman Catholic archbishops—Baltimore (the oldest, created in 1808), Oregon City, St. Louis, New Orleans, New York, Cincinnati, Dubuque, San Francisco, Milwaukee, Boston, Philadelphia, Santa Fé, Chicago, and St. Paul. See EPISCOPACY; ARCHES, COURT OF; also Hook's *Archbishops of Canterbury* (12 vols. 1860-76); Raine's *Archbishops of York* (1879); Lightfoot's *Dissertations on the Apostolic Age*, pp. 19, 150, 190 (1892).

Archdeacon, an ecclesiastical dignitary in charge of the affairs of a diocese, particularly of its charities, acting as the bishop's assistant in things temporal, as the archpriest in things spiritual, being in reality the 'bishop's eye' and 'right hand.' As the church organization became more settled, the powers of the archdeacon increased, including separate jurisdiction in the lowest ecclesiastical court, which powers were considerably reduced by the Council of Trent, and entrusted to the bishop's vicar-general. The archdeacons' court (in the Church of England) is now a mere survival. In the Anglican Church there are, in accord with the Act of 1836, from two to four archdeacons to each bishop, there being eighty-five in all; their duties specially including examination of candidates for holy orders, induction of beneficed clergy, parochial visitation, dispensation of charities, care of church fabrics and glebe houses, and holding general synods as deputy of the bishop. See Cripps's *Law Relating to the Church and Clergy*.

Archduke, ARCHDUCHESS, titles borne by the members of the imperial house of Austria. It began to be used about the middle of the 14th century, but was formally conferred by the Emperor Frederick III. in 1453.

Archegoniata include the moss, fern, and gymnosperm groups of plants, whose common female organ is the archegonium, which is multicellular and flask-shaped, consisting of a hollow body or venter, a tubular neck, and, when ripe, an open mouth. In the moss group the whole organ stands out from the surface of the tissue; in ferns the venter is sunk in this tissue, with the neck exposed; in gymnosperms the mouth alone reaches the surface.

Archegosaurus, a group of fossil amphibians in the Carboniferous and Permian formations, chiefly found in the Rothliegenden (Permian) of Saarbrücken. The skull was pointed, strongly ossified, with a ring of small (sclerotic) bones round the eyes. The vertebræ consisted of several parts, detached throughout life. The teeth were of the labyrinthodont pattern. The animals resembled gigantic salamanders, with a long body, a long, stout tail, and small, short legs, with a dermal armour of small, bony plates. The group became extinct in Secondary times. See H. N. Hutchinson's *Creatures of Other Days* (1894).

Archelaus. (**1.**) A Greek philosopher (*c.* 450 B.C.), born at Athens or at Miletus; studied under Anaxagoras. By observation he inferred for the first time the sphericity of the earth. (**2.**) King of Macedonia (d. 399 B.C.), natural son of Perdiccas II.; succeeded to the throne in 413. He introduced great reforms in the country, fortifying cities, making roads, and organizing the army. He removed his court from Ægæ to Pella, where he gathered round him the great poets (Euripides, Agathon), painters (Zeuxis), and musicians of the age. He was killed by his favourite, Craterus. (**3.**) Served as general under Mithridates in Greece, where (86 B.C.) he was twice defeated with great loss, and sued for peace. On the eve of the second Mithridatic war his loyalty was suspected by the king, and he deserted to the Romans. (**4.**) Son of the preceding, became king of Egypt by marrying Berenice, daughter of Ptolemy Auletes, in 56 B.C., who had obtained the sovereignty of Egypt after the expulsion of her father. At the end of six months he was defeated by the Roman proconsul Gabinius, who had marched into Egypt to restore Ptolemy to his throne. (**5.**) Son of Herod the Great, was bequeathed (4 B.C.) the kingdom of Judæa. His elder brother Antipas was preferred by the people, but Augustus on appeal decided in favour of Archelaus, and made him ethnarch of Judæa, Samaria, and Idumæa. Subsequently Augustus banished him, and he died at Vienne in Gaul, A.D. 7.

Archenholz, JOHANN WILHELM VON (1743-1812), German historian, was born near Danzig. He was in England from 1769-79, and in Italy; then went (1792) to Hamburg, and died at his country seat of Oyendorf, close to that city. His *Geschichte des Siebenjährigen Krieges* (1789) has attained great popularity in Germany, owing to the freshness of its style and its admiration for Frederick the Great. He also wrote successful books on England—*England und Italien* (5 vols. 1785); *Annalen der Britischen Geschichte* (20 vols. 1789-98).

Archer, FRED (1857-86), jockey, apprenticed to trainer at age of ten. He won his first Derby in 1877, and was premier jockey for ten years. He committed suicide during an attack of fever.

Archer, JAMES (1822-1904), Scottish painter; studied art in Edinburgh; member R.S.A. (1858). He went to London (1862). He has painted several large subject pictures, including *The Worship of Dionysus*, *St. Agnes—a Christian Martyr*, *Music in the Gloamin'*, etc., but is known chiefly as a portrait-painter, his portraits including those of Sir Charles O. Trevelyan, Professor Blackie, Andrew Carnegie, and Sir John Leng.

Archer, WILLIAM (b. 1856), critic, was born at Perth. He worked on the staff of the *Edinburgh Evening News* (1875-8), with an interval of a year in Australia; settled in London in 1878, and was dramatic critic to the London *Figaro* from 1879-81, and since 1884 has held a similar post on *The World*. In 1900 he paid a visit to the United States, chiefly for the purpose of recording his impressions of the American stage. He has a wide knowledge of contemporary European drama, particularly the French and Norwegian, and was mainly instrumental in bringing about the performance in London of the plays of Ibsen, whose works he has translated. His criticisms are marked by scholarly insight and a determination to take the drama seriously as an art. Latterly he has also devoted considerable attention to the criticism of contemporary English poetry. His works, besides his translations (1890-2) of Ibsen's plays, and editions of Leigh Hunt's and Hazlitt's dramatic essays, include *English Dramatists of To-day* (1882), *Henry Irving* (1883), *Masks or Faces* (1888), *William Charles Macready* (1890), *Study and Stage* (1899), *America To-day* (1900), *Poets of the Younger Generation* (1901). His dramatic criticisms in *The World* from 1893-7 were republished in book form in annual volumes, under the title of *The Theatrical World*.

Archer Fish, a name given to several E. Indian and Polynesian fishes, particularly to the Toxotidæ (*Toxotes jaculator*), from their peculiar habit of shooting drops of water a distance of three or four feet, and thus bringing down insects into the water for food.

Archery, the art, practice, or skill of shooting with a bow and arrows. Stone arrow-heads have been found in French caves beside remains of the reindeer and the mammoth. Neolithic arrow-heads and bows are numerous. Among ancient peoples the bow was extensively used by the Scythians, the Egyptians, the Parthians, the Thracians, and, in the time of the Romans, by the Cretans, the Numidians, Balearic Islanders, and other foreign mercenaries. These last did not form a part of the legion, but were skirmishers, like the Moorish dartmen and the Balearic slingers, their office being to fight here and there, and draw the enemy into action. The Greeks employed archers for the same purpose.

The bow was never greatly valued in Britain until the Saxons began to subdue the inhabitants 'wyth nothynge so much as with their bowe and shafte, whiche wepon beynge straunge.... was wonderfull terrible unto them' (Ascham's *Toxophilus*). The words 'shaft,' 'bow,' 'arrow' are all of Saxon origin, and the Saxon *boga* survives in Welsh as well as in English. But the real interest in archery does not begin until the use of the English longbow, which was encouraged from Edward I. to Charles I., and won at Creçy and Agincourt. The kings of Scotland were not long in imitating the English archery laws, from the days of James I. to those of James V.

Gustavus Adolphus had Lapp bowmen in his army when he invaded Germany in 1630; and Cossack bowmen are said to have formed part of the allied army which took Paris in 1814. The Earl of Essex raised a company of bowmen for the king at the outbreak of the civil war. Many uncivilized peoples have been expert with the bow—*e.g.* the N. American Indians. The dwarf Akka of Central Africa are dreaded bowmen, because they use poisoned arrows; as also did the native tribes of the Guianas and the Orinoco region in S. America.

The English archery laws compelled all able-bodied males under a certain rank to practise with the bow on Sundays and holidays, from childhood to the age of sixty; ordered butts to be set up in all villages; commanded sheriffs to provide archery tackle; fixed the quality and the prices of there weapons, and imposed fines to keep the bowyers and fletchers honest; prohibited nearly all other games; and obliged merchants to import four good bow-staves with every ton of merchandise, and ten with each butt of Malmsey wine, bow-staves six feet six inches long passing free of duty. In the reign of Henry VIII. the use of crossbows and hand-guns was forbidden, as it interfered with the practice of archery; and all archers above the age of twenty-four were commanded not to shoot with their light-flight arrows at a distance under 220 yards, the effective range of the old archery. But at the beginning of the 17th century, when hand firearms began to be more used, the war bow and shaft were allowed to fall rapidly into disuse.

British archery is still one of the national sports, though a minor one. A tradition of the old martial times is kept alive by the Woodmen of Arden (revived in 1785) and the Royal Scottish Archers, both of which societies shoot for their prizes at the distances fixed by statute when long ranges (exceeding nine score yards) were essential to the success of archery in war. The Royal Scottish Archers, otherwise known as the Royal Company of Archers, date back to 1676. Not the least interesting of their possessions is the famous Flodden bow, the strength of which is estimated at from 80 to 90 lbs. They form the sovereign's bodyguard for Scotland, and on a royal visit they have to present him with a *reddendo* of three barbed arrows. Archery in London is practised by the Royal Toxophilite Society, founded in 1781, who shoot in Regent's Park.

See Oman's *Art of War in the Middle Ages* (1898); Ascham's *Toxophilus, or The Schole of Shootinge* (1545; or Arber's edition, 1868); Markham's *Art of Archerie* (1634); Roberts's *English Bowman* (1801); Waring's *Treatise on Archery* (9th ed. 1832); Hansard's *Book of Archery* (1840); Hargrove's *Anecdotes of Archery* (1845); Ford's *Theory and Practice of Archery* (new ed. 1887); and *Archery* in the Badminton Library (1894)—an excellent bibliography is given at the end of this book.

Arches, COURT OF. The court of the Archbishop of Canterbury, established to hear appeals from the various consistorial courts of the province. It is so called because it held its sittings in the church of St. Mary-le-Bow, in the city of London—*Ecclesia Beatæ Mariæ de Arcubus*. Appeals also lie to it under the Clergy Discipline Act, 1892, and in that case are final; but there is an alternative right of appeal to the Privy Council. Proceedings under the Public Worship Regulation Act, 1874, now come before the official principal, who is appointed by the Archbishops of Canterbury and York jointly, and this official has now practically superseded the office of dean of the Arches Court of Canterbury. See Phillimore's *Ecclesiastical Law*.

Archidamus, the name of five kings of Sparta. The best known are—ARCHIDAMUS II., who reigned 469-427 B.C., and commanded (431-427) the Spartans in the Peloponnesian war—a good soldier, wise in counsel, and of marked moderation in his policy; and ARCHIDAMUS III., who reigned 358-338 B.C., and led an army into Italy.

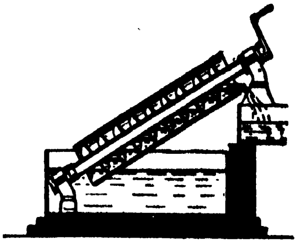
Archil, or ORCHIL, a fugitive colouring matter analogous to litmus, obtained from lichens, especially *Roccella tinctoria*, and formerly used in the dyeing of silk and woollen fabrics.

Archilochus OF PAROS, Greek poet, lived probably in the earlier half of the 7th century B.C. He went as a colonist to Thasos, and there lost his shield while fighting against the Thracians. He returned to Paros, and fell in battle against the Naxians. Of his poetry only fragments survive; but he enjoyed a great reputation in Greece, being classed at the head of satirical poets. Personal satire was his strongest point, but he wrote in many other forms—elegiacs, lyrics, drinking songs, hymns, and poems of reflection. He may be regarded as 'the Greek Swift, but wider than Swift in his range' (Mahaffy, *Hist. of Greek Literature*, 1880). He invented several new metrical forms, particularly the iambic and trochaic, and, according to some, also the elegiac. See CALLINUS. For the fragments, see Bergk's *Poetæ Lyrici Græci*.

Archimage. (1.) The personification of Falsehood in Spenser's *Faërie Queene*, who deceives Una by putting on the disguise of the Red-Cross Knight. (2.) The personification of Indolence in Thomson's *Castle of Indolence* (1748).

Archimandrite, an Eastern abbot or superior of a monastery, especially one of the first order. Formerly it was used in a wider sense, being sometimes applied to archbishops.

Archimedean Screw, an apparatus invented by the Greek mathematician Archimedes, was first used in Egypt for the purpose of raising water from a lower to a higher level. It consists of a hollow tube in the form of a spiral screw wound round a central axis. When in use the one end is immersed in water, and the whole is set at a slope which must not be greater than a limiting position dependent upon the pitch of the screw; for in order that the water may work gradually upwards from thread to thread, it is necessary that the lowest part of one thread must not be higher than the highest part of the contiguous lower thread. As the Archimedean screw is made to rotate about its axis, the water in the lowest bend works its way along the screw, and is ultimately expelled at the upper end.



Archimedean Screw (Section).

Archimedes (*c.* 287-212 B.C.), the most famous mathematician of antiquity, intermediate in time between Euclid and Apollonius, was a native of Syracuse. Besides making many important discoveries in mechanics and mathematics, he invented numerous mechanical contrivances. (See ARCHIMEDEAN SCREW.) The machines he made for showering stones on the Roman ships, and for seizing them and raising them in the air, so terrorized the attacking party in the siege of Syracuse that Marcellus at once stopped his assault. He was killed in the confusion attendant upon the capture of Syracuse by the Romans. The extant books of Archimedes are: *On the Equilibrium of Planes, or Centres of Gravity of Planes; The Quadrature of the Parabola; On the Sphere and Cylinder; On Spirals; On Conoids and Spheroids; On Floating Bodies; The Arenarius; The Measurement of a Circle; Lemmata*. Among the more important editions of his works are those by Torelli (1792), and (in Ger.) Nizze (1825). See Heath's *Works of Archimedes* (1897).

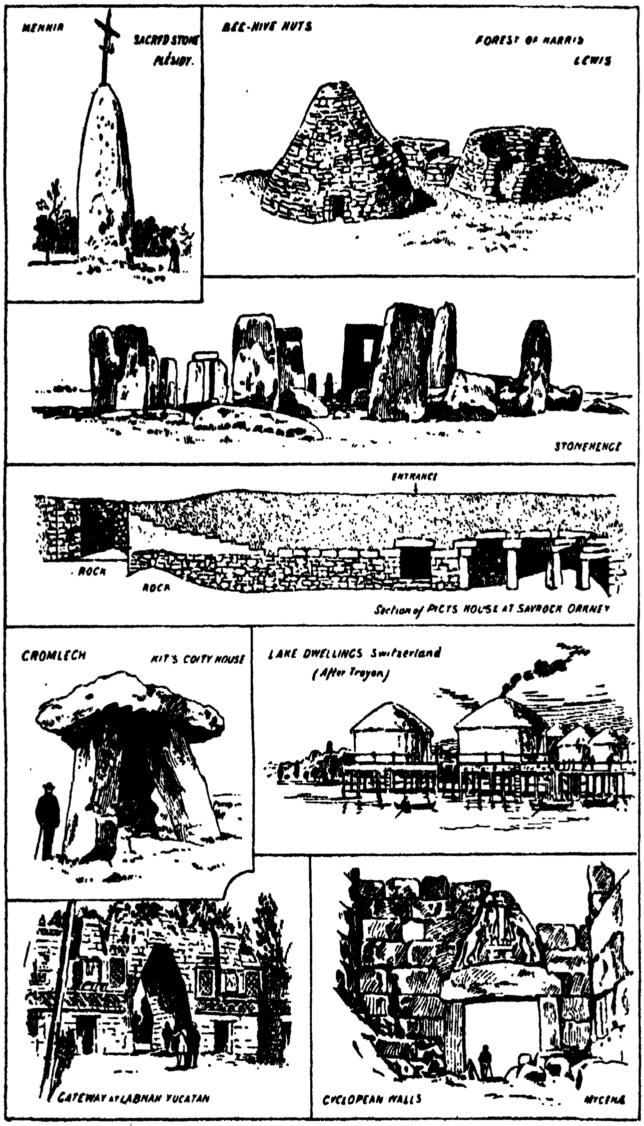
Archipelago. Originally connoting the island-studded Ægean Sea, lying between Greece and Asia Minor, the term has been transferred to any group of islands considered collectively.

Architects, ROYAL INSTITUTE OF BRITISH, founded in London in 1834, incorporated in 1837, reincorporated in 1887. It confers diplomas (A.R.I.B.A. and F.R.I.B.A.) after examination.

Architects, SOCIETY OF, founded in London in 1884, incorporated in 1893. It holds examinations twice a year, in April and October.

Architectural Association of London gives instruction in architecture; prepares for the examinations of the Royal Institute of British Architects; and generally promotes the association of persons interested in architecture.

Architecture is the art of building according to certain well-defined principles of proportion and symmetry, so that an edifice, when completed, shall not only suit the purpose for which it was erected, in accommodation and usefulness, but at the same time form a harmonious whole, externally and internally. The origin of this art is mainly due to man's necessity for a protection from the various climates of the globe. In prehistoric times there is ample evidence to show that in northern and in tropical climates the inhabitants lived in underground dwellings and caves, in temperate regions in huts (such as the lake dwellings and bee-hive huts), and in warm countries in tents. War also has had a certain influence on the form of architecture, compelling man to construct his dwelling in such a manner and of such material as to be well-nigh invulnerable to the attack of an enemy. But by far the greatest incentive man has experienced in the production of buildings has been through the spiritual sense—*i.e.* the desire or craving to erect a habitation in honour of his God. We find in Britain many remains of such worship, dating from the time of the Druids, Stonehenge being the finest example of this character. In foreign countries there are magnificent ruins to be found of even more ancient date—Egyptian, Indian, Mexican, Grecian, and Roman.



Prehistoric or Primitive Structures.

From a description of the architecture of each country and race, it will be seen that the difference in design is largely due to climatic influence, to the warlike and religious feelings of the people, and to the variety and amount of material at their disposal.

PREHISTORIC STRUCTURES. — These embrace the following:—

Monoliths. — Single upright stones. An example is the Carnac stone in Brittany, 63 ft. high, 14 ft. in diameter, and 260 tons in weight.

Cromlech. — Table-stone supported on others that are vertical. Finest example is Kits Coity House, near Maidstone, the table-stone being 12 ft. in length, 9½ ft. in width, 2 ft. thick, and 10½ tons in weight.

Stone Circles.—The best example is Stonehenge, near Salisbury. The diameter of the circle, which is 105 ft., consisted of thirty stones, each 18 ft. high, with architrave stones on the top. There are also inside circles of stones, and it is possible that it was entirely roofed over.

Bee-hive Huts and Picts' Houses. —The first named, so called from their shape, are built of stone, and are found throughout the British Isles; while the latter is a form of underground dwelling belonging to the same period.

Lake Dwellings.—Huts of wood, erected on piles above the water-level. Remains have been discovered in Switzerland and elsewhere, through the water in lochs or lakes falling exceptionally low.

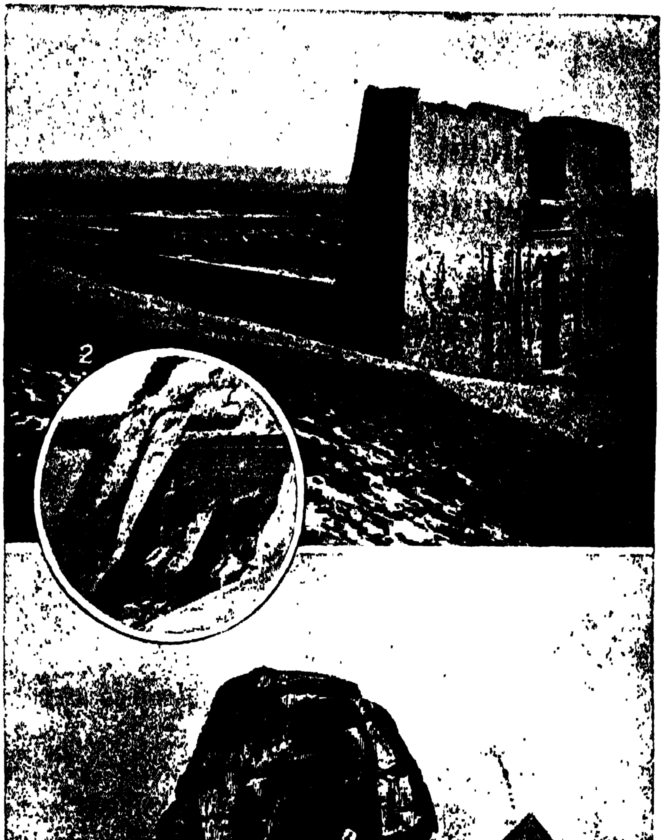
Cyclopean Architecture. — The name given by the Greeks to the prehistoric forms of masonry supposed to have been erected by the Cyclops or giants. The average blocks of stone were 9 ft. long and 4 ft. thick. These blocks were fitted closely in the walls (25 ft. wide and 60 ft. in height) of the ancient cities of Tiryns and Mycenæ. Similar materials were used at Præneste, Rusellæ, Populonia, and other places in Italy (Etruria).

Ancient American.—The buildings of Yucatan, discovered in the forests of Mexico, show that that country was at one time peopled by a race of high intelligence. They used the arch opening, not with radial beds, but corbelled out on each side with stones in horizontal layers. No less than sixty cities have been discovered with temples raised on high mounds, and of considerable magnitude, the temple of Palenque being 240 ft. long and 210 ft. wide. The prehistoric remains in Peru are of even more interest. In addition to many tombs circular in plan and widening towards the top, which is covered with a bee-hive roof (not found elsewhere), there are other immense mounds supported by retaining walls, one of these being 828 ft. long, 225 ft. wide, and 108 ft. high. The fortifications at Cuzco consist of three terraces 1,800 ft. long, the retaining walls that uphold them being respectively 25 ft., 18 ft., and 14 ft. in height; and the width between the walls, which are built of solid masonry accurately cut, is 30 ft. and 18 ft. respectively. One stone measures 27 ft. in length by 14 ft. by 12 ft., and many others are about the same size.

ASSYRIAN ARCHITECTURE includes Babylonian and Chaldean. The building material used was composed of two classes of brick, the inside walls being built of sun-dried bricks, while the outside faces were constructed of the class known as kiln-burnt bricks. The peculiarity of those buildings is their rectangular shape, while their length is out of all proportion to their breadth. The designs employed prove that this was the origin of Grecian architecture. One of the bas-reliefs represents a small temple having two columns on bases, and a form of Ionic capital between two plain pilasters; another shows a palace with windows divided by Ionic columns; while, more astonishing still, we find some designs of columns with Corinthian capitals, and entablature on top composed of architrave, frieze, and cornice, though not in the perfect proportion of the Grecian order.

Until recent times the enormous mounds which represent the ruins of Babylon, etc., were not considered the work of man; but excavations have unearthed brick walls, in some cases 38 ft. thick. Hitherto the most interesting building brought to light is the temple of Birs Nimrud, said to have been reconstructed by Nebuchadnezzar. It was built in diminishing stages towards the top, and was of enormous extent, for at the present time the heap of débris is 200 ft. high and 2,286 ft. in circumference. Above this a portion of brickwork is visible, 28 ft. square and 37 ft. high. Alabaster slabs (19½ ft. by 12 ft.), beautifully carved, and evidently used as a pavement, have been discovered, showing that the interiors of those palaces were magnificent. Carved figures of huge proportion, representing bulls with human heads and winged, stood in pairs on either side of the doorways, while numerous remnants of tiles and coloured plaster work have also been brought to light.

EGYPTIAN ARCHITECTURE.—Among the oldest monuments are the pyramids at Ghizeh, north of Memphis (Cheops, Chephren, and Mycerinus), formed of solid masses of masonry, the sides being stepped from four to five feet on each course. The great pyramid of Cheops, called after the king of that name, has a base of 768 ft. square, and a height of 480 ft. The sides face the cardinal points, and the stones used are in no case less than 30 ft. long. They were quarried in the Arabian mountains, and conveyed by the Nile, and by a specially-constructed roadway 60 ft. wide, to the site. Twenty years were spent in building; and if a similar structure were erected at the present time, the cost would be at least £9,000,000. In all the pyramids the entrance is from the north, and by means of a long passage, inclining downwards and then upwards to the centre, which consists of the sarcophagus chamber.



Egyptian Architecture.

1. Temple at Edfu. 2. Rock Temple at Abu-Simbel. 3. The Great Sphinx, Ghizeh.

The Great Sphinx at Ghizeh is another monument to the genius and ambition of the Egyptians. It has the body of a lion crouching, with the head of a man. The length is 146 ft., breadth 34 ft., and height to the top of head 100 ft. (from chin to crown is alone 28 ft.). With the exception of the front paws and a small temple resting between, this monument is carved out of the solid rock.

Temples.—The building of temples was begun in 2000 B.C., when Thebes was the capital of Egypt, and was continued till the time of the Cæsars. The temples were of two types, the one excavated out of the solid rock, and the other built in the ordinary manner. Of the former, Abu-Simbel in Nubia (1400 B.C.) is the finest example. The façade was cut in the perpendicular face of the rock, the entrance having gigantic figures, 66 ft. high, on either side. The interior consisted of a great hall, supported by two rows of detached piers, with immense statues in front of each. In some temples the walls were lined with marble. The plan of an Egyptian temple, when built of masonry, was always uniform, symmetrical, and rectangular, the principal feature being the number of columns. These columns were necessary owing to the roof being built of stone, because of the scarcity of timber. The temple of Edfu, near Thebes, is a typical example (450 ft. long by 140 ft. wide). At one end is the entrance, 20 ft. wide, between two buildings pyramidal in form, which project beyond the sides of the temple, 100 ft. by 35 ft. This leads to a quadrangle 140 ft. by 120 ft., flanked by columns a few feet from the main walls, and is supposed to have had a flat roof. At the farther end, opposite the entrance, is a portico extending the full width of the quadrangle, and 45 ft. in depth, the roof being supported on three rows of columns. In the centre of the inner vestibule we find a cell or apartment, surrounded by rooms of various sizes, where the priests lived.

Ruined Palace of Chehil Minare, Persepolis.

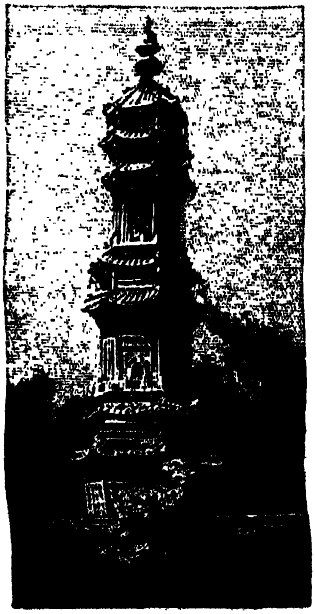
The carving on Egyptian monuments, where they are not plain or covered with hieroglyphics, is peculiar, representing a bundle of trees or reeds bound together by a rope at regular intervals. The capitals exhibit a great variety of form. The entablature is very little subdivided, and what might be termed the cornice consists of a projecting concave member without mouldings, but highly sculptured. The architrave is often covered with patterns representing an orb with a large and small wing and bird's head on either side, the lotus flower or water lily, and palm leaves.

PERSIAN ARCHITECTURE.—As ancient Persia possessed a plentiful supply of timber, the people were induced to erect their dwellings, temples, and palaces mostly, if not entirely, of wood; hence few historical remains are left. There are, however, several exceptions, the most notable of which is perhaps Persepolis, the ancient capital, commenced fifty years after the empire was founded by King Cyrus, whose tomb, situated at Murghab, 40 m. N.E. of Shiraz in Persia, is still in a wonderful state of preservation. The city proper has disappeared, but there still remain the ruins of a portion of the palace called Chehil Minare. This consists of a raised platform from 14 to 40 ft. high, supported by retaining walls 1,424 ft. long on the west and 926 ft. on the north, composed of immense stones, and approached by the finest double staircase in the world, the steps being 22 ft. long, with 4 in. of a rise, and 14 in. on the tread. At the top two large entrance gateways still stand, though there was originally a third. The centre portal measures 39 ft., while the side one is 28 ft. in height. This was the main entrance to the grand hall, the columns of which, still standing, are 60 ft. in height. It is supposed that the remaining tions of the building, includ- the roof, were completed in carved and gilt woodwork. The entablatures are very similar in many ways to the Egyptian, but of more refined design, while the columns exhibit proportions unrivalled in the history of art. The only form resembling Assyrian architecture is the massive sculpture of winged bulls with human heads.

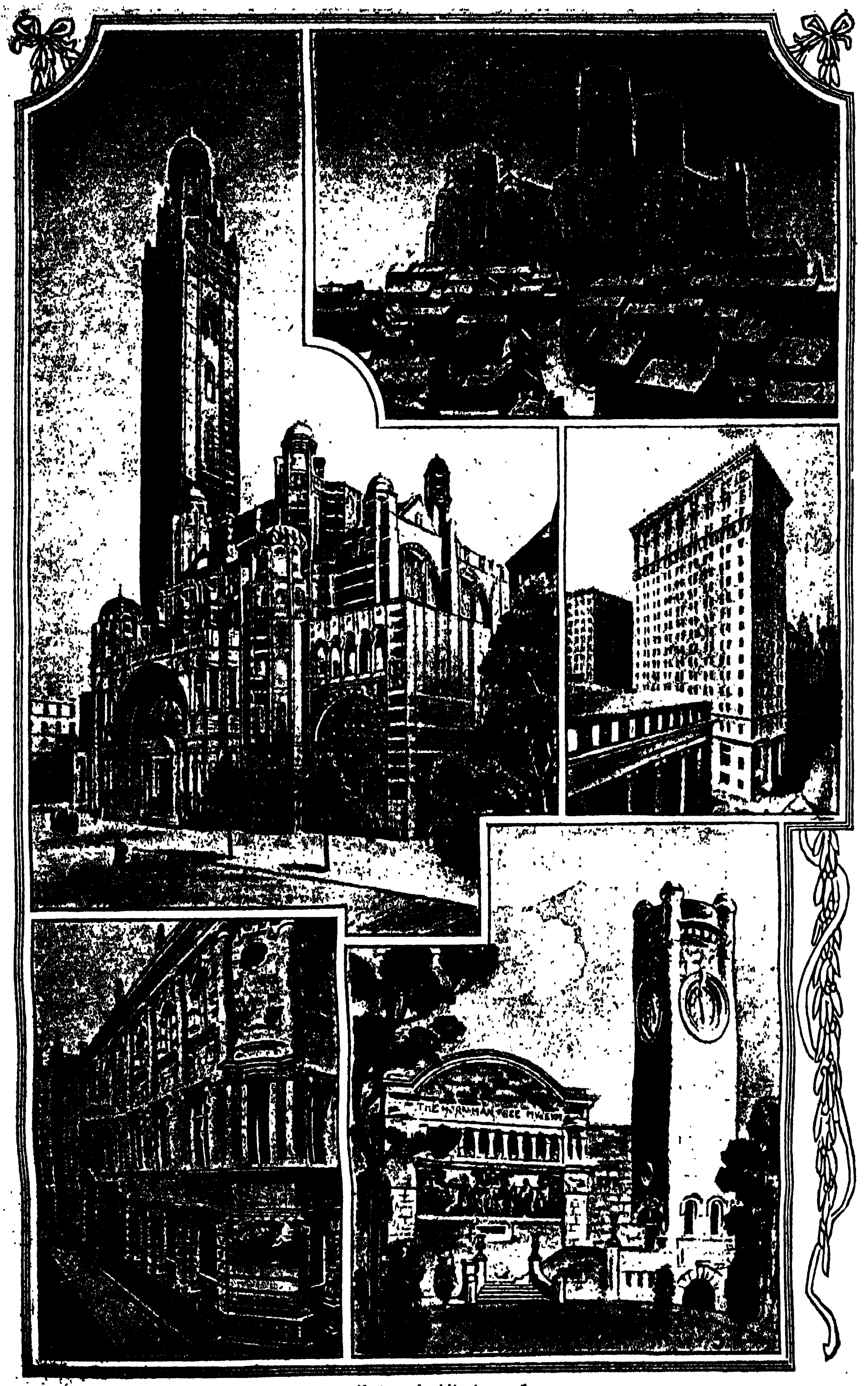
MORESQUE, SARACENIC, OR ARABIAN ARCHITECTURE.—See special article.

JEWISH ARCHITECTURE.—Of the buildings constructed by the Jews no ruins remain. The temple was built in the time of Solomon, and was largely composed of cedar wood. The design, which was carried out by Phœnician workmen (the Israelites were untrained in the method of cutting wood), is supposed, from Biblical writings, to have been similar to an Egyptian temple, and probably due to the then world-wide Phœnician enterprise.

CHINESE ARCHITECTURE.—The Chinese style of architecture is based on the principle of the tent. Owing to the peculiar customs, laws, and traditions of the country, each individual is obliged to have a house suitable in size and form to his rank in society. The dwellings are composed of bamboo and bricks, their peculiarity being that after the bamboo framework is put together the roof is erected, leaving the remainder of the building to be filled in. The roof is feature of the Chinese style, has wide projecting eaves upwards on the outside. C pagodas are octagonal towers 40 ft. in diameter, having seven to nine



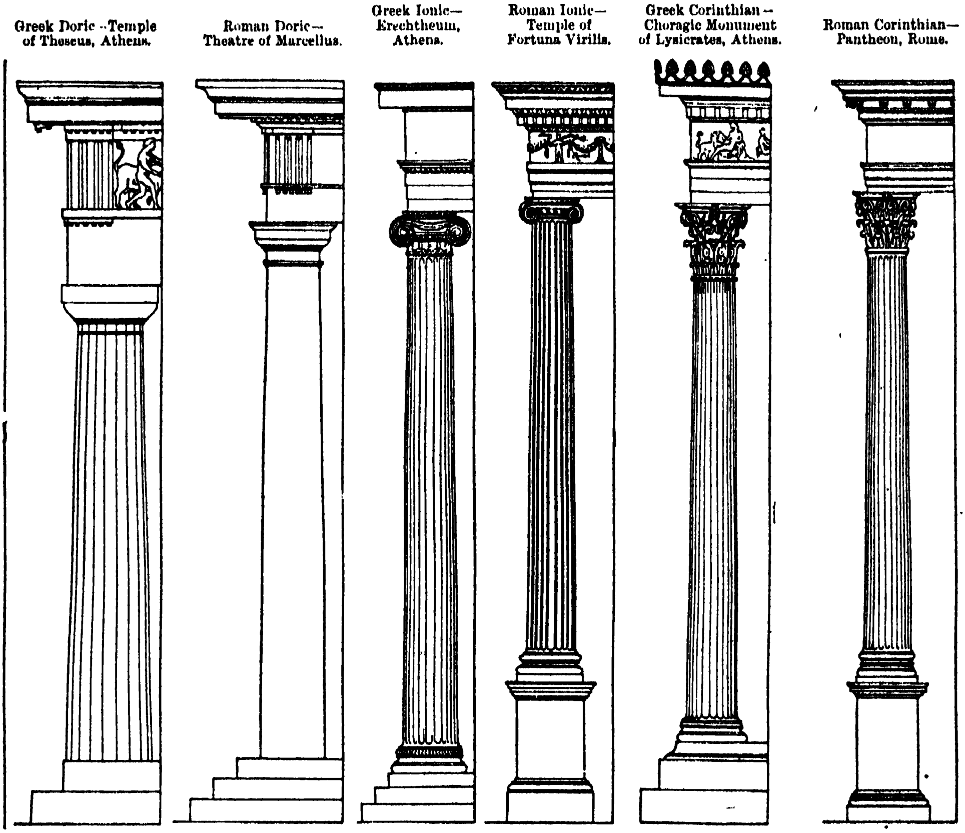
Chinese Pagoda.



Modern Architecture.—1.

1. Roman Catholic Cathedral, Westminster (J. F. Bentley & Son). 2. Liverpool Cathedral (Messrs. Bodley & Scott). 3. Modern Tall Building, Wall Street, New York. 4. Institute of Chartered Accountants (J. Belcher, A.R.A.). 5. The Horniman Museum (C. Harrison Townsend).

stories, 200 ft. high, with a small staircase to the top. The walls are composed of marble or brick, and have many niches filled with idols, while the whole place is lighted by means of numerous small windows. A projecting roof, with corners turned up, and hung with bells, encircles each story, while the top is raised to a considerable height, terminating in a finial. With the exception of the wall of China, triumphal arches, and bridges, we find little stone-work used.


Greek Doric—Temple of Theseus, Athens.
Roman Doric—Theatre of Marcellus.
Greek Ionic—Erechtheum, Athens.
Roman Ionic—Temple of Fortuna Virilis.
Greek Corinthian—Choragic Monument of Lysicrates, Athens.
Roman Corinthian—Pantheon, Rome.

Greek and Roman Orders.

Indian Architecture.—See special article.

Grecian Architecture.—The Greeks may be justly called the most perfect masters of the art. In proportion and symmetry of design they have never been surpassed, and although they had no knowledge of the principles of the arch, yet their architecture, which was entirely of the columnar order, exhibits a massiveness and quiet repose lacking in the buildings of any other nation. There is a resemblance in some points between their architecture and that of Assyria. To the casual observer the columns, capitals, bases, and mouldings in Grecian art appear similar to those of Rome; but on closer observation it will be noticed that, while the Roman mouldings are formed with the curves of a circle, those of Greece are produced in the curve of a conic section. The proportion of the different members is also dissimilar. The artistic genius of the Greeks enabled them to perceive those defects in a building which are due, not to its actual construction, but to optical illusion. The sides of a column, though straight, may appear hollow: this was rectified by giving a slight outward curve. And, again, a cornice with top pediment may seem depressed: this defect they obviated by making the highest point in the centre, the entablature being slightly curved. We are also indebted to the Greeks for the pediment design.

It is supposed that Grecian temples and buildings were originally made of wood, and this accounts largely for the various forms found in their stone architecture. The architrave represented the beam on the top of the columns, which again supported the main rafters, the triglyphs represented the external ends of the same, while the slope of the roof rafters necessitated the filling in of the ends of the building by what is known as the pediment. The three distinct orders of Grecian architecture, Doric, Ionic, and Corinthian, are given under Classic Orders (see below), showing the different proportions of column, entablature, and mouldings between those of Greece and Rome. Comparing the temples with those of Egypt, we find the centre cell similar in both cases, yet in every other respect they are different. The Egyptians sacrificed external effect, in the endeavour to procure a building with a fine interior; but the Greeks did exactly the reverse. Owing to their main building being formed of stone walls without any moulding, the grace and beauty of the structure depended entirely on the surrounding columnar arrangement.

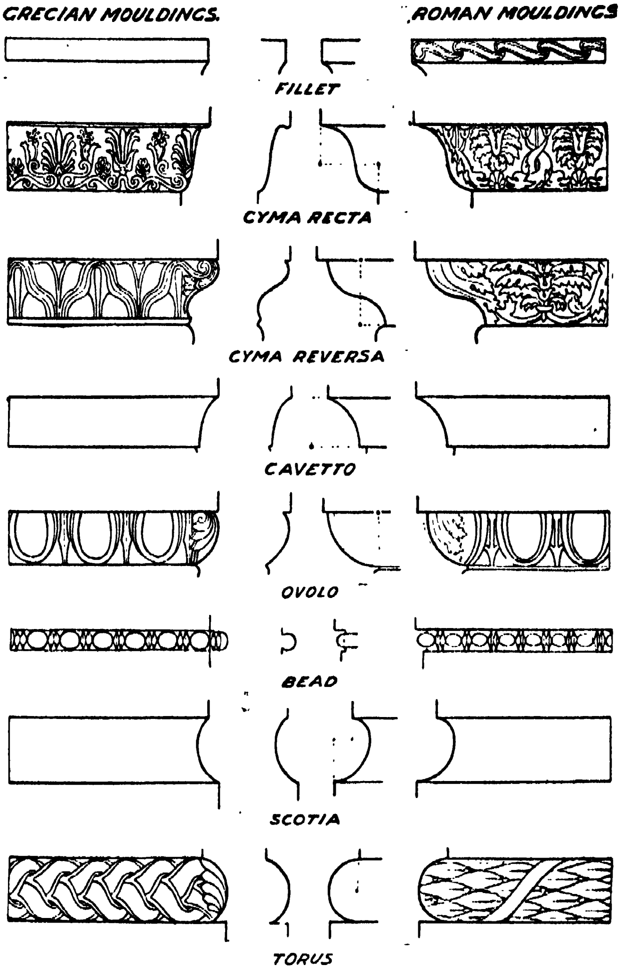
Our knowledge of Grecian architecture is derived entirely from the ruins of the ancient temples, for there are no traces left of private dwellings. Among the most prominent and ancient ruins of the Doric order we may mention the temple of Jupiter at Ægina, the façade of which is hexastyle peripteral (B.C. 600). The principal ruins in Athens are the Propylæum (437 B.C.) and the Parthenon, finished in 438 B.C. Both belong to the Doric order, which was the favourite or national order adopted in Greece. The Athenian buildings were built of white marble, and it is supposed that, both externally and internally, they were painted in many bright colours, in conjunction with a considerable amount of gilding. In Athens the three principal Ionic ruins are the temples of Ilissus, Minerva Polias, and Erechtheum; while, of the Corinthian order, the Tower of the Winds and the Choragic Monument are the finest examples. There is, besides, an additional order, called the Caryatic order, in which the statues of women were used instead of columns.

ROMAN ARCHITECTURE.—If the Greeks were indebted to Assyria and Egypt for the origin of their designs in building, it is equally true, though to a greater extent the case, that the Romans almost entirely borrowed their ideas from the Greeks. Until the conquest of Greece by the Romans in 145 B.C., the buildings of the latter were of the rudest description. The warlike Romans had no time to pursue the arts, but left those peaceful occupations in the hands of Grecian workmen. At the beginning of the Christian era the introduction of buildings circular in plan, the knowledge of the principles of the arch, and the combination of both forming the dome, had the wonderful effect of planting edifices of imposing beauty and grandeur throughout the vanquished countries. The Romans, being more practical and less æsthetic than the Greeks, introduced the segments of circles instead of adopting Grecian mouldings; while, as engineers, their aqueducts, roads, sewers, and bridges were of the most substantial and perfect description. When the nation became less warlike, and settled on more peaceful times, the artistic sense of the people increased; but, unhappily, the advance was checked by the downfall of the empire at a moment of exceptional promise. The orders of Roman architecture (Corinthian, Doric, Ionic, and Composite) are given under CLASSIC ORDERS below. Although the Greeks favoured the Doric, the Romans preferred the Corinthian.

Rectangular Temples (*Corinthian Order*).—The temple of Jupiter (now known as that of Castor and Pollux), situated in the Forum, Rome, is octastyle peripteral in plan, with 11 columns on either side, while the cell is 8 columns in length. When completed, it must have been a building of most perfect form and proportion. The temple of Saturn, or Vespasian, at the foot of the Capitol, Rome, was hexastyle peripteral in plan (extreme size, 115 ft. long and 92 ft. wide); but only the columns remain. It is not so refined and perfect in design as the temple of Jupiter, the cornice being weak.

Ionic Order.—Of this order only two examples are found in Rome—the temples of Fortuna Virilis and Concord. Both are weak in design, with an excessive amount of ornament.

Of the *Doric Order*, the temple of Cora is but a poor imitation of the Grecian, Roman mouldings being adopted in place of Greek. The last two orders, although found in Roman architecture, can scarcely be classified as such, being simply weak imitations.



Grecian and Roman Mouldings compared.

Circular Temples.—This class is purely Roman. Among the finest specimens stands the Pantheon at Rome, begun 27 B.C. It is circular in plan; inside diameter 139 ft., and columns 33 ft. high. At a height of 75 ft. from the ground is the dome, with five horizontal ranks of panels, the top having a circular opening 27 ft. in diameter. The portico was probably built by Marcus Aurelius Antoninus, 166 A.D., while the interior was completed by the introduction of columns by Septimius Severus, 202 A.D. The whole design belongs to the Corinthian order. The temple of Vesta at Rome and that of the Sibyl at Tivoli are of greater antiquity. The cells in each case are encircled by a colonnade of the Corinthian order.

Forums.—All large cities contained several of these buildings, They consisted of a large rectangular court surrounded by a colonnade or aræostyle portico (with ambulatory above), through which entrances led to temples, law courts, theatres, etc. The finest specimen known is that at Pompeii. The forum of Trajan, Rome, is perhaps the largest (1,150 ft. long and 470 ft. broad). At one end was placed the celebrated column of Trajan (115 ft. high), and at the other a triumphal arch.

Triumphal Arches.—In Rome we find those built in honour of Titus, Severus, and Constantine. In earlier times they represented a single arch, but latterly consisted of a large central arch flanked by two smaller ones, and excessively decorated.

Villas.—The private dwellings of the Romans, although built externally of plain brick, surpass those of any other nation in internal magnificence. Hadrian's villa at Tivoli, and the palace of Diocletian at Spalato, are the finest examples. These houses are generally of one story, with the atrium, or entrance-hall, in front, and behind it an interior court surrounded by a colonnade, off which opened the various apartments, from 10 to 12 ft. square. The ceilings were lofty, and usually formed of stone slabs supported on arched ribs (of stone). The apartments round the atrium were reserved for guests. In many of the villas facing a thoroughfare the frontage next the street was laid out in shops, in a manner very similar to that of some continental towns at the present day.

Amphitheatres.—These are also of Roman design, ruins existing in most countries conquered by the Romans. The most important is the Coliseum, Rome, built by Vespasian and Titus. Elliptical in shape, it has a length of 615 ft. and a breadth of 510 ft., or about 6¼ ac. in area. The arena, 281 ft. by 176 ft., was encircled by a high wall with a parapet, behind which seats rose in tiers to the outside wall. This wall was divided externally into three stories of columns and arches, and on the top was yet another wall, divided by Corinthian pilasters, which were really the upward continuation of the columns below. The whole was surmounted by a frieze and cornice, and the total height from base to summit was 162 ft. This vast building could accommodate 87,000 spectators.

Baths.—It is said that there were at one time as many as 850 baths in the city of Rome, the largest being those of Diocletian, Titus, and Caracalla. That the baths of the last-named were of enormous size is shown by their length of 1,840 ft. and breadth of 1,476 ft. At each end, and at the sides, were temples, while the main building contained a large vestibule, with four halls (on each side) for cold, tepid, warm, and steam baths. In the centre was an immense quadrangle for taking exercise, and, beyond, a hall with 1,600 seats for bathers, while at each end were libraries. In addition there were music, lecture, and dressing rooms, besides gymnasia and swimming baths, all conceived in the highest ideal of Roman architecture, and gorgeously decorated.

Basilicas.—These were the halls of justice, usually attached to the forum. In earlier times they were open in the centre, the only covered portion being the colonnade. In later times the walls were raised and roofed in, the part above the colonnade being used as a gallery—one end semicircular in shape—where the judges sat. In many respects these buildings have become models for modern Christian churches.

CLASSIC ORDERS.—In distinguishing between Greek and Roman orders, in addition to the curves of the mouldings being different, there is the variation in the proportion of the diameter of the columns, not only to their height and to the distance they are apart, but also to the depth of the entablature. This is again divided by varying proportions into architrave, frieze, and cornice.

Grecian Doric Order.—Universally used in Greek temples, and consisting of three parts—stylobate, column, and entablature. At the base the stylobate is from two-thirds to one diameter of the column in height, and is divided into equal courses or steps. Resting on the top step is the column, 4 to 6 diameters in height, and diminishing in a slightly-curved line to the necking or hypotrachelium, where it is between two-thirds and four-fifths diameter at base. It is generally divided into 20 flutes. The capital, which is included in the height of the column, is slightly less than half a diameter, and is divided into the necking (one-fifth), echinus or ovolo (two-fifths), and the abacus (two-fifths of the height). The entablature varies from 1¾ diameters to 2 diameters, and is divided into architrave (two-fifths), either absolutely plain or divided into three projecting horizontal fillets; frieze (two-fifths), divided horizontally into triglyphs, usually half a diameter in width; metopes (equal in length to the height of the frieze), which regulate the intercolumniations; and, lastly, the cornice (one-fifth), which projects its own height.

Grecian Ionic Order.—This was doubtless borrowed from Assyrian designs. The stylobate is from four-fifths to one diameter in height, and is divided into 3 steps. The column, 9 diameters in height, is divided into base (two-fifths of a diameter), consisting of a torus and scotia moulding, with a series of smaller mouldings above; these again are divided by fillets. The column, which diminishes to five-sixths at the hypotrachelium, is divided into 24 elliptical flutes and alternating fillets. The capital, three-quarters of a diameter in height (including the necking), is like a paper roll lying on the top of a column, with the rolls or volutes hanging downwards on each side.

Grecian Corinthian Order.—Of this order there are only two remaining specimens in Greece, all others at present standing having been built after the Roman invasion. The Choragic Monument at Athens—circular, and standing on a square pediment—is the best example. The stylobate and column are similar to those of the Ionic order, with the exception that the latter is 10 instead of 9 diameters in height. The base is two-fifths and the capital 1⅓ diameters in height, composed of a cylindrical core with eight leaves clustered round it, while above are four acanthus leaves *cyma recta* in contour, surmounted by a moulded abacus curved inwards on each face. The entablature is 2¼ diameters in height, the architrave being divided into 3 horizontal fillets, separated by a narrow moulding from the frieze, on which bas-reliefs are carved; while the cornice, which has a projection equal to its height, consists of bed mouldings, corona, small crown mouldings, and fillet, surmounted by a cut fascia.

Grecian Caryatic Order.—In this order the statues of women were substituted instead of columns, and rested on a stereobatic dado, which in turn stood on the stylobate. The entablature consisted of architrave and cornice alone, divided into equal portions.

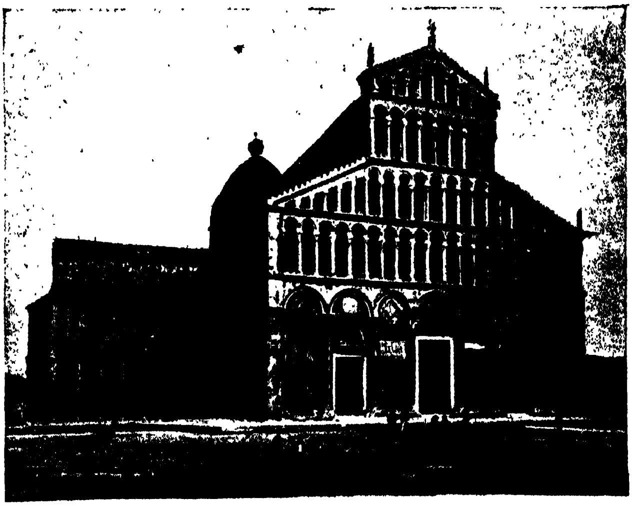
Roman Doric Order.—This is a rude imitation of the Grecian design, and seldom used. In the theatre of Marcellus, Rome, the columns are 8 diameters in height, and consist of a perfectly plain shaft, tapering to four-fifths of its diameter at the neck. The capital consists of necking with torus moulding and 3 fillets below, and the abacus, equal to three-fifths of a diameter. The entablature, 2 diameters in height, has a very short architrave, perfectly plain; a deep frieze, with triglyphs half a diameter in width, and square metopes between; while the projection of the cornice is equal to its depth.

Roman Ionic Order.—This design is in many respects similar to the Grecian. The only building in Rome worthy of note is the temple of Fortuna Virilis. The stylobate is higher than that of the Grecian, and has no steps. The column, 9 diameters in height, and tapering to nine-tenths of its diameter at the neck, has 20 flutes. The base is very similar to that of the Grecian order, but the connecting band of mouldings between the volutes in the capital is horizontal instead of being bent downwards in the centre. The entablature consists of an architrave unequally divided by fasciæ mouldings; a frieze, plain, but enriched by figures and foliage; while the cornice is largely composed of carved mouldings.

Worms Cathedral.

Roman Corinthian.—This was the favourite order adopted by the Romans, the stylobate being similar to that of Ionic, and about 3 diameters in height. The column consists of base, shaft, and capital, 10 diameters in height—the base similar to Ionic, the only difference being that it stands on a square plinth. The shaft diminishes to seven-eighths at the neck, and it has usually 24 flutes and fillets. The capital is 1⅙ diameters in height, consisting of two rows, one above the other, of eight acanthus leaves, surmounted by helices and foliage, and the abacus, with inward curved moulded faces. The entablature is about 2 diameters in height—of architrave, divided into 3 unequal fasciæ; frieze, divided from the latter by carved mouldings, and perfectly plain; and cornice, with bed-moulding of considerable projection.

Second Corinthian Order.—This order, afterwards known in Italian Renaissance as the Composite order, is similar in most respects to the Corinthian. The columns, however, were not quite so high, and have a deeper capital, which in appearance is a combination of Corinthian with 4 Ionic volutes projecting at each corner directly under the abacus. The entablature has a small architrave, divided into 3 projecting fillets; the frieze is plain; while the cornice is deep, with a large number of carved mouldings.

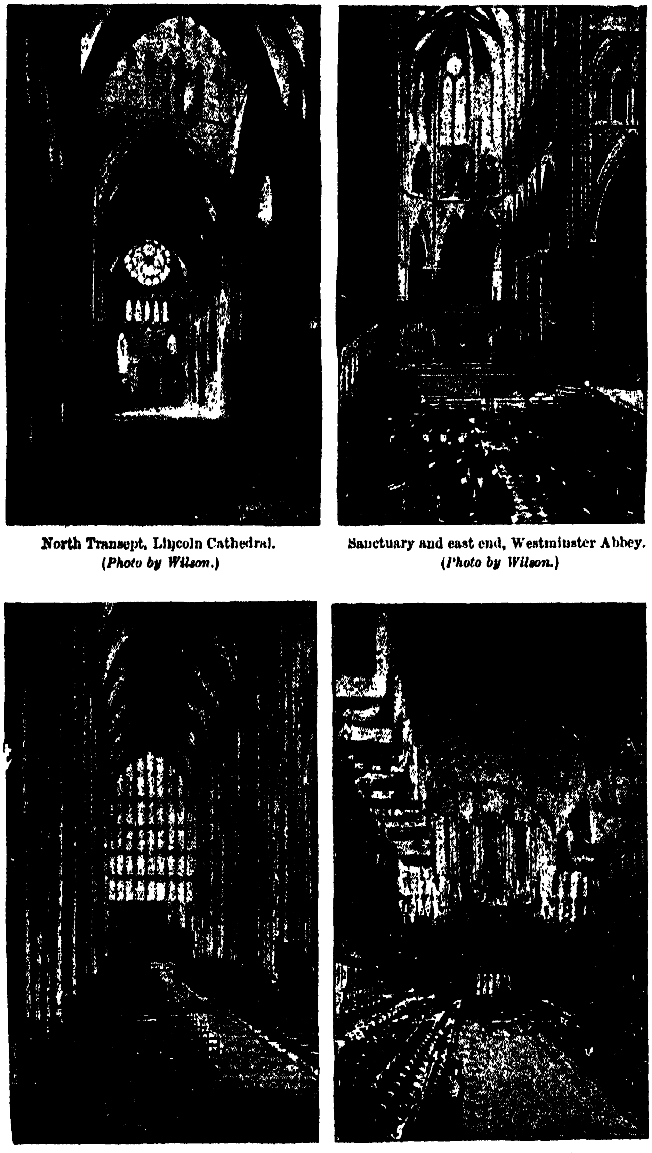


Pisa Cathedral.

The several mouldings used in Grecian and Roman orders are shown in the plate on page 329.

Byzantine Architecture is the form which combines the Roman style with that used by Mohammedan nations. From the overthrow of the Roman power in 476 A.D., little advance was made in architecture for about seven hundred years; in fact, there was rather retrogression. This was largely due to the temperament and warlike disposition of the Goths, who in the earlier stages of their conquest destroyed many of the existing temples and other buildings. But as time went on their kings began to take a livelier interest in learning and in the arts. Justinian erected (532 onwards) the magnificent church of St. Sophia in Constantinople, still standing, and used as a Mohammedan mosque. Its external appearance is that of a high dome or aerial cupola, 106 ft. in diameter, supported on piers, commencing at a height of 182 ft. above floor-level, and pierced by 24 windows; while clustering round this are portions of the building, with shelving roofs gradually ascending towards the dome. The church of St. Mark, Venice, is also a splendid specimen of Byzantine work.

Romanesque.—The spread of Christianity throughout Europe during this epoch caused the construction of many churches, largely based in plan and general design on the basilicas of the Romans, but with this difference, that instead of the columns being connected together by architraves on the top of their capitals, semicircular arches were used; while greater detail of carving was given to the external elevation of these buildings. The preservation of architecture was in great measure due to the religious feeling of the age; for with the exception of churches and castles, few buildings were erected. The effect throughout Europe was to form a peculiar style in each country, subdivided into Saxon, Norman, French, Rhenish, Spanish, and Italian.



North Transept, Lincoln Cathedral. (*Photo by Wilson.*)

Sanctuary and east end, Westminster Abbey. (*Photo by Wilson.*)

Nave, Winchester Cathedral. (*Photo by Wilson.*)

St. George's Chapel, Windsor. (*Photo by Stewart.*)

English Gothic.

Correctly speaking, the architecture of these countries is Gothic; but the term has been restricted, in popular usage, to that which is characterized by the pointed arch, introduced at the end of the twelfth century.

Anglo-Saxon.—In 672 A.D. certain builders from the Continent landed in Britain. Previous to this period buildings had been composed mostly of wood, and covered with thatch; and although several were then built of stone, and glass was used for windows, it was not until near the end of the 10th century, when a church was completed on the spot where Westminster Abbey now stands, that architecture developed into a definite style, which may be termed a debased Roman. Arches were always semicircular, and generally plain, but sometimes decorated with moulding on soffit. The columns were cylindrical, hexagonal, or octagonal, very thick in proportion to their height, and often ornamented with herring-bone or zigzag carvings. The capitals were rude both in profile and carving, and the walls very thick, without external buttresses.

Norman.—At no time in English history was so much building accomplished in Britain as during the Norman period (1066-1200). After the conquest of the country by William I., the clergy at once commenced the erection of monasteries, cathedrals, and other places of worship; while the nobles, owing to the unsettled state of the country, built castles of great strength. They were usually erected on a commanding position partly adapted by nature as a place of defence. These buildings, which were somewhat similar to the castles of Normandy, were often placed on an eminence beside a river, surrounded by a moat on the landward side. A drawbridge gave access to the castle gate, which was protected by a barbican, or lofty wall with turrets. The main walls of the castle, from 8 to 12 ft. thick, and from 20 to 30 ft. high, were surmounted by a parapet with embrasures; while at the angles or corners high towers were erected, used for sleeping apartments and look-out stations. The granaries, stables, kitchens, and other offices connected with the castle were situated within this wall. In the centre of this space or courtyard, surrounded by another moat or ditch, was the keep or tower, four or five stories in height, where the banqueting-hall for friends and retainers was placed, while underneath were the dungeons. The most noted building of this class, still in perfect preservation, is the Tower of London. The peculiarity of the Norman style is principally shown in massive towers and walls, with narrow apertures or loopholes for windows, the upper portions being often circular. The roofs were flat, with raised parapets or battlements with embrasures on the top of walls, towers, and turrets. Ecclesiastical architecture of this date may be termed an impressive form of Saxon. In plan, the churches are designed with transepts and nave, with a tower, but no spire, at their intersection. The eastern end of the edifice is usually semicircular; while the sides of the nave are of square, cylindrical, or octagonal columns. If the first, it has clusters of small half-columns surrounding it, and both bases and capitals are formed of simple mouldings. The arches above the columns are circular, and of greater span than the

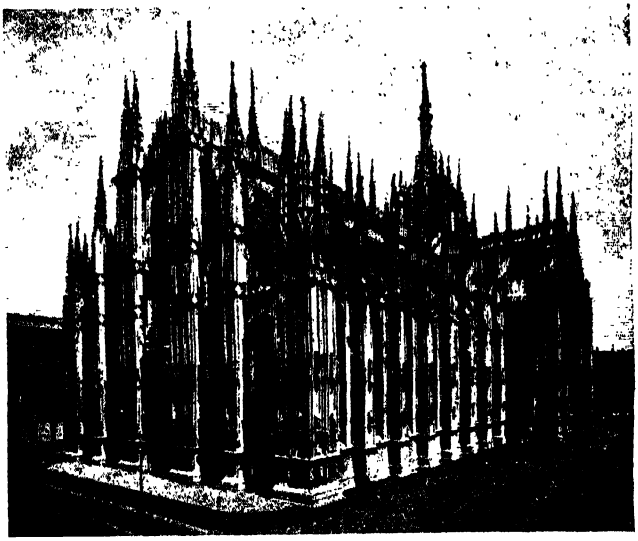
Saxon, and the ornaments bolder, with the soffits plain. In the second story two smaller arches are inserted, springing from a small central pillar; and in the third story there are three arches, the central being higher than those on each side, the width of the double and treble windows combined being the same as the width of the main arch below. In many the mouldings and carving are profuse, and are formed of several distinctive types, such as (1) the chevron or zigzag, (2) the embattled fret, (3) the triangular fret, (4) the billet, (5) the cable, (6) the hatched, (7) the lozenge, (8) the wavy, (9) the pellet, and (10) the nebule. The torus and cavetto were also used. The western towers and nave of Ely Cathedral, the choir at Canterbury, and almost the whole of Durham, Peterborough, and Rochester Cathedrals, are splendid examples.

French.—The style of architecture in France contemporaneous with that of the Norman period may also be designated as a debased form of Roman. During the 9th and 10th centuries the country was the scene of turmoil and bloodshed, and it was not until the dawn of the 11th century that art again began to flourish, and churches, such as St. Germain des Près in Paris, were erected.

Rhenish.—During this period many fine churches were built in Germany, the more important being those of Mainz, Worms, and Spires. The plan, like those of England and France, is cruciform, and consists of the nave, usually lofty, and enclosed by groined vaulting, with side aisles, while the choir and chancel terminate in the apse. The mouldings are purely Roman. The cathedral of Worms is a perfect example.

Italian.—There is a considerable difference in design between Italian and German ecclesiastical buildings of this period, the most important being the addition in the former of the campanile tower. In erecting their churches, the Italians often used the columns and relics of antiquity removed from former Roman buildings. The cathedral at Pisa is one of the best examples. The plan is that of a Latin cross. On each side of the nave are two aisles, divided by Corinthian columns, from whose capitals spring arches, on the top of which is another row of smaller and more numerous Corinthian columns, surmounted by a wall with circular-headed windows. The transepts are also divided into nave and side aisles, and at the intersection with the main nave are four piers, which support an elliptical cupola. The front elevation has five stories of columns and arches, the lowest consisting of seven large arches; the second of twenty-one small arches; the third with the same number, the outer ones being partly reduced to the slope of the side roof; the fourth of nine arches, the columns being higher than the two stories below; and the fifth has the same number, but reduced in size towards the sides, as the main roof forms a triangular pediment. The bell or campanile tower, also known as the leaning tower, of Pisa, built in 1174, is one of the peculiar architectural developments of the period. It is cylindrical in shape, 180 ft. high, 50 ft. in diameter, and is canted 13 ft. from the perpendicular, owing to defective foundations.

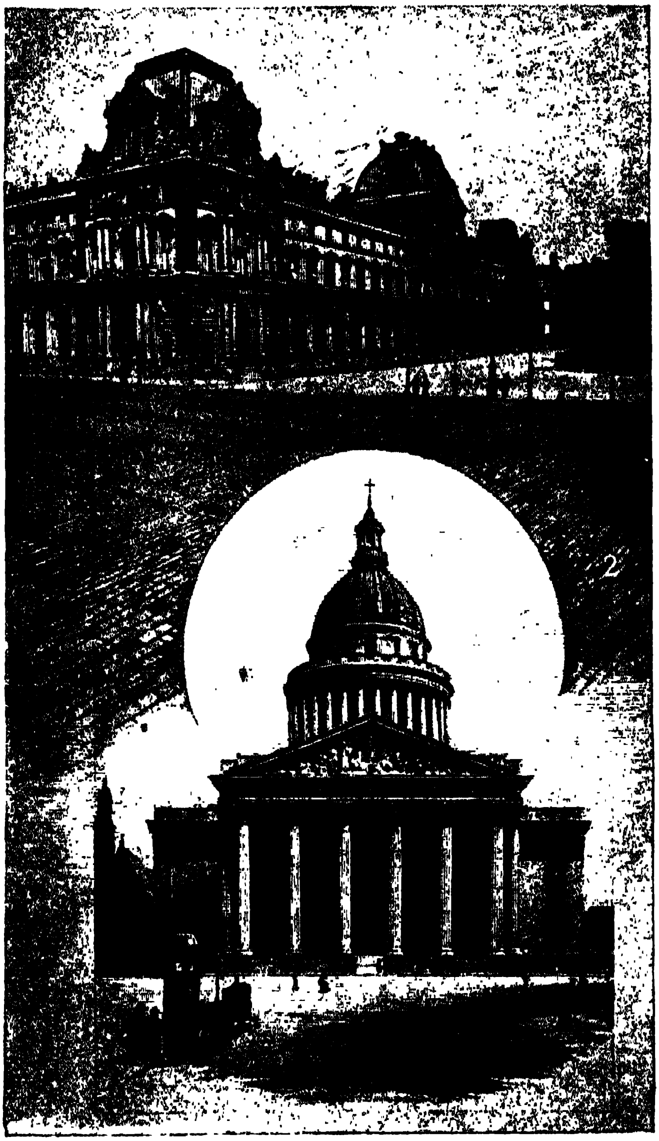
GOTHIC OR POINTED.—About the end of the 12th century a wonderful change came over the architecture of Europe. In all countries we have the simultaneous appearance of the pointed arch. That this peculiar form of design had not been used before is curious, as it was certainly known in the East. The date, however, is synonymous with the first crusade—a war in which all the nations of Europe took an active part. It is, therefore, probable that in the Holy Land the crusaders received their first inspiration in a style of architecture which for centuries gave an impetus to the development of Gothic or Pointed in its many varied forms. At first it was a simple lancet arch; but by degrees, through adding clustered pillars, mullions of manifold form, and tracery, a degree of perfection and refinement was obtained never before dreamt of.



Milan Cathedral.

English Gothic.—The first examples, during the reign of Richard I. (1189-99), exhibited gracefulness in detail and general character, with a desire to attain an appearance of lightness and elegance which must have necessitated a thorough knowledge of building construction. Slim marble columns and mouldings of a very refined type were introduced. The groined roofs were simple in design, but ridge ribs were sometimes added. Two of the finest types of castles built at this period were Carnarvon and Conway, which, although similar in plan to those of the Normans, exhibited a considerable quantity of Gothic detail. Of ecclesiastical buildings, the transepts of York, Lincoln, and Salisbury Cathedrals are the best examples. In 1307 the style became changed to what is known as Middle Pointed, in

England; but in a very short time the Scots introduced a national style, beautifully exemplified in Elgin, Kirkwall, Glasgow, and St. Andrews Cathedrals; in Holyrood and Melrose Abbeys, and in Roslin Chapel.



French Renaissance.

1. The Louvre, Paris. 2. The Panthéon, Paris.

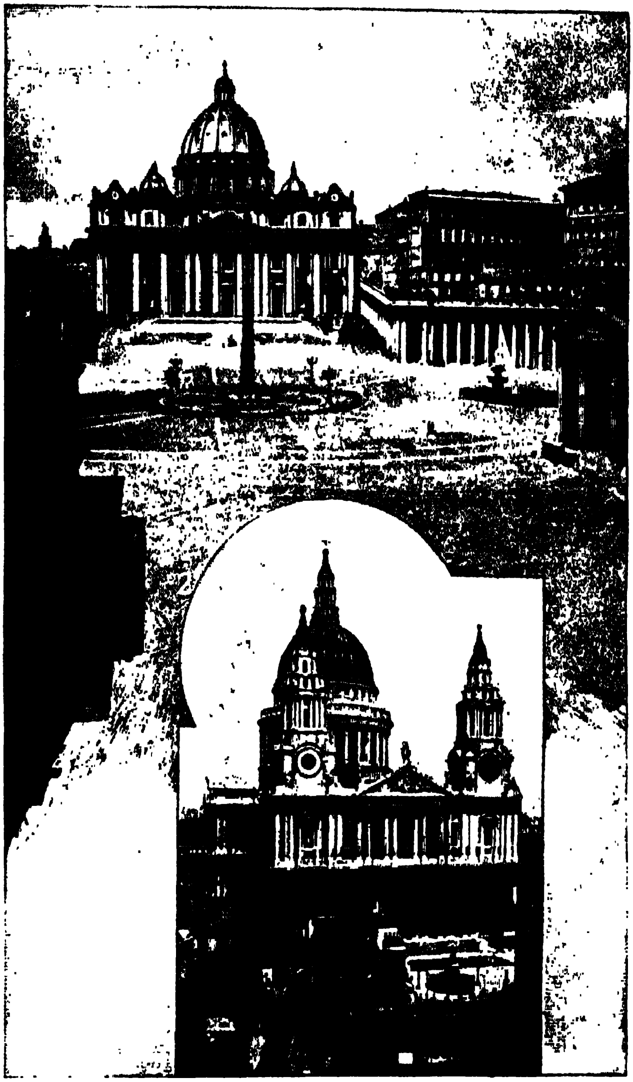
Continental Gothic.—The Gothic architecture of the Continent was affected largely by the basilica plan, which necessitated the retention of the apse, surrounded by aisles and chapels. In France the roof vaulting was much loftier, and generally of stone instead of timber. In beauty of design and intricate planning, these ecclesiastical buildings are unique; Amiens, Rheims, Notre Dame in Paris, and Rouen Cathedral are among the finest examples. In Germany the apse was also largely used, and sometimes at both ends of a church, but without surrounding aisles and chapels. The main building is often under one vast roof, covering in both aisles and nave; the columns are of exceptional height; while the external walls are generally arcaded by open galleries directly under the eaves. Cologne, Marburg, and Strassburg Cathedrals are the finest examples. Of Spanish cathedrals there are several magnificent specimens, those of England and France being small in comparison. In their earlier buildings there is a slight appearance of Moorish architecture, but those of later date are distinctly French. Stone vaulting is predominant, while in the cathedral at Gerona the width of the nave measures 73 ft. Seville, Salamanca, and Toledo Cathedrals are also good examples. Italy does not possess the same number of grand Gothic buildings as the other countries of Europe. Milan Cathedral, although magnificent in scale and full of rich detail, is badly planned. The Italians also adopted a distinct style by variegating the colour of the stones used in construction, as shown in St. Mark's at Venice. Como and Orvieto are other cathedrals of note.

Italian Architecture.—We have observed that Gothic architecture never gained such popularity in Italy as in other European countries. As early as 1296 the church of Santa Maria del Fiore, Florence, was commenced; but it was not completed till 1474, although the original plan was adhered to. During the 178 years it was under construction, the different ideas of the various architects are plainly visible in the forms of decoration and style. In 1407 Brunelleschi, a Florentine architect, who had visited and studied the ruins of ancient Rome, returned to Florence, and gave the initial impulse to what may be termed the revival of Roman architecture. In the dome of Santa Maria we have a specimen of his work. The church is 454 ft. and the transepts 334 ft. in length; the nave is 153 ft. and the side aisles 96 ft. in height; while the top of the dome is 387 ft. above the floor-level. The revival commenced by Brunelleschi was continued by Leo Battista Alberti, who wrote no less than ten books on architecture, which give one an insight into the refined taste and thorough knowledge of building construction as known to these old masters. It is a matter of regret that, about this time, the ancient book on architecture by Vitruvius was translated, in which certain erroneous rules of proportion were laid down for the design of the orders and their mouldings; and these, as we now know after personally studying the ruins of ancient Greece and Rome, were of a most perfunctory character, and did considerable harm to the Italian school. The founders of this school called themselves Cinquecentists, and thought they had found the ideal architecture.

In addition to the three orders (Doric, Ionic, and Corinthian) before mentioned, a second form of Corinthian was termed the fourth or Composite; and a new or fifth order, called Tuscan, was adopted, though it was only a debased form of Roman Doric.

The Italian school was divided into three distinct sections—Florentine, Roman, and Venetian—each having its peculiar style, largely due to the habits of the people and the materials at command.

To the *Florentine school* we are indebted for many of the designs in street architecture of the present day. The Pandolfini Palace is a notable example, and shows how often this style, although severe, is now reproduced with slight alterations in our dwelling-houses and public buildings. The *Roman school* adopted a style which, instead of representing that massiveness and fortress-like appearance of the former, had a gracefulness and lightness of design formed by breaking up the exterior walls by pilasters and columns. An elaborate entrance was also one of the principal features. The grandest building in Rome, commenced during the time of Pope Julius II., was St. Peter's. The designs of Bramante having been adopted, the work was commenced in 1506; and although beautiful and artistic in conception, the building is too light in form. This was proved when the roof vaulting was commenced, as the four main piers which were to support the cupola cracked. After Bramante's death the work was strengthened and carried on by several architects until the time of Michael Angelo, who made (1546-64) the erection of this vast building his life's work. When he died he had completed so much of the edifice that it was impossible for any other person to alter the design. The extent of the building is enormous, covering an area of more than 5 ac.; while the summit of the cupola, which is 139 ft. in diameter, is 432 ft. above pavement-level. The palaces of Rome, rectangular in shape, with an inner court, were generally constructed externally of brick. The Farnese Palace, three stories in height, is one of the finest, and is thus constructed. The inside arcades, facing the court or *loggia*, are composed entirely of stone columns, each story being designed in a different order, while the various apartments lie towards the outside walls. The villas, erected in the outskirts of Rome, were lighter in design than the palaces, and in many cases had handsome façades, while their plan of arrangement exhibited great ingenuity. From those models the designs of many British country houses have been copied.

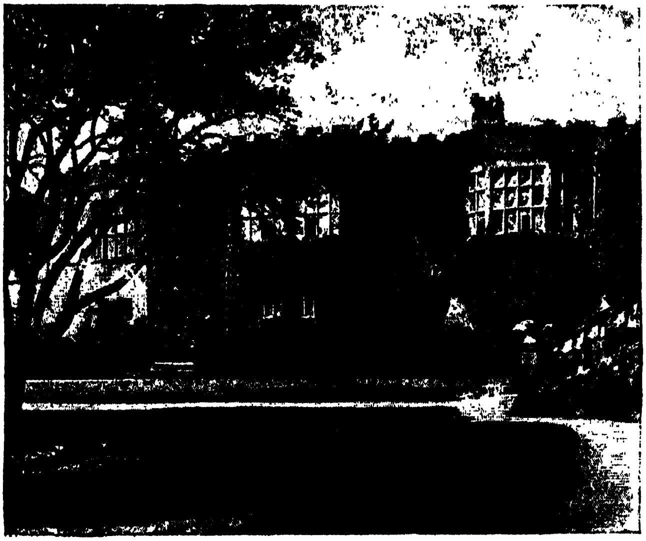

Renaissance.
1. St. Peter's, Rome. 2. St. Paul's, London.

The *Venetian school* displayed an elegance in design due largely to the use of columns in the façades of their buildings, with arched apertures for windows. The palace of Pompei at Verona and St. Mark's Library at Venice are two of the best examples. One of the most celebrated architects of the time was Andrea Palladio, whose works retrieve in many respects the deformities and constant application of absurd rules largely indulged in by his contemporaries. This style embraced the great necessity of all architecture—*i.e.* accommodating interior convenience with external effect, without displaying harshness or want of proportion. Many of his buildings, which exhibit great simplicity, were copied by Wren, Inigo Jones, and other British architects, because his designs were effective, and could be constructed at a minimum cost. The Villa Capra is an example of Palladio's work.

French Renaissance was introduced into France in the 16th century, and soon developed into a special style. In Paris we have the finest street architecture in Europe. Many of the buildings—such as the Louvre, the palaces of the Luxembourg, Tuileries, and Versailles, the Hôtel des Invalides, and, lastly, the Panthéon, one of the finest churches ever erected — may rank among the most beautifully designed edifices in Europe.

In Germany there are few typically national specimens of revival architecture, because the buildings erected at this period were either by French or by Italian masters. In Spain and Russia we find buildings similar to those of Italy, and with no outstanding or exceptional form either in plan or in elevation.

ENGLISH REVIVAL OR RENAISSANCE.—In Britain the Cinquecentists did not obtain a footing until the reign of Elizabeth, fully one hundred years later than on the Continent. During this period many changes had taken place in the style of architecture. Gothic architecture had declined, and in its final stages became known as the Florid or Tudor style, which exhibits a complexity and richness of ornament in ecclesiastical buildings. The outstanding peculiarities of this style are arches abnormally flat, and wide in proportion to their span; windows of the same description, and divided by transoms with small embattled ornaments as mouldings; and ceiling vaulting covered by an innumerable variety of interlacing ribs with pendent carvings. Specimens may be observed in the cathedrals of Gloucester, Peterborough, Ely, and St. George's Chapel, Windsor. In domestic architecture great advance was made. Castles, mansions, and country houses were built on a magnificent scale, both as regards planning and elevation. Projecting bay windows divided by mullions and transoms, hexagonal or octagonal towers and very high chimneys, and entrance doorways highly ornamented with mouldings and carving, were the principal features of the time. Unfortunately, few of these buildings now remain. Among the best examples are Haddon Hall, Derbyshire; Raglan Castle, Monmouthshire; Wolterton, Norfolk; and Harlaxton, Lincolnshire.



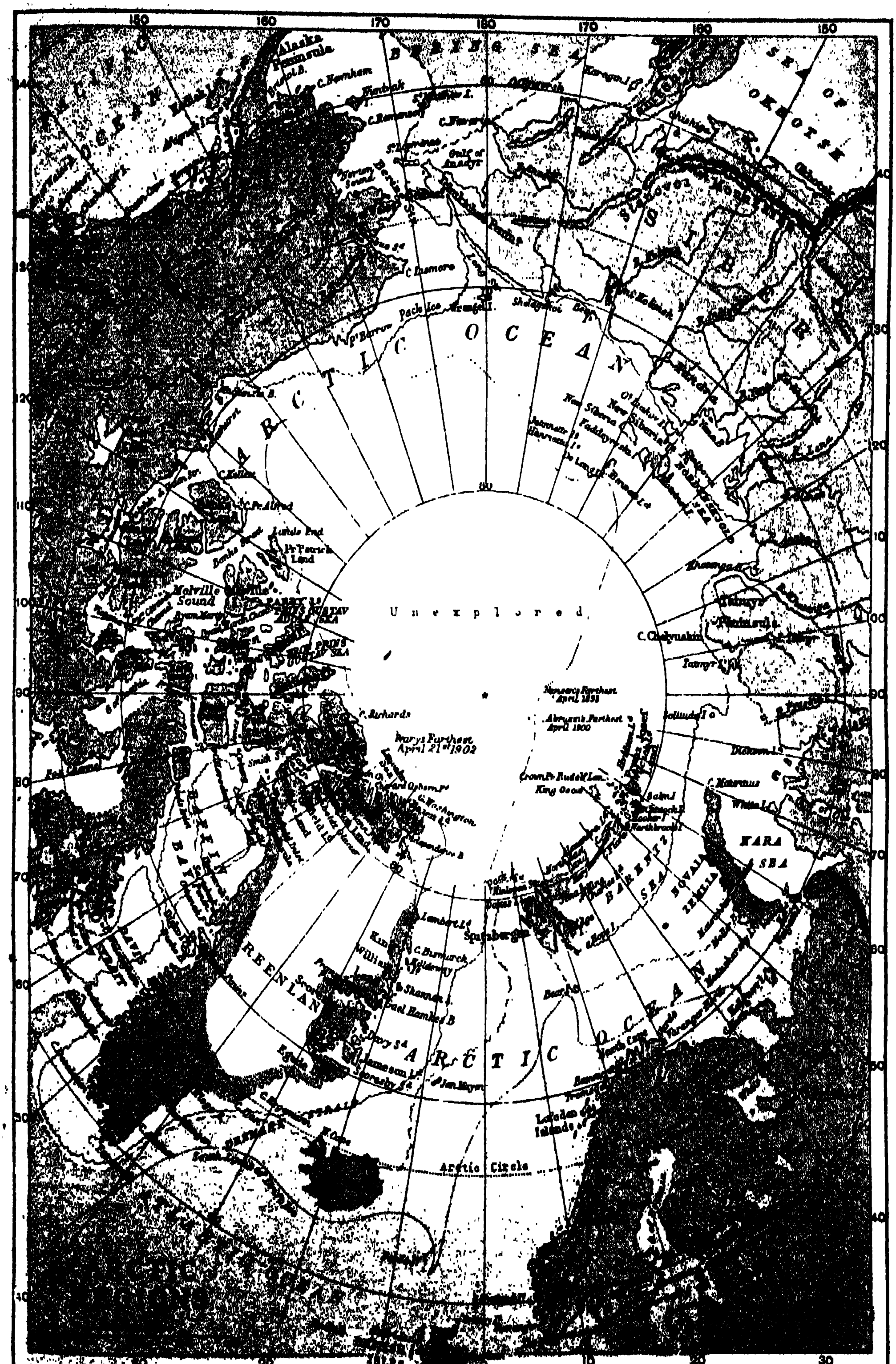
Haddon Hall, Derbyshire.

Elizabethan or Late Tudor Style.—This became predominant, exhibiting in design a combination of the former with that of the Cinquecento school. The buildings are well arranged in plan, but the combination of the two styles is grotesque, and not pleasing to the eye. Longford Castle, Wiltshire; Hatfield, Herts; and Wollaton Hall, Nottinghamshire, are among the most typical. Another style copied from the Continent was that of dwellings built with timber frames, filled in with harled brickwork, while the roofs are tiled, the result being a picturesque and artistic whole. In the town of Chester there are still some of these old buildings.

During the reign of James I., Inigo Jones was the most famous architect. His design for a palace at Whitehall (the only part ever completed being the banqueting-hall) might have ranked as the finest in the world. The Great Fire in London took place shortly after his death (1666), and then it was that Sir Christopher Wren's genius became known. During his lifetime he had the good fortune to see his design for St. Paul's Cathedral, London, carried out. It was begun in 1675, and finished thirty-five years later. In the form of a Latin cross, it has a length of 500 ft., and a breadth across the transepts of 250 ft. Above the intersection of nave and transepts is the dome, 100 ft. in diameter, springing at a height of 168 ft. above the floor. The height from pavement-level to the top of the cross is 330 ft. No less than twenty-five churches in London alone were designed by Wren, several of them Gothic, and exhibiting very refined taste. He was also the architect of Greenwich Hospital, the Monument, and Temple Bar. Sir John Vanbrugh, who succeeded Wren, adopted the massive style as his ideal, his finest work being Blenheim Palace. During the earlier part of the 18th century Hawksmoor, Keith Gibbs (a Scotsman), and Page were among the most celebrated architects; while towards its close we find Sir William Chambers, Sir Robert Taylor, and James Wyatt in the foremost rank. Chambers designed Somerset House, one of the most beautiful examples of Italian architecture, while many of his works are scattered throughout England. Stuart and Revett made many researches, and personally studied the works of ancient Greece, but it was some time before the beauty of their art was fully appreciated. Adams attempted to imitate them, but met with poor success.

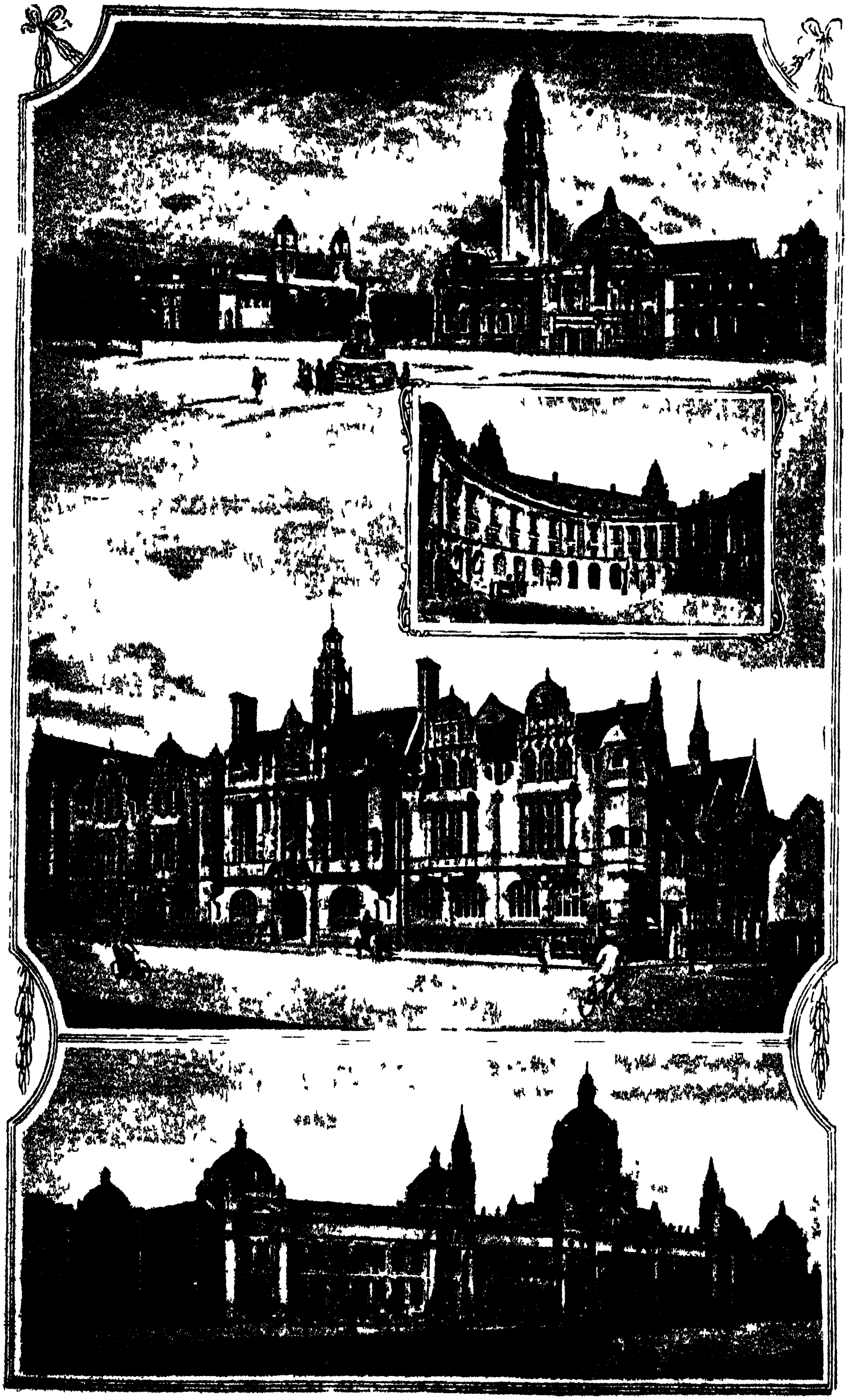
PRESENT-DAY ARCHITECTURE.—In earlier times every country had a style or styles peculiar to itself, but nowadays we find the art of building has become truly cosmopolitan. This change has been brought about by increased communication all over the world. In striving after originality, designs are often produced of such incoherent style that they inspire a feeling of curiosity rather than admiration.

The now universal use of ironwork in buildings has had the effect of spoiling, through the light appearance of the substructure, the external appearance of many buildings which otherwise might have been extremely handsome; yet it has been of immense advantage in regard to internal arrangement. The value of ground in the centre of our large cities is causing the rapid demolition of old dwellings, which are generally replaced by buildings of great height, substantially built, and containing apartments of a fixed minimum height and area, according to rules laid down by local authorities. See Waring's *Stone Monuments and Tumuli of Remote Ages* (1870); Dodwell's *Cyclopean Remains in Greece and Italy* (1834); Bollaert's *Antiquarian Researches in New Granada, Ecuador, Peru,*



To face page 344.

John Bartholomew & Co.



Modern Architecture.—2.

1. Cardiff Town Hall and Law Courts (Lanchester, Stewart, & Rickards) 2 New Government Offices, Great George Street, Westminster—the circular court (J M. Brydon, F R.I B.A) 3. Oxford City Buildings (H T Hare) 4. Victoria and Albert Museum, South Kensington (Sir Aston Webb, R.A., F.R.I.B.A.).

and Chili (1860); Rich's *Koordistan* (1836); Fergusson's *Nineveh and Persepolis*, and *History of Architecture;* Cockerell's *Antiquities of Athens* (1830); Taylor and Cresy's *The Architectural Antiquities of Rome* (1821-2); Pugin's *Gothic Architecture* (1836); Gotch's *Early Renaissance Architecture in England*(1901); Winkles's *French Cathedrals* (1837); Wild's *Architectural Grandeur* (1837); Stevenson's *House Architecture* (1880); Gwilt's *Encyclopædia of Architecture;* Cate's *Dictionary of Architecture* (8 vols. 1853-92).

Architrave, the lowest of the three principal members of the entablature (the other two being the frieze and the cornice), and the chief beam in it, resting on the columns. An architrave cornice is an entablature consisting of an architrave and cornice only, without a frieze; and the architrave of a door or a window is a collection of members and mouldings round either.

Archives. See RECORDS.

Archivolt, the ornamental band of mouldings round an arch. The word is also used by mediæval writers for a vault.

Archon, the chief magistrate in Athens after the abolition of the kingship, appointed at first for life. This life-tenure was reduced to a period of ten years, probably about 750 B.C. In 683 the office became annual. Meanwhile the office of king was retained, though eventually it became an annual office, the second archon being called *archon basileus* ('king archon'), the sacrifices, etc., having always to be performed by at least a nominal king. Early in the 7th century B.C. there were three archons—the third being the *polemarch*, the commander in war. About 650 B.C. the six *thesmothetæ* ('keepers of the law') were joined with them, as forming one college of nine archons. Originally nobles alone could become archons; but by 600 B.C. the qualification became one of wealth. Solon (594 B.C.) provided that the nine archons should be chosen by lot out of forty elected candidates. Cleisthenes's institution of a new office, the *strategia*, or generalship, weakened the archons' power, as the *strategi* came to monopolize the state business. On the two lower classes being made eligible for the archonship, the office became a paid one. See Aristotle's *Constitution of Athens.*

Archpriest, a church dignitary whose office was formerly given in each diocese to the priest senior by ordination. He was the helper of the bishop in his spiritual functions, as the archdeacon was in his temporal functions. Along with the parish priests he formed the rural chapter corresponding to the cathedral chapter of the bishop and canons. In the Roman Catholic Church the title has fallen into desuetude. In England, from 1598 to 1623, archpriests (George Blackwell, 1598-1608; George Birket or Birkhead, 1608-14; Dr. William Harrison, 1615-21) were appointed by papal commission to take charge of the secular clergy. They were vigorously opposed by the English clergy, who finally obtained their supersession in favour of William Bishop (1623) as bishop's vicar-general.

Archytas OF TARENTUM (*c.* 400 B.C.), Greek general and mathematician, and a friend of Plato, was the first to apply geometry to mechanics. He is known only by references in ancient writers.

Arcis-sur-Aube, tn., dep. Aube, France, 17 m. N. of Troyes; birthplace of Danton, and scene of the battle of March 20-21, 1814. Napoleon was forced to retreat, leaving the route to Paris open to the allies. Pop. (1901) 2,774.

Arcole, vil., Italy, prov. Verona, 15 m. S.E. of Verona, in a marshy situation; was the scene, on Nov. 15, 16, and 17, 1796, of stubborn battles between the Austrians (about 40,000, under Alvinczy) and Napoleon, in which the latter finally gained a victory which prevented the relief of Mantua. Pop. (1901) 3,339.

Arçon, JEAN CLAUDE ELÉONORE LE MICHAUD D' (1733-1800), French general and engineer, born at Pontarlier; the inventor of the floating batteries used in the attack upon Gibraltar in 1782. He took an active part in the wars of the French revolution, and wrote military books, such as *Considérations sur les Fortifications* (1795).

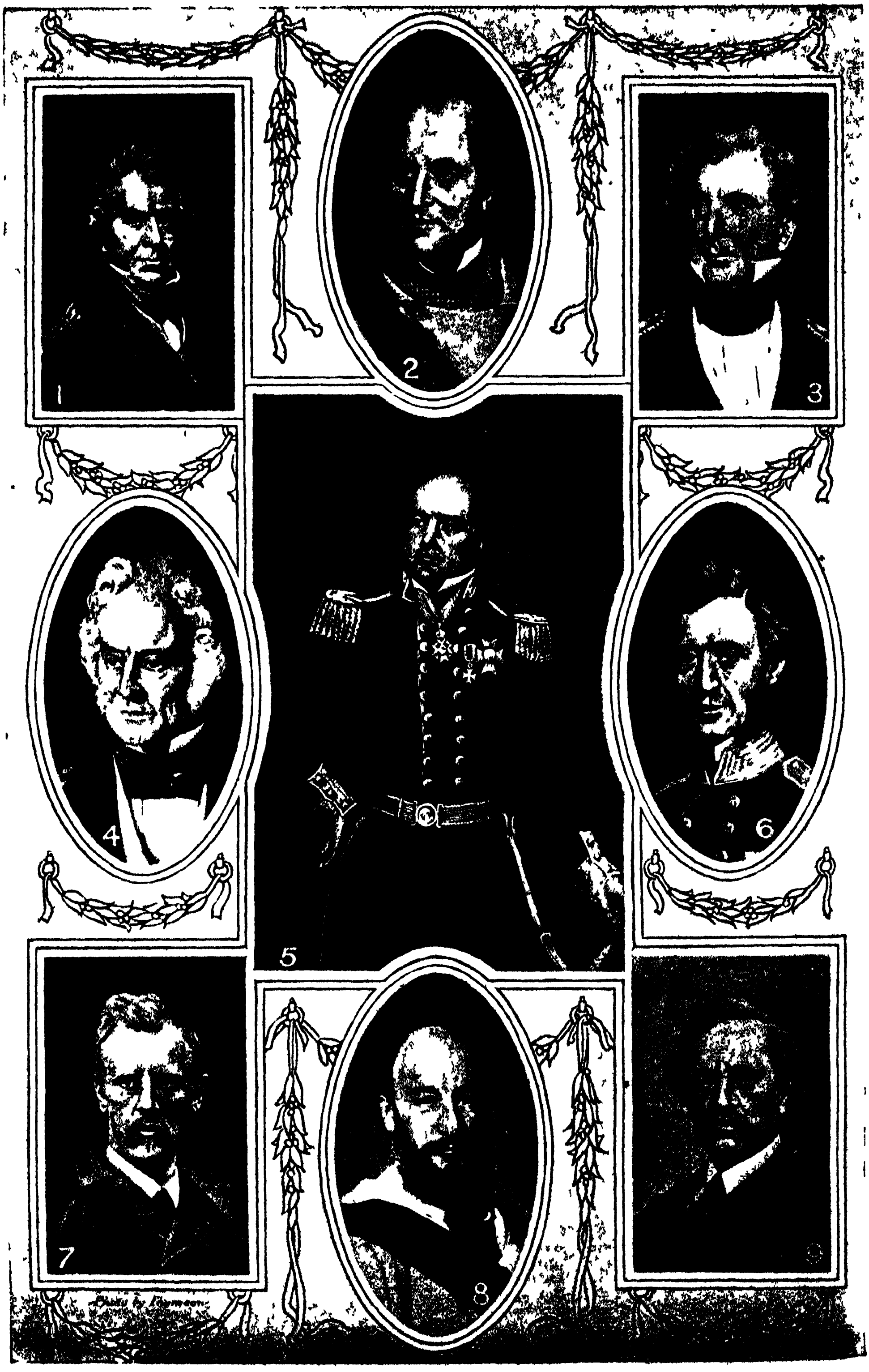
Arcos de la Frontera, tn., prov. Cadiz, Spain, 19 m. N.E. of Jerez. Finely situated on rocky elevation. Pop. (1900) 13,926.

Arcot, tn., N. Arcot dist., Madras, 65 m. W.S.W. of Madras; was formerly the capital of the Carnatic. The fort, now in ruins, was taken by Clive in 1751; by the French in 1758, from whom it was recaptured in 1760. During the Mysore war, Arcot was taken by Haidar Ali in 1780, and finally passed into the hands of the British in 1801. Pop. (1901) 10,734.

Arcot, NORTH (area, 7,616 sq. m.), a district of the Madras Presidency; formed part of the kingdoms of Carnatic and Mysore, and at the termination of the Mysore war was ceded to the British. Paddy, ragi, and cholam are grown, and there are manufactures of carpets, brass work, and carved wood. Pop. (1901) 2,207,712. SOUTH ARCOT (area 5,217 sq. m.) has similar productions. Fort St. David, 2 m. to the N., was taken by the French in 1758, and abandoned two years later. Pop. (1901) 2,349,894.

Arctic Exploration. The Arctic Sea was first entered by Other, a Norwegian, who sailed to the N. coast of Russia, and made a report of his voyage to King Alfred; and about 1001 the W. coast of Greenland was colonized by the Icelander, Erik the Red. No further progress, however, was made in Arctic discovery until 1553, when Sir Hugh Willoughby sighted Novaya Zemlya. Three years later the Kara Str. and Kolguyef I. were discovered by Stephen Burrough, and in 1580 the Yugor Str. by Pet and Jackman. Dutchmen soon joined in the quest. William Barents (Barendszoon or Barendsz) made three voyages to the north, and in 1596, having discovered Bear I. and Spitzbergen, rounded the N. extremity of Novaya Zemlya, and wintered on the E. coast. This was the first time Europeans passed a winter in the Arctic regions. Novaya Zemlya was first circumnavigated by Elling Carlsen in 1871. Henry Hudson, in 1607, sailed up the E. coast of Greenland to Cape Hold with Hope, and crossing over to Spitzbergen, named Hakluyt Headland. On his return he discovered Hudson Tutches, afterwards named Jan Mayen after a Dutch skipper. In another voyage, in 1610, the same navigator discovered Hudson Strait. Thomas Edge, in the employment of the Muscovy Company, besides other discoveries, sighted and named Wyche's Land (1617), renamed by Von Heuglin in 1870, after the king of Würtemberg, König Karl Land. In 1707 the Dutch captain Giles, or Gillis, sighted land 25 m. E. of N.E. Spitzbergen, which has been sought for in vain by later navigators. Parry, in 1827, reached, by means of boats, the lat. of 82° 45′ to the N. of Spitzbergen—the farthest north until the Nares expedition. Nordenskiöld made several voyages to this group, on one of which (1868) he carried his vessel, the *Sophie*, to 81° 42′—a record on the European side of the Arctic beaten only by the *Fram.* Captain Carlsen (1863) was the first to sail round Spitzbergen. In 1872 Payer and Weyprecht discovered Franz Josef Land. On the chart of the Van Keulens the Land van Edam and Land van Lambert are marked on the E. coast of Greenland in lat. 78° 10′ and 78° 20′ respectively. These points were seen in 1655 and 1670. A Dutch skipper, Gael Hamke, discovered the bay which bears his name in 1654. In 1822 Dr. Scoresby surveyed it from Gael Hamke Bay down to lat. 69°; and in 1823 Clavering and Sabine, in the *Griper*, made pendulum observations at Pendulum I., and advanced north to the Haystack. The S. extremity of the E. coast was visited by Captain Graah in 1829, and explored up to 65° 18′ N. More important was the first German expedition of 1869-70 in the ships *Germania* and *Hansa*, under the command of Captain Koldewey. Accompanied by Lieut. Payer, Captain Koldewey reached with sledges the N. shore of Dove Bay, N. of Cape Bismarck, in lat. 77° N.; while the crew of the *Hansa*, which was crushed by the ice, made a remarkable journey on an ice-flow to the S. extremity of Greenland. Frobisher and Hall made voyages to the W. coast of Greenland and the opposite American coast; but the entrance to the Arctic regions W. of Greenland is the strait discovered by John Davis in 1585. In 1616 Baffin and Bylot passed through this strait, and sailed up the North Water to Smith Sound, discovering on the homeward voyage Jones Sound and Lancaster Sound, which were closed by ice. Except for the voyage in 1631 of Luke Fox, who sailed up Fox Channel to Peregrine Point, in lat. 66° 47′ N., nothing further was learned of these regions for about two hundred years, and Baffin's discoveries were almost forgotten. At length the interest in a North-West Passage having revived, Commander John Ross was sent out in 1818 with the *Isabella* and *Alexander*. He confirmed the accuracy of Baffin's observations, and named Melville Bay, Capes Isabella and Alexander, and other points. The following year Lieut. Parry, commanding the *Hecla* and *Griper*, sailed through Lancaster Sound, and laid down on his chart the islands of N. Devon, Cornwall, Bathurst, and Melville on the N., and N. Somerset, Cape Walker (Russell I.), and Banks Land on the S.; and in 1821-3, with the *Fury* and *Hecla*, he passed up Fox Channel and traced the Fury and Hecla Straits to Regent Inlet. Sir John Ross made another voyage in 1829-33 in the *Victory*, a vessel equipped by Felix Booth, a wealthy distiller, and passed up Regent Inlet to the Gulf of Boothia; while his nephew, J. C. Ross, traversed the S. part of Boothia and the strait named after him, and discovered the north magnetic pole, then situated on King William Land, in lat. 70° 5′ N. and long. 96° 46′ W. A few years earlier, in 1826, Dr. Richardson had passed through Dolphin and Union Straits, and sighted Wollaston Land, part of which was afterwards named Victoria Land by Simpson of Hudson's Bay Company, who, with Dease, in 1838-9, passed through Dease Str. and the entrance of Simpson Str.; while Dr. John Rae, in 1846-7, explored the S. coast of the Gulf of Boothia from Fury and Hecla Straits on the N. to Lord Mayor's Bay on the W., and proved Boothia to be a peninsula. The successful though ill-fated expedition of Sir John Franklin in search of a North-West Passage set sail from the Thames on May 20, 1845. With the *Erebus* and the *Terror*, under the command of Captains Fitzjames and Crozier, Franklin passed through Lancaster Sound, and, as was afterwards ascertained, sailed up Wellington Channel to Penny Strait and down Crozier Channel, returning to Beechey I. in winter. Subsequently the vessels made their way to the N.W. coast of King William Land, where Franklin died in June 1847. The survivors, under Captain Crozier, started in 1848 for the Great Fish River, and their remains were found along the route to Adelaide Peninsula. The expedition had, therefore, ascertained the existence of a sea passage from the Atlantic to the channels S. of Victoria and Wollaston Land, leading to Bering Str. Nothing having been heard of Sir John Franklin and his vessels, some forty expeditions were sent out between the years 1847 and 1857, during which many new discoveries were made. Of those entering the Arctic regions from the E. may be mentioned that of Lieut. De Haven, of the U.S. navy, in the *Advance*, equipped by Mr. Grinnell, who, sailing up Wellington Channel, named Grinnell Land, to the N.W. of N. Devon; that of Captain Austin of the *Resolute* (1850-1), who, with Lieut. M'Clintock, surveyed the S. shores of the Parry Is.; the expedition of Sir E. Belcher, with the ships *Assistance*, *Resolute*, *Pioneer*, *Intrepid*, and *North Star* (1852-4), when the commander of the expedition surveyed the Belcher Channel, Lieut. Sherard Osborn the N. shores of the Parry Is., and Lieuts. M'Clintock and Mecham Prince Patrick I.; while, in 1857-9, Captain M'Clintock, in the *Fox*, sailed up Regent Inlet, and established his winter quarters at Port Kennedy in Bellot Str. (discovered in 1851-2 by Captain Kennedy and Lieut. Bellot of the French navy), whence sledge parties, under the command of Captain Allen Young and Lieut. Hobson, set forth to examine the W. coast of N. Somerset and Boothia, the S. coast of Prince of Wales I., and the shores of King William Land. On the W. coast of the last-named island was found a paper recording the voyage of the ships *Erebus* and *Terror*, the death of Franklin, and the departure of the crews for the Great Fish River; and traces of their journey were discovered at many points as far N. as Montreal I., at the base of the Ogle Peninsula. Since then remains have been found and relics collected by Dr. Rae, Captain Hall, and Lieut. Schwatka. Meanwhile, Dr. Kane, who had accompanied De Haven, led another Grinnell expedition, in 1853-5, up through Smith Sound to Kane Basin, whence Dr. Hayes explored the coast of Grinnell Land (N. of Ellesmere Land, not the Grinnell Land of De Haven) up to lat. 79° 45′, and Wm. Morton the Humboldt glacier and Washington Land. In a second journey, made in 1860-1, Dr. Hayes reached Cape Lieber, lat. 81° 35′, and made an excursion into the inland ice of Greenland, on the N. side of Inglefield Gulf. Captain C. F. Hall, in 1871, carried his vessel, the *Polaris*, up to 82° 16′ N. lat., and wintered in Polaris Bay, N. of Petermann Fjord. He was followed, in 1875-6, by the Nares expedition, with the ships *Alert* and *Discovery*. The *Alert* wintered off the coast of Grinnell Land, in lat. 82° 24′; the *Discovery* in Discovery Harbour, opposite Polaris Bay. Sledge parties were sent out, one of which, under Commander A. H. Markham, drove northwards over the ice to lat. 83° 20′ 26″ N.; a second, under Lieut. Aldrich, explored the N. coast of Grant Land; and a third, under Lieut. Beaumont, reached the farther coast of Sherard Osborn Fjord. Lastly, in 1881-4, Lieut. Greely, U.S.A., led an expedition up Kennedy Channel, and, with the assistance of Lieut. Lockwood, explored the interior of Grinnell Land westwards to the Greely Fjord, while the latter followed the coast beyond Sherard Osborn Fjord to Lockwood I., 83° 24′ N.—the highest latitude reached by man until the Nansen expedition.

Several exploring vessels have entered the Arctic seas by Bering Str. Captain Cook reached Icy Cape in 1778, and Captain Beechey, in the *Blossom*, tried, in 1826, to meet Sir John Franklin, who skirted the coast from the Mackenzie; but he did not get farther than Point Barrow. The greatest expedition by this route was that of the *Investigator* and *Enterprise*, under Captains M'Clure and Collinson (1850-4), which explored the W. coast of Wollaston Land and the coasts of Banks Land, while M'Clure and his crew made the North-West Passage on the ice, being received by Captain Kellet of the *Resolute* in Melville Sound, and taken home by the *North Star*. Another important voyage was made through Bering Strait in 1879-81. Lieut. De Long of the U.S. navy set sail towards the pole in the *Jeannette* (Captain Allen's yacht *Pandora*), and having ascertained that Wrangell Land (seen first by Baron Wrangell from the Chukchi coast in 1824, and supposed to be of great extent) was only a small island, drifted with the ice past Jeannette and Henrietta Islands, and, his ship being



Famous Arctic Explorers.

1. Sir John Ross. 2. Sir Robert M'Clure. 3. Sir James Ross. 4. Sir W Parry. 5. Sir John Franklin. 6. Sir F L. M'Clintock. 7. Fridtjof Nansen. 8. Sir George Nares. 9. Professor Nordenskiöld.

crushed in the ice, endeavoured to reach the river Lena. One party, under the command of Engineer Melville, reached Yakutsk, and afterwards found and buried the bodies of De Long and some of the crew on the Lena delta. About the same time (1878-9) Baron Nordenskiöld made the North-East Passage in the ship *Vega*.

During recent years a large number of expeditions have visited the Arctic regions. Lieut. Peary has spent several seasons in Greenland and on the neighbouring coast. In 1892, accompanied by Eivind Astrup, he crossed the N. of Greenland to Independence Bay, in lat. 81° 37′ N.; and, in 1899, crossed Ellesmere Land, and connected his survey of the W. coast with that of Lieut. Lockwood. In 1900 he reached lat. 83° 50′ to the N. of Greenland, and in 1902 lat. 84° 17′ to the N. of Grant Land. Nansen entered the ice with the *Fram* near the New Siberia Is. in 1893, drifted during two winters towards the pole, and with Johansen marched over the ice to lat. 86° 14′ N., while the *Fram* reached lat. 85° 57′ to the N. of Spitzbergen. Nansen and Johansen returned by Franz Josef Land, where they were welcomed by Mr. F. C. Jackson of the Jackson-Harmsworth expedition, which spent the years 1894-7 in the archipelago. The Duke of the Abruzzi has also visited this group in the *Stella Polare*, and one of his party, Captain Cagni, advanced in 1900 to 86° 33′ N. Danish officers have explored parts of the coast of Greenland (see GREENLAND) hitherto unknown; and Swedes, Russians, Britons, Germans, and others have made scientific investigations in Spitzbergen. Captain Sverdrup (1898-1902) visited Jones Sound, and determined the western side of King Oscar Land, Ellesmere Land, and Grinnell Land, and the connection between North Devon I. and the Grinnell Land immediately to the N.W. of it, as well as discovered the large islands Ringnes Is. and Axel Heiberg I. to the W. of Grinnell Land, the explorations of the sledging parties extending to 106° W. long. and 81° 40′ N. lat. Roald Amundsen, a Dane, is now (1905) examining the north magnetic pole area. A Danish expedition is in the north of Greenland, and an American one is at Franz Josef Land. See Barrow's *Chronological Hist. of Voyages into the Arctic Regions* (1818); Scoresby's *Account of the Arctic Regions, etc.* (1820); Richardson's *The Polar Regions* (1861); C. R. Markham's *The Threshold of the Unknown Region* (1873); Nourse's *American Explorations in the Ice Zones* (1884); Captain Sverdrup, in *S.G.M.*, July 1903.

Arctic Life. The Arctic zone forms a well-defined geographical region, characterized by many peculiar animals and plants. In certain parts—as, for example, in the interior of Greenland—this region is singularly barren and devoid of life; but elsewhere, as in the tundras of Asia, there is, during the brief but hot summer, an exceedingly luxuriant growth of plant life, with a corresponding abundance of insects, birds, and herbivorous and carnivorous mammals. There are relatively few kinds of herbivorous mammals, though, as in the case of lemmings and reindeer, those present may be numerous in individuals. Many Arctic animals depend directly or indirectly upon the marine organisms with which the Arctic Ocean teems. This is true of man, no less than of such characteristic Arctic forms as fur seals, walruses, and polar bears; of entirely aquatic forms like the whales; and of the flocks of birds which are temporary inhabitants of the region.

Among the land plants the mosses and lichens deserve special mention, on account of their abundance and importance as food for the reindeer, musk ox, and lemming. Among mosses, the bog moss (*Sphagnum*), as well as species of *Hypnum* and *Polytrichum*, are common, and cover vast tracts. The so-called 'Iceland moss' (*Cetraria islandica*) is an important part of the reindeer's diet, and is also exceedingly abundant. In addition, there are many different kinds of flowering plants whose botanical interest is greatly accentuated by the fact that they also occur as 'living fossils' on the tops of Scottish mountains. Among such may be mentioned the pink *Andromeda polifolia*, the cloudberry (*Rubus chamæmorus*), various rushes and sedges, and saxifrages. Within the Arctic region proper trees do not occur, the Arctic species of willow and birch being low-growing plants—herbs rather than shrubs. The majority of the plants display what are known as xerophytic characters (*cf.* article on the SEASHORE), and many possess rounded or centric leaves, which have not an upper and lower surface, but stand erect, and are structurally arranged so that light falling on any part of the surface can be utilized in assimilation. This is an adaptation to the peculiar conditions of illumination, the light falling on every side of the plant in turn. Again, the continuity of the light during the brief period of summer checks growth, so that the plants are dwarfed and tufted in habit. Further, although insects are numerically abundant, they are largely short-tongued forms, such as flies (*Diptera*), and the flowers are therefore mostly short-tubed, with honey near the surface; very many are self-fertilized, and where self-fertilization is impossible, the power of asexual reproduction is marked.

The plant life of the sea would not appear to be of great direct importance. Indirectly, the algæ, both large and small, are of great importance, as they furnish ultimately the food upon which the numerous crustaceans, molluscs, fish, and other marine organisms depend. The molluscs especially are of much interest, for many of those now living in the Arctic Ocean also occurred in British seas during the Glacial Period, and are abundantly represented as fossils in Pleistocene deposits. Among such may be mentioned *Pecten islandicus*, *Astarte borealis*, *Turritella polaris*, *Leda rostrata*. Many others are now rare or absent in the south and west of Britain, but are abundantly represented in the north and east. Among such are *Cyprina islandica* and *Fusus islandicus*. Among other molluscs should be mentioned *Mya truncata* and *Saxicava arctica*, which are very abundant, and constitute the chief food of the walrus; the pteropods, *Clio borealis* and *Limacina arctica*, which form the staple diet of the whalebone whale; and the cuttles, which feed many of the toothed whales. The Crustacea also deserve passing mention. Crabs are few, but shrimps, schizopods, and amphipods are abundant; in the case of the ill-fated Greely expedition they formed the only food obtainable by the survivors. In certain parts of the Arctic region fish are extraordinarily plentiful, and reach a large size. They form a very important part of the diet of many Arctic mammals.

Of the terrestrial animals, the birds in certain regions are very abundant during the summer months. The valuable eider duck, cormorants, mergansers, oyster catchers, puffins, guillemots, terns, auks, razor-bills, and many others, literally darken the air in the vicinity of their breeding haunts. In the tundras such land birds as the ptarmigan, the golden plover, and the phalarope abound. The first named, like so many of the Arctic mammals, becomes white in winter.

The mammals themselves show many striking peculiarities. As the conditions throughout the region are very uniform, a dominant species is likely to be widely distributed. This is true of the reindeer (*Rangifer tarandus*) and the elk (*Alces machlis*); the musk ox (*Ovibos moschatus*), now confined to the northern parts of the W. Hemisphere, is an apparent exception, but it occurs as a fossil in Europe and Asia, and was undoubtedly once widely distributed.

Among other interesting forms should be mentioned the fossil mammoth (*Elephas primigenius*), which constitutes a very important source of fossil ivory; the lemming, important on account of its fecundity; the Arctic fox, which, like the marten, ermine, sable, and others, exhibits a seasonal change of colour, and forms a valuable fur animal. Of even greater importance are the aquatic or semi-aquatic mammals, such as the true fur seal (*Otaria*), whose breeding habits are of great interest, the whalebone whale (*Balæna mysticetus*), the bottlenose (*Hyperoödon rostratus*). Of less commercial but equal zoological importance are the hooded seal (*Cystophora cristata*), the polar bear, the narwhal (*Monodon monoceros*), the white whale (*Delphinapterus leucus*), the Greenland seal (*Phoca grœnlandica*), and others. See F. Nansen's *First Crossing of Greenland* (1890); A. E. Nordenskiöld's *Voyage of the 'Vega' round Asia and Europe* (trans. by Leslie, 1881); A. E. Brehm's *From N. Pole to Equator* (trans. by Thomson, 1896); R. Collett's *Bird Life in Arctic Norway* (trans. by Cocks, 1894). A discussion of the general characters of Arctic plants will be found in J. C. Willis's *Flowering Plants and Ferns* (1897). For the special characters of Arctic mammals, reference should be made to Flower and Lydekker's *Mammals, Living and Extinct* (1891).

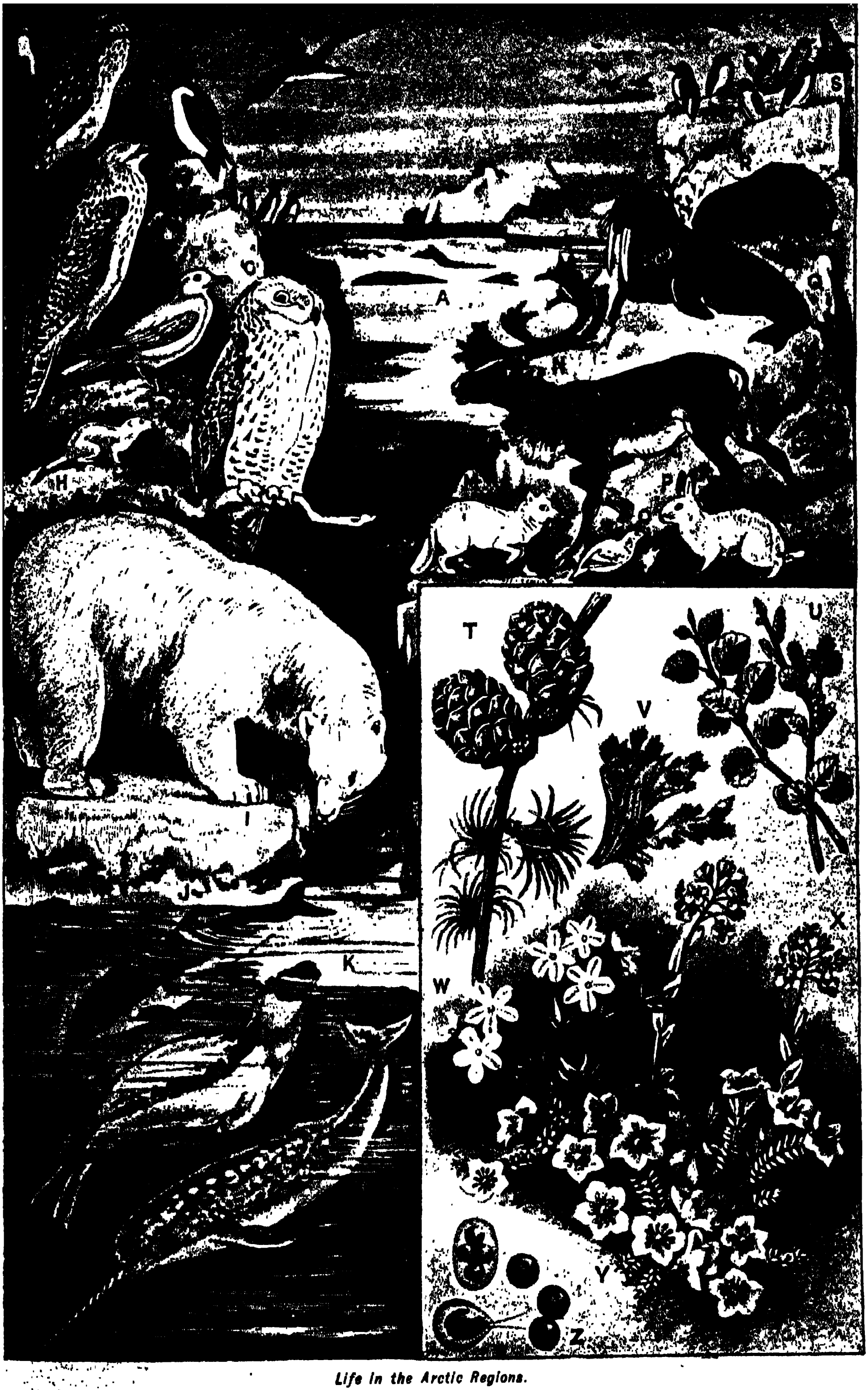
Arctic Ocean, one of the great water divisions of the globe, is for the most part enclosed between the N. coasts of Europe, Asia, and N. America. The only wide connection it has with the Atlantic runs over the ridge which links Iceland with Scotland by way of the Faroes, Shetlands, and Orkneys; but it has three other narrower openings—*viz.* Denmark Str., between Greenland and Iceland; Davis Str. (with Baffin Bay, Smith Sound, Lancaster Sound, and Jones Sound), between Greenland and British N. America (both of these connecting it with the Atlantic); and Bering Str., which unites it with the Pacific. The area immediately round the N. Pole is as yet unexplored; the nearest approaches which have been made to the pole have been that of Dr. Nansen and Johansen (*viz.* 86° 14') in 1895, and that of Captain Cagni of the *Stella Polare* (*viz.* 86° 34') in 1900. So far as is known, the region immediately round the pole consists of deep water covered with rough and broken pack ice. At its periphery the Arctic is bordered by a tolerably broad continental shelf, above which the water is exceptionally shallow; at least this is the case along the N. of Europe and the N. of Siberia as far as 135° E. long. West of this point the depth of water on the continental shelf is generally between 50 and 80 fathoms; but in the Kara Sea it sinks to 400 fathoms or more, and between Novaya Zemlya and Franz Josef Land there exists a depression of 100 to 150 fathoms deep. There is also another depression between Norway and Bear I., measuring 240 fathoms. But east of 135° E. long. the depth, even on the line of continuation of the continental shelf, suddenly plunges down to 2,000 fathoms. Along the route which the *Fram* (Nansen's vessel) drifted in 1893-6 the soundings exceeded 1,800 fathoms, and often 2,000 fathoms, from 79° N. lat. and 138° E. long. to near Spitzbergen. West of Spitzbergen the greatest ascertained depth is 1,720 fathoms (Nathorst expedition, 1898). And, so far, the absolutely greatest depth sounded in the Arctic is 2,100 fathoms, in 81° N. and 130° E.; or 2,650 fathoms, if we accept the sounding of the *Sofia* made in 1868. The various subdivisions of the Arctic Ocean —Kara Sea, Barents Sea, White Sea, Greenland Sea, Norwegian Sea, Baffin Bay, Davis Strait, and Bering Strait—are treated under separate articles. The area of the Arctic Ocean is estimated at 5,908,000 sq. m., and it is computed to receive the drainage of 8,614,000 sq. m. In the Polar basin the temperature of the surface water is generally at 29·2°—about the freezing-point of salt water. At about 110 fathoms it suddenly increases to 33°-33·5°. But the temperature (and with it the salinity) ranges highest between 120 and 350 fathoms—*viz.* 35° to 39·9°. Underneath this warm stratum—which is no doubt due to the diffusion of the Gulf Stream—there comes a second cold layer, the middle of which lies at about 500 fathoms, where Nansen found the temperature to be 31·9°. But from 1,000 fathoms to the bottom there is a pretty uniform temperature of 33·1° to 33·4°. The lowest temperature recorded on the *Fram* expedition was -52·5°, with which it is interesting to compare the lowest land temperature of -68° F. at Verkhoyansk in Siberia. In the higher latitudes of the Polar basin the winter seems to be characterized by a clear atmosphere and absence of wind, though towards its outer margin (Franz Josef Land, Spitzbergen, Greenland) boisterous gales prevail, and the temperature is not so low. Normally, the ice-pack seldom exceeds from 7 to 13 ft. in thickness. It is neither unchangeably fixed nor unalterably solid, but, in the summer at any rate, is in almost unceasing motion. Not only does it drift bodily from the middle of the N. coast of Siberia in a northerly curve westwards towards the N.E. shoulder of Greenland, but it is locally subject to continuous di

being thrust up into

by pressure from below, and alternately split asunder and again driven together. In summer, outside the edge of the permanent ice-pack, there is in many places a permanent layer of fresh water, sometimes 5 to 6 ft. in depth, which has resulted from the melting of the ice-pack itself, and from the outflow of the great Siberian rivers. In addition to the movements just mentioned, there is a never-ceasing circulation between the waters of the Arctic and the waters of the Atlantic, in that the warm surface water of the latter flows up between Greenland and Norway, and then, becoming chilled on contact with the cold Arctic water and ice, sinks towards the bottom, and finally flows back southwards as a cold current, chiefly along the E. side of Greenland and down Davis Str., carrying with it the icebergs which are so often a menace to vessels navigating the Atlantic. But this circulation, thus generally outlined, is locally much complicated by the Gulf Stream, by the winds, and by the submarine ridges and trough-like depressions which intervene between the continental shelf and the islands, and amongst the islands themselves. Animal life is fairly abundant in the Arctic regions (see above). The sun remains permanently above the horizon about 160 days, and for a corresponding period remains permanently below it—this is, of course, in high latitudes. See Dr. Nansen's *Farthest North* (2 vols. 1897), and *Scientific Results of the Nansen Expedition* (vol. i. 1900), the Duke of the Abruzzi's *On the 'Polar Star' in the Arctic Sea* (Eng. trans. by Le Queux, 1903), Kinloch's *Hist. of the Kara Sea Trade Route to Siberia* (1898).

Arctinus of Miletus (fl. *c.* 750 B.C.), one of the 'cyclic' poets, who completed the cycle of epic stories begun by Homer. Only fragments of his poems survive, but he is said to have written two epics—the *Æthiopis*, continuing the story of the *Iliad*, and the *Sack of Troy*. His fragments are collected in Kinkel's *Epicorum Græcorum Fragmenta* (1878), also in Monro's Oxford Text of *Homer* (1896).

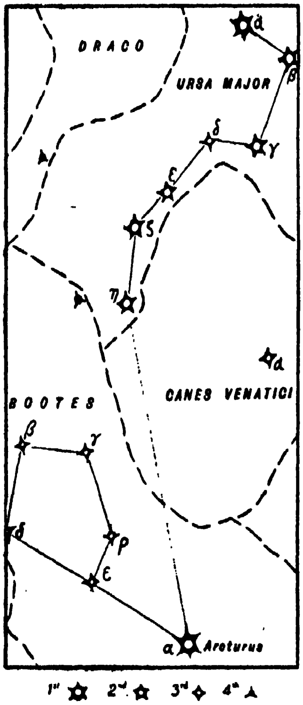
Arcturus, *α* Boötis, the brightest star in the northern hemisphere, its photometric magnitude being 0·07. It is first mentioned by Hesiod, who selected the acronychal rising of Arcturus (the latest visible after sunset) as the signal for the pruning of the vines; and his fixing of the occurrence at sixty days after the winter solstice gives 730 B.C. as the approximate date of composition



Life in the Arctic Regions.

A, Greenland whale. B, Long-tailed skua. C, Guillemot. D, Great northern diver. E, Greenland falcon. F, Iceland gull. G, Great snowy owl. H, Stoat. I, Polar bear. J, Porpoise. K, Harp or Greenland seal. L, Narwhal. M, Arctic fox. N, Caribou. O, Ptarmigan. P, Arctic or mountain hare. Q, Walrus. R, Musk ox. S, Little auk. T, Larch. U, Dwarf birch. V, Iceland moss. W, Androsace villosa. X, Thlaspi alpinum. Y, Saxifraga oppositifolia. Z, Protococcus hæmatococcus.

of the *Works and Days.* Arcturus had a stormy reputation. The spectrum of the star is of the solar type, and its rays have a reddish tinge. The minuteness of its parallax indicates for it a light-power 1,100 or 1,200 times greater than that of the sun; and, taken in conjunction with its proper motion of 2·3″ annually, shows it to have an actual velocity in space of at least 260 m. a second. Arcturus was one of four stars which Halley in 1718 observed had unmistakably shifted their positions since Ptolemy's epoch. The heat received from it was measured with a sensitive radiometer by Professor Nichols at the Yerkes Observatory in 1898.



Arcturus.

Arcus Senilis, a gray curved band partially or wholly occupying the rim of the cornea of the eye, occurring generally in the aged. It causes no inconvenience, and is incurable.

Ardagh, SIR JOHN CHARLES (1840), soldier and diplomatist; took part in the congresses of Constantinople (1876 and 1881) and Berlin (1878 and 1880), in the Bulgarian boundary commission (1879); was commissioner for the delimitation of the Turco-Greek frontier (1881), and delegate at the Hague peace conference (1899); member of the Chile-Argentina arbitration tribunal, and of the S. African claims commission (1901). In his military capacity he took part in the Sudan expeditions of 1884-6, being present at the actions of Tell-el-Kebir, Teb, Tamai, and Giniss; was director of the school of military engineering, Chatham (1894-6); director of military intelligence (1896-1901); and government director of the Suez Canal Company (1903).

Ardahan, fort. tn., Transcaucasia, Russia, on river Kura.

Ardalan, or ARDELAN (6,000 sq. m.), prov., forming the E. div. of Kurdistan, Persia. It is divided into two districts—Ardalan in the N., with Senna as cap. of district and of Kurdistan; and Kermanshah in the S., with cap. of same name. The surface is mostly mountainous, with fertile valleys and grass plains, except in the E., where there is much waste land.

Ardashir, founder of the Sassanian dynasty of Persia, wrested the crown from Artabanus, the last of the Arsacid (Parthian) line, in a battle fought by appointment on the plain of Hormizjan (227 or 224). He had first made himself master of Istakhr (Persepolis), and built his power upon the influence of the ancient Zoroastrian faith. His career of conquest was checked by the Romans in 233. Ardashir died in 241.

Ardea, decayed tn., prov. Rome, Italy, on an isolated rocky plateau in the Campagna, 12 m. N.W. of Anzio; was abandoned about the beginning of the Christian era because of malaria.

Ardebil, ARDABIL, or ARDABEEL, tn., prov. Azerbaijan, Persia, 110 m. E. of Tabriz; trading centre on the route to port of Astara on the Caspian Sea. The shrine of Sheikh Sufi is annually visited by numerous pilgrims. Pop. 10,000 to 15,000.

Ardèche, mountainous and picturesque dep. (area, 2,136 sq. m.), S. France, on r. bk. of Rhone, its E. limit; is watered mainly by the swift-flowing Ardèche and its tributaries. Though mainly agricultural, iron, coal, lignite, zinc, and lead are plentiful, and there is some silk-spinning. Cap. Privas. Pop. (1901) 353,564.

Ardee, mrkt. tn. and par., Co. Louth, Ireland, on the Dee, 10 m. S.W. by S. from Dundalk; has milling industries. Pop. (1901) 1,883.

Arden, FOREST OF, a former forest (patches of woodland rather than continuous forest) in Warwickshire, N. of the Avon (see Shakespeare's *As You Like It,* Act ii., in which, though the characters are French, the allusions to Robin Hood and the descriptions of scenery clearly indicate the English forest) Previous to the division of England into counties, the name was applied to a more extended tract reaching N. to the Trent and W. to the Severn.

Ardennes. (1.) Wooded mountain system, S.E. Belgium, between Meuse and Moselle; geologically connected with the hills which fence in the Rhine between Bonn and Bingen. The general elevation is about 1,800 ft. It consists mainly of barren moors, with densely-wooded (oaks and beeches) slopes and fertile river valleys. Large stalactite caves exist at Han and other places, and the region yields coal, iron, lead, antimony, copper, manganese, and clay. See Montagnac's *Les Ardennes* (1875). **(2.)** Department (area, 2,028 sq. m.), N. France, with only the N.W. portion in the Ardennes system; is crossed by the Meuse and the Aisne, these rivers being joined by a canal. The climate is continental, and dry and pleasant in autumn. The department is agricultural in the centre and south, pastoral in the east, with a renowned race of sheep, and industrial (iron and textiles) in the Meuse valley. Cap. Mézières; but its neighbour, Charleville, is twice as populous. Pop. (1901) 315,589.

Ardent, a British torpedo-boat destroyer launched in 1894. The name commemorates the capture of a French 64 of the same name in 1746 by the *Exeter* and consorts. In the British service the ship-name is associated with Toulon (1793), Camperdown (1797), the Texel (1799), Copenhagen (1801), the River Plate (1807), and the Sea of Azov (1855).

Ardilaun, ARTHUR EDWARD GUINNESS, BARON (b. 1840), the head of the great brewing firm of Arthur Guinness and Co., who, after representing Dublin in the Conservative interest in 1868-9 and 1874-80, was raised to the peerage in 1880.

Arditi, LUIGI (1822-1903), musical composer and conductor; born in Piedmont; studied music at Milan, and became an expert violinist. In 1841 he produced his opera *I Briganti,* and made his début as an operatic conductor at Vercelli in 1843. He conducted in London, Vienna, Madrid, Constantinople, St. Petersburg, Havana, and the great cities of the United States; and from 1858, when he settled in London, he was conductor at Her Majesty's Theatre. He is best known by his brilliant vocal compositions—*e.g. Il Bacio* and *L'Ardita.* See *My Reminiscences* (ed. Baroness von Zedlitz, 1896).

Ardnamurchan, vil. and headland, Argyllshire, Scotland. Village lies 7 m. N.N.W. of Tobermory. Pop. (1901) 1,954. The headland is the most westerly point of the mainland of Scotland, and dangerous for mariners.

Ardoch, par. (22,127 ac.) and vil., 7½ m. S. of Crieff, Perthshire. Site of a celebrated Roman camp, and of Lindum, an aboriginal

British town, in the vicinity of Ardoch House. Pop. (1901) 916.

Ardrossan, seapt. and wat.-pl., Ayrshire, Scotland, 1 m. W.N.W. of Saltcoats. The dock (1887-92) occupies 17 ac., with a depth of 18 ft. at low water and of 37 ft. at high water. The harbour has cost nearly £400,000. Industries are shipbuilding, engineering, iron works, sawmills, and timber yards. Exports, coal and pig iron. Castle Craig Head was the site of a castle of the Montgomeries, which was captured by Wallace and demolished by Cromwell. Pop. (1901) 6,077.

Are (Lat. *area*), in the French metric system, is the unit of superficial measurement, being 100 sq. metres, equivalent to 119·6 sq. yds. The hectare (100 ares) = 2·47 imperial acres.

Areca. See Betel-nut Palm.

Arecibo, tn., N. coast, Puerto Rico, W. Indies, at outlet of Rio Grande; exports coffee and sugar; railway to San Juan. Pop. (1899) 8,008.

Arena, The, an American monthly magazine devoted to serious interests. It was founded in 1889 in Boston, U.S.A., by Mr. B. O. Flower, and ten years later was transferred to New York. Recently the *Coming Age* was merged in the *Arena.*

Arenaceous Rocks, sedimentary rocks consisting chiefly of sand or gravel. See Sandstone.

Arenaria, or Sandwort, a large genus of rock and alpine plants of wide distribution. *A. balearica, A. montana,* and *A. norwegica* are useful in the rock garden.

Arenberg, formerly a part of the bishopric of Münster, in Westphalia, Germany; made a duchy in 1826, but incorporated with Prussia—*i.e.* Prussian Hanover in 1866. It lies on both sides of the middle course of the Ems, and had an area of 847 sq. m. Its capital was Meppen.

Arendal, or Arndal, tn., Nedenäs co., Norway, on S. coast, 36 m. N.E. of Christiansand; timber and carrying trade. Pop. (1900) 4,370.

Arends, Leopold (1817-82), a Russian, resident in Berlin; devised a system of shorthand extensively used on the Continent. See his *Vollständige Leitfaden* (1860; latest ed. 1896); Kaselitz's *Kritische Würdigung der deutschen Kurzschriftsysteme* (2nd ed. 1890); Wendtland's *Leopold Arends* (1883).

Arenicola. See Lugworm.

Arenig Rocks, the lowest subdivision of the Lower Silurian formation, so called from the Arenig Mt. in N. Wales; often hundreds of feet thick, and consists mostly of black and gray shales and grits. Slates are quarried from this series in Wales. See Ramsay's *Geol. of N. Wales* (1866).

Arensky, Anton Stephanovitch (1861), Russian musical composer; born at Novgorod; professor at the Moscow Conservatoire (1883-95), and director of the imperial choir at St. Petersburg; author of two operas (*Un Songe sur le Volga* and *Nal et Damajanti*), symphonies, etc. His trio (Op. 32) and quintet (Op. 51) for pianoforte and strings are well known. In his *Attempts at some Forgotten Rhythms* (1894) he has revived some interesting ancient forms.

Areolar Tissue, a form of connective tissue.

Areometer. See Hydrometer.

Areopagus, 'Hill of Ares (Mars),' a hill in Athens, W. of the Acropolis; on its northern slope stood the temple of Ares. It gave its name to the council of the Areopagus, which met there. This council represents the 'council of elders' possessed by every Aryan nation. Until the establishment of the democracy, it constituted the government of Athens; but Solon's council of 400, and Clisthenes's of 500, took away some of its powers, which were finally abolished (460 B.C.) by Ephialtes and Pericles. Its composition in earlier days is unknown; after 600 it consisted of ex-archons.

Arequipa, tn., Peru, the second in the republic, stands in the former bed of a lake, watered by the Chile R. The town, which was founded by Francisco Pizarro in 1540, has suffered severely from earthquakes, as in 1868. Besides the cathedral, there are large churches, monasteries, and convents. Of the university only the faculty of law remains. Near the town are the springs of Tingo and Jesus, the latter impregnated with carbonic acid, and with a temperature of 87° F., and Yura (17 m.), with a temperature of above 90° F. Arequipa sends to Mollendo (107 m. by rail) sheep, alpaca and vicuna wool, borate of lime, ores, etc., for export. Alt. 7,850 ft. Pop. (1901) 35,000. Harvard College (U.S.A.) has opened here a branch astronomical observatory. See El Misti.

Ares, the Greek god of war, called Mars by the Romans, generally represented as the son of Zeus and Hera. Homer shows a distinct repugnance to him, and represents him in undignified positions: *e.g.* in the *Iliad*, Athene and Diomedes drive him from the field, and the Aloidæ hold him prisoner; in the *Odyssey*, his amour with Aphrodite involves him in ridicule. This aversion of the Greeks may be attributed partly to their deeply-rooted love of peace, and partly to the foreign origin of the god, whose worship apparently originated in Thrace. In Greece, Thebes appears to have been the oldest seat of his worship.

Aretæus (*c.* 100 A.D.), a Greek physician who is ranked next after Hippocrates as a diagnoser of diseases; born in Cappadocia; practised in Rome, and left two important medical works, written in elegant and concise Ionic Greek. See ed. by J. Wigan (1723), Adams (Gr. and Eng., 1856), Eng. trans. by T. F. Reynolds (1837), and Locher's *Aretæus aus Kappadokien* (Gr. and Ger., 1847).

Arethusa, one of the Nereids, and nymph of the famous fountain of the same name in the island of Ortygia, near Syracuse. See Alpheus.

Arethusa, a British second-class cruiser, launched in 1882. The name commemorates the capture of the French *Aréthuse*, (1759). An *Arethusa* took part in the capture of the *Pomone* and *Babet* (1794); the destruction of the *Félicité*, etc. (1794); the capture of St. Vincent (1796); of the *Gaité* (1797); of the *Pomona* (1806); of Curaçao (1807); the bombardment of Odessa (1854), and of Sebastopol (1854).

Aretino, Pietro (1492-1557), Italian poet and satirist; born at Arezzo, whence he was banished on account of his lampoon against indulgences; worked as a bookbinder at Perugia; visited Rome (1517), where he was favourably received by Pope Leo X., whose patronage, however, he lost by the publication of obscene sonnets as letterpress to drawings by Julio Romano. He then became a client of Giovanni de' Medici, and received favours from Francis I. of France and Charles V. of Germany. His later days were spent at Venice. Although his life was licentious and venal, and his writings impudent, Pietro enjoyed extraordinary popularity for the wit of his verses and plays. He wrote dialogues (*Ragionamenti*, 1535-8), five prose comedies (*Il Marescalco*, 1533; *La Cortigiana*, 1534; *L'Ipocrito*, 1542; *La Talanta*, 1542; and *Il Filosofo*, 1546), a tragedy (*Orazia*, 1546), letters (6 vols. 1538-57), and sonnets, the last of which have been translated into French under the title of *Académie des Dames*. See *Lives* by Sinigaglia (1882), Schultheiss (1890), and Bertani (1902).

Arezzo. (1.) Prov. (area, 1,273 sq. m.), Italy, forming S.E. division of Tuscany, stretching across main chains of Central Apennines. Cereals, wine, fodder crops, olives, mulberries, etc., are grown, and woollens, hats, and leather are the chief industries. Pop. (1900) 272,359. (2.) Anc. *Arretium*, cap. of above and episc. see, 55 m. by rail S.E. of Florence, stands on the side of a hill overlooking the valley of the Chiana. It was one of the twelve confederate cities of the ancient Etruscans, and possesses several very interesting buildings of the 13th to the 15th century, chief among them being the Gothic cathedral, begun in 1277, and containing monumental tombs of Pope Gregory X., who died here in 1276, and of Tarlati, the warlike bishop of Arezzo (died 1327). Arezzo is the birthplace of the poet Petrarch (1304), the satirical writer Pietro Aretino (1492), Vasari (1513), the painter Spinello Aretino (*c.* 1330), the musician Guido Aretino (*c.* 1000), and the botanist Cesalpino (1519). Silk, cloth, leather, pottery, etc., are manufactured. Pop. (1901) 44,027. The old Etruscan town was noted for its arms, its earthenware, and its bricks.

Argall, SIR SAMUEL (*c.* 1580-1626), an English adventurer who went to Virginia in 1609, abducted (1612) Pocahontas, the daughter of the Indian chief Powhatan, and thus secured the liberty of several English captives. In 1613 he destroyed the French settlements of Mount Desert, St. Croix, and Port Royal, in Nova Scotia. He was deputy governor of Virginia (1617-19), and died when returning from an expedition against Cadiz (1625-26).

Argand Burner, invented by Argand of Geneva about 1782. Used in oil lamps, the wick rises through a hollow ring, so as to admit air to both surfaces of the flame, with the effect of greatly increasing the light and heat. Gas burners are also made on this principle, the gas rising through a hollow ring perforated with small holes. By means of a chimney the flame is steadied, and a draught created.

Argan Tree (*Argania sideroxylon*), a hard and durable evergreen tree of Morocco, from the nuts of which is extracted an edible oil resembling that of olives.

Argao, tn., E. coast, Cebu, Philippine Is., 35 m. S.W. by S. of Cebu. Pop. (1898) 34,050.

Argaum, or ARGAON, tn. in Akola dist., Berar, India; contains 800 wells, hence its name 'city of wells.' The Nagpur army was defeated here by the British, under Wellesley, in 1803.

Argel, or ARGHEL (Syr.), a name given in Syria and the Levant to *Solenostemma argel* (nat. order Asclepiadaceæ), a plant whose leaves are used in Egypt for the adulteration of senna leaves, from which they are distinguishable by their leathery texture, downy surface, and the symmetry of their sides.

Argelander, FRIEDRICH WILHELM AUGUST (1799-1875), German astronomer, was born at Memel, and was the pupil and assistant of Bessel at Königsberg. From 1823 to 1827 he was director of the Abo Observatory, which was removed to Helsingfors about 1832. In 1837 he became professor of astronomy at Bonn, where he published a valuable celestial atlas, *Uranometria Nova*, in 1843. In continuation of Bessel's work, he determined the position of 22,000 stars, described in his *Astronomische Beobachtungen zu Bonn* (7 vols. 1846-75). Another important book was *Atlas d. nördlichen gestirnten Himmels* (1857-63; new ed. 1899).

Argensola, BARTOLOMÉ LEONARDO (1565-1631), Spanish poet and historian; born at Barbastro. With his elder brother, Lupercio, he was the leader of the so-called Aragonese school of Spanish literature. He succeeded Lupercio as annalist of Aragon, and also wrote a *Hist. of the Conquest of the Moluccas* (1609). Although a canon of Saragossa, he penned numerous songs, satires, and sonnets. The poetical works of the two brothers, who were styled 'the Horaces of Spain,' were published first in Saragossa in 1634. See Mir's *B. L. de Argensola* (1891).

Argensola, LUPERCIO LEONARDO (1563-1613), Spanish poet and historian, brother of the preceding. His genius and works, poetical and historical, were similar to those of his brother, and give him a high place in Spanish literature. He was secretary to the ex-Empress Maria of Austria at Madrid, chronicler of Aragon, and secretary of state to the viceroy of Naples. He wrote three dramas, *Isabela*, *Filis*, and *Alexandra*, the first two praised by the canon in *Don Quixote*; but he is best known for his lyric poems and sonnets. See De la Viñaza's ed. of his poems, entitled *Obras Sueltas* (1889).

Argenson, D', name of a distinguished French family of Touraine, of whom the most famous are: (**1.**) MARC RENÉ DE VOYER (1652-1721), chief of police in Paris (1697-1718), president of the council of finance (1718-20) in the time of Robert Law, with whom he secretly co-operated, but in favour of whom he was dismissed in 1720. (**2.**) RENÉ LOUIS VOYER, MARQUIS (1694-1757), son of Marc René, foreign secretary (1744-7); author of *Considérations sur le Gouvernement de la France* (1764), and useful *Mémoires* (9 vols., ed. Rathery, 1860-8). (**3.**) MARC PIERRE DE VOYER, COUNT (1696-1764), brother of René Louis; minister of war (1742-57). He laboured for the reorganization of the army, and founded (1751) the military school. The friend of Diderot, who dedicated the *Encyclopédie* to him, and of Voltaire, he incurred the enmity of Madame Pompadour, and was exiled, but returned to Paris at her death. (**4.**) MARC RENÉ DE VOYER (1771-1842), a wealthy aristocrat who in the revolution was Lafayette's aide-de-camp for a time.

Argent, in heraldry, is the metal silver, sometimes represented by white.

Argenta, tn. in Emilia, Italy, between Ravenna and Ferrara. Pop. incl. commune (1901) 20,474.

Argentan, tn., dep. Orne, France, 27 m. by rail N. of Alençon; has manufactures of lace (*point d'Argentan*), linen, and gloves; contains an old castle (15th century). The historian Mézeray (1610) was born near here. Pop. (1901) 6,291.

Argentario, or ARGENTARO, MONTE, mt., Italy, prov. Grosseto, in the Tuscan Apennines; alt. 2,050 ft. It forms a peninsula, connected with the mainland by two strips of land of recent formation, situated 37 m. N.W. of Civita Vecchia. At the foot of the mountain are two little harbours, Porto Ercole and Porto San Stefano.

Argentera, PUNTA DELL', the highest summit (10,794 ft.) of the Maritime Alps, S.W. of Cuneo, in Piedmont. It was first ascended in 1879 by Mr. Coolidge.

Argenteuil, dist. tn. in dep. of Seine-et-Oise, France, on r. bk. of Seine. Market gardening; also quarries, watchmaking, and wine industries. Pop. (1901) 17,375.

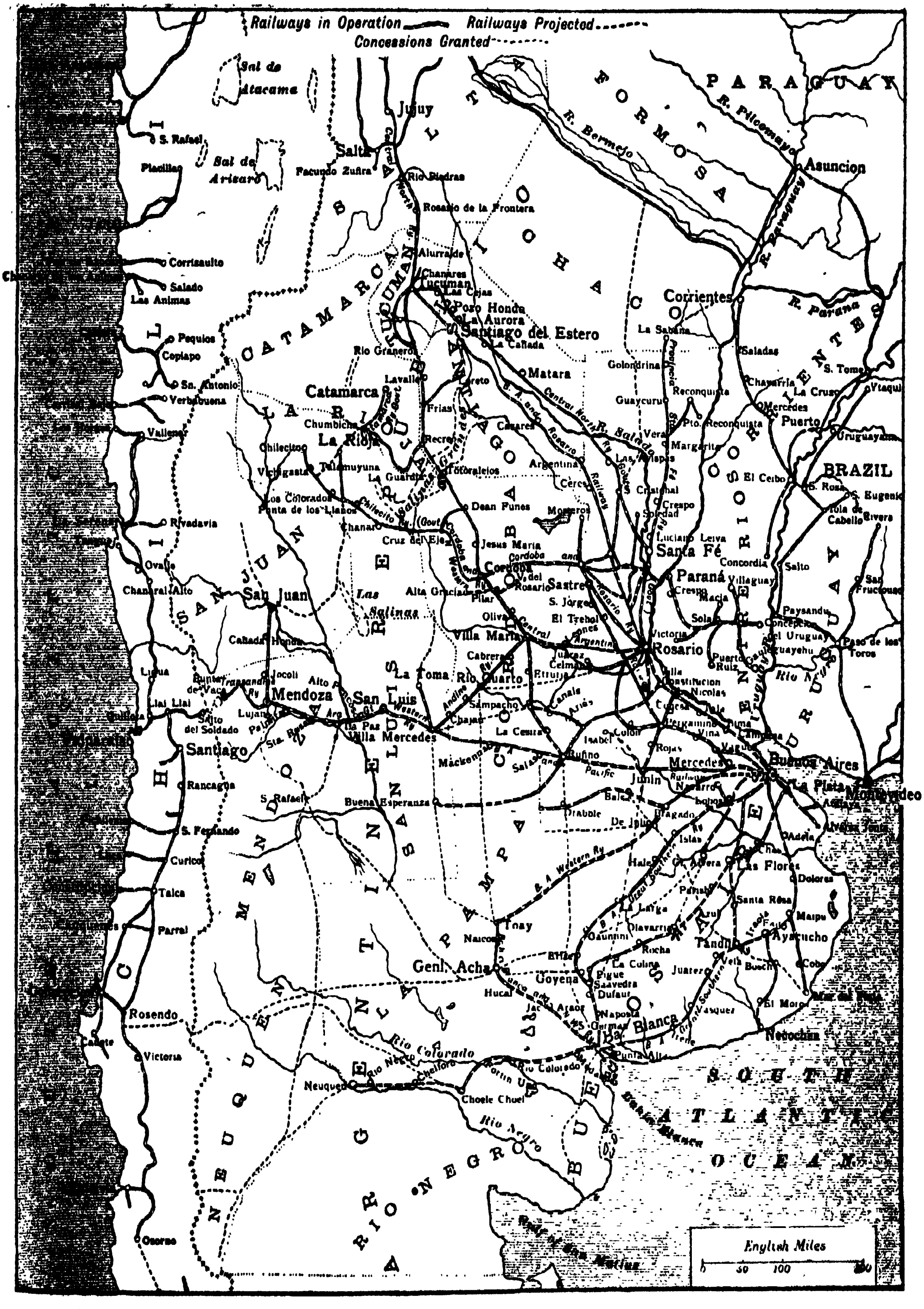
Argentière, COL D', an easy Alpine pass (6,545 ft.) leading from Barcelonnette, in the French valley of the Ubaye (an affluent of the Durance), to the Italian valley of the Stura, and so to Cuneo. Napoleon made a carriage road across it, but the pass was known to the Romans (remains found), though it only came into prominence when crossed by Francis I. of France and his army in 1515. Some have supposed that it was Hannibal's pass, but this was probably the Mont Genèvre.

Argentine, a city of Wyandotte co., Kansas, U.S.A., situated on Kansas R., 3 m. from Kansas city. Has smelting and refining works for gold, silver, copper, etc., grain elevators, and railway repairing works. Pop. (1900) 5,878.

Argentine Republic extends for a distance of 2,300 m. from the frontier of Bolivia, on the N., to Staten I., Tierra del Fuego, in the S. In the N. the Puna de Atacama was divided with Bolivia in 1899 so that the larger and more valuable E. portion fell to the Argentine Republic. South of 41° S. lat., the dispute as to the boundary with Chile was submitted to King Edward VII. of England as arbitrator, and in 1902 he determined that the frontier should coincide for the most part with the watershed (this does not coincide with the main chain of the Cordillera).

The N. part of the republic slopes very gradually from the coast N.W. to the Bolivian basin, where the watershed between the affluents of the Paraguay R. and the headwaters of the Madeira lies only 800 or 900 ft. above sea-level. At a very recent geological period this

ARGENTINE RAILWAYS.



Mileage of Principal Railway Companies in Argentina.

Buenos Ayres Great Southern, 2,976; Buenos Ayres and Rosario (including Central Argentine), 2,309; Buenos Ayres and Pacific, 791; Buenos Ayres Western, 700; Buenos Ayres and Valparaiso Transandine, 80; Cordoba Central, 772; Cordoba and North-Western, 95; Cordoba and Rosario, 180; East Argentine, 99; Entre Rios, 471; Argentine Great Western, 390; Argentine North-Eastern, 411; Bahia Blanca and North-Western, 239; Province of Santa Fe, 650. Government lines: Andine, 170; North Argentine, 280; Central Northern, 500. (Total mileage (1905), 11,000.)

country was the basin of a vast sea covering about 600,000 sq. m. On the S. it seems to have been bounded by the Archæan and Palæozoic sierras of Tandil, Ventana, etc., stretching across the province of Buenos Ayres from Cape Corrientes. On the W. the Sierra de Cordoba rose as islands above the sea, and the Salina Grande was a fjord opening into it. Into this great basin the rivers carried their silt. The S. extremity of the republic, Patagonia, is a plateau of Tertiary sandstone, interrupted here and there by old eruptive rocks and Archæan schists, which slopes up W. to the watershed, where Cretaceous rocks are exposed. It is intersected by deep depressions, many of them drained by the existing rivers flowing to the Atlantic. Late eruptive rocks occur over a large area on the plateaus, and the greater part of their surface is covered with loose glacial gravel. Along the watershed, a succession of elevations 6,000 to 7,000 ft. high, lies a series of lakes, some of which now drain to the Pacific, but occasionally, when the water is high, send part of their overflow to the Atlantic. The land has risen even within historic times, and the lakes, to a great extent excavated by glacial action, are drying up.

From the great lake Nahuel-huapi (41° S. lat.) to 34° S. lat. the Andes consist of a single chain. Farther N. a succession of sierras lies to the E. of the main chain, the chief being the Uspallata, Huerta, and Famatina, and the prolongation of the Cordillera Real of Bolivia, with summits rising to 19,000 ft. Near the S. extremity of this region are found the loftiest peaks of the main Cordillera—*e.g.* Aconcagua (in which the American continent culminates at a height of 23,082 ft.), the extinct volcano Tupungato, and Maipu.

The largest hydrographic basin is that of the Parana and its tributaries. Many rivers lose themselves in the swamps and sands of the pampas. Of the rivers of Patagonia, the Negro is the most important for navigation.

Several lakes are scattered over the country, such as the Ibera lagoon in Corrientes, and the shallow Mar Chiquita in the province of Cordoba, which has no outlet. The Salina Grande is an immense salt-pan, about 300 m. long, with an average breadth of 25 m. The finest lakes are those in the W. of Patagonia—the beautiful Nahuel-huapi (2,100 ft. above sea-level, and 200 sq. m. in area), the Buenos Ayres (75 m. long and 558 ft. above the sea), and others.

The mean temperature in the central part of the republic is not much higher than that of S. Europe, and the extremes are not excessive. The mean temperature at Buenos Ayres (63° F.) is nearly the same as at Cadiz. In the N. and midland provinces it is higher—*e.g.* 71° at Corrientes, and 67° at Tucuman. Mendoza, near the Andes, at an elevation of 2,500 ft., has a mean temperature of only 61°. At Rawson, on the Chubut, the mean temperature is 56°, and in S. Patagonia the climate is cold. The rainfall—34 in. at Buenos Ayres and 46 in. at Rosario—diminishes towards the Andes, being only 13 in. at Rioja and 3 in. at San Juan. The prevailing wind is the S.E. The *pampero*, from the S.W., is cold and invigorating, the N. wind relaxing and unhealthy.

A large part of the lands of the republic (about 45 per cent.) is classed as waste. West of Cordoba, and also in Patagonia, the rainfall is often too small to produce much vegetation. Irrigation, however, will in time convert a considerable proportion of these lands into fertile fields. The chief industry was originally stock-raising on the grassy plains between the Parana and Cordoba (*pampas*). The number of sheep has considerably increased of late years, especially on the N. plains of Tierra del Fuego and in Santa Cruz.

The country is well suited for agriculture, but there is always considerable risk from drought. Wheat, maize, and linseed are grown, especially in Buenos Ayres and Santa Fé, as well as at the Welsh colonies on the Chubut. Wine comes principally from the W. provinces, Mendoza, San Juan, and La Rioja. Tucuman produces the most sugar, and Corrientes ranks first as a tobacco district. Lucerne (*alfalfa*) is one of the great crops, and is grown in almost all the provinces.

Minerals, including gold, silver, copper, lead, antimony, and petroleum, are widely distributed in the W. provinces. La Rioja, Catamarca, and Salta are especially rich in copper. Good coal is found at San Rafael in Mendoza, and superior lignite in Tierra del Fuego. The mining industry is at present little developed. Railways, with an aggregate length (1901) of 10,400 m., radiate from Buenos Ayres N., N.W., S.W., and W. to Mendoza, whence a line is continued over the Andean pass of Uspallata to Valparaiso.

The most extensive forests are situated in Misiones, El Chaco, and Formosa. Misiones yields a quantity of valuable fibres, and the *yerba-maté*, or Paraguay tea, as well as excellent timber for building and cabinet work and dyewoods. The export of *Quebracho colorado*, a hard-wood used in Europe for tanning, is rapidly increasing. Along the foot of the Andes the woods consist chiefly of Winter's bark, *Fitzroya patagonica*, and *Libocedrus*.

The fauna is rapidly vanishing. The puma and jaguar are still found in the less-populated districts of the Chaco and Patagonia. The viscacha is becoming scarce; and armadillos, esteemed a delicate dish, are killed in large numbers. The huemul (*Cervus chilensis*), the guanaco, and the rhea, or American ostrich, roam over the Patagonian plateaus. The peccary and anta, a species of tapir, are confined to the N. The Patagonian hare, weighing 25 lbs., and a weasel with a pouch for its young, are peculiar. Birds are more numerous than mammals. They include the condor of the Andes and other birds of prey, humming-birds, game-birds, and a large variety of water-fowl.

This country was a dependency of the Spanish crown from 1535 until the declaration of independence in 1816. The government is a federal republic, with Buenos Ayres as its capital. The federal assembly is composed of two chambers—a Senate of 30 members, and a House of Representatives (86) elected by the city of Buenos Ayres and the 14 provinces (Buenos Ayres, Entre Rios, Corrientes, Santa Fé, Cordoba, San Luis, Santiago del Estero, Tucuman, Mendoza, San Juan, La Rioja, Catamarca, Salta, and Jujuy), each of which manages its own internal affairs. A president and vice-president are elected for a term of six years. The sparsely-inhabited parts of the country are divided into 10 *gubernaciones* or territories—Formosa, El Chaco, Misiones, Los Andes, and Pampa, N. of the Colorado; Neuquen, Rio Negro, Chubut, Santa Cruz, and Tierra del Fuego, to the S.—which are administered by governors appointed every three years by the executive, with the approval of the Senate. Roman Catholicism is the state religion, and the hierarchy of the church consists of the archbishop of Buenos Ayres and the bishops of Cordoba, Mendoza, Parana, Cuyo (residing at San Juan), and Salta. Other sects can freely exercise their religion. An admirable system of free and compulsory education has been introduced, but at present a large proportion of the people is illiterate. There are universities at Buenos Ayres, Cordoba, La Plata, Santa Fé, and Parana.

The estimated population in 1902 was 5,022,249, giving an average of 4·4 to the sq. m. Argentines—*i.e.* persons born in the country, of whatever nationality their parents may be—constitute fully three-fifths of the whole population. The majority of these are of Spanish extraction. The remaining two-fifths are made up of immigrants, Italians accounting for about 500,000. The principal Indian races are the Guaranis, in the E.; the Calchaquis and Quichuas, in the N. and centre; and the Araucanians and Patagonians, in the S. In El Chaco live the Tobas, Guaycurus, and Chiriguanos, the last of whom have attained to a remarkable degree of civilization. In Patagonia the natives are rapidly dying out. The Tehualches, in the extreme south, trade with Europeans, and to them are probably akin the Ouas of Tierra del Fuego. The Yaghans of Beagle Channel are an undersized race of low intelligence.

In 1903 the declared value of imports was £26,241,000, and of exports £44,197,000. The chief exports are hides, wool, meat, and other animal products, wheat, maize, and linseed. In 1902, 150,091 tons of frozen beef and mutton were exported; that sent to the United Kingdom was valued at 2¾ million pounds. Great Britain supplies 30 to 36 per cent. of the imports, and receives 19 per cent. of the exports. Area, 1,135,840 sq. m.

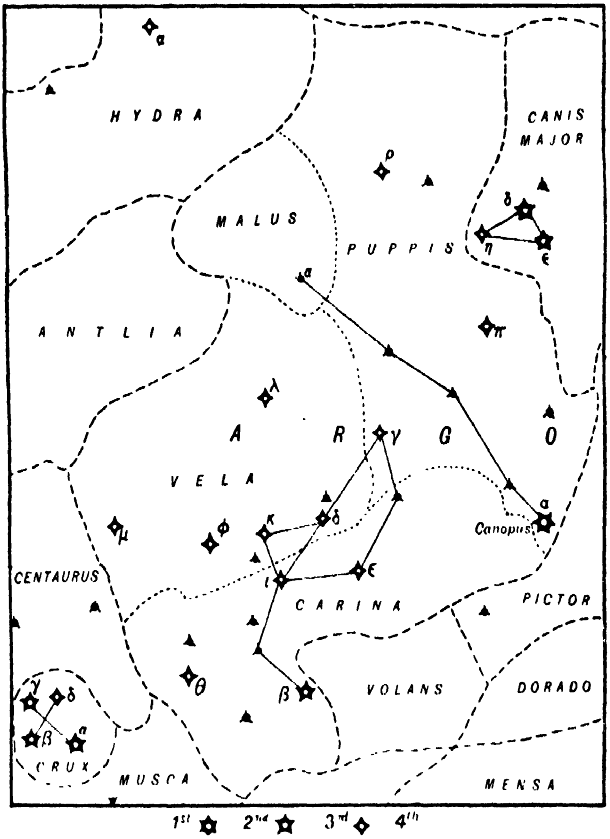
The railway development of Argentina has been remarkable, and its mileage (11,000 m. in 1905) exceeds that of all other American countries south of the United States. (See *Map, page 347.*) From a point 14,933 ft. above sea-level in the Andes to Chilecito station on the Northern Railway, the longest aerial line (87 m. of rope) in the world is under construction.

See Turner's *Argentina and the Argentines* (1892); Child's *The Spanish American Republics* (1891); W. O. Campbell's *Through Patagonia* (1901); H. H. Pritchard's *Through the Heart of Patagonia* (1902); Mulhall's *Handbook of the River Plate Republics* (6th ed. 1893); J. Grant and Son's *Directory and Argentine Commercial Guide* (1901).

Argile Plastique (Fr. 'plastic clay'), a series of beds of clay found in the Tertiary basin of Paris, used for the manufacture of pottery, and belonging to the Lower Eocene. They correspond to the Woolwich and Reading beds of the London basin.

Argillaceous Rocks, sedimentary aqueous rocks in which clay is the chief ingredient. See SHALE, SLATE, MARL, CLAY, PIPECLAY, and FULLER'S EARTH.

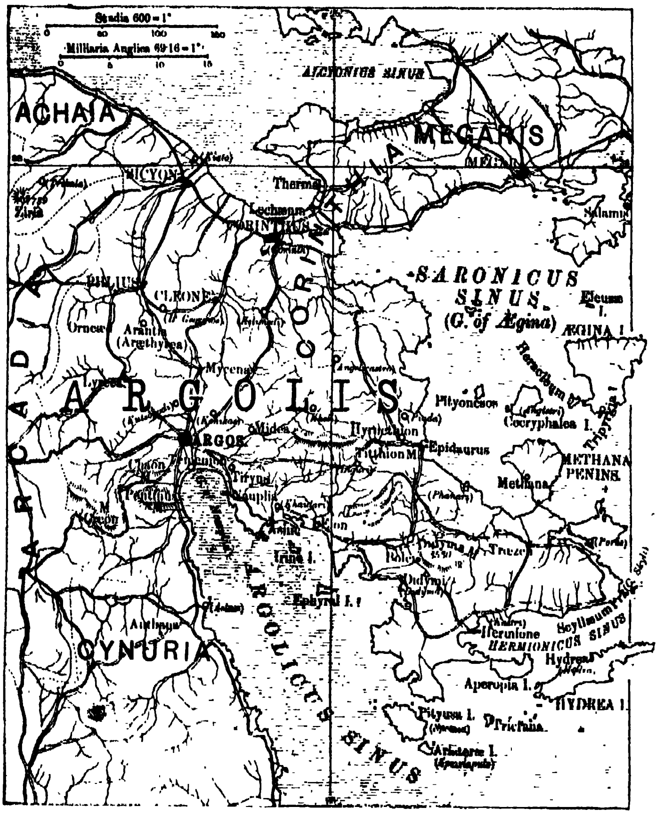
Argo, the largest of Ptolemy's fifteen southern constellations, lies east of Canis Major and Columba. The Greeks and Romans saw in it the ship of Jason; the Hindus venerated it as a solar, the Egyptians as a lunar, bark—the last-named people holding, further, that by means of it Isis and Osiris had surveyed the Deluge; and in Europe it still figured as the ark in the 17th century. The unwieldy size of the asterism led to so much confusion in the nomenclature of its component stars that Sir John Herschel recommended its partition into Carina, 'the keel;' Puppis, 'the poop;' Vela, 'the sails;' and Malus, 'the mast;' and the arrangement has become prevalent, save that, for Malus, Lacaille's Pyxis, 'the compass,' is sometimes substituted. One of the structures forming the great 'Keyhole' nebula (N.G.C. 3372), so called from the shape of one of its characteristic dark openings, seems, from a comparison of Sir John Herschel's drawing with Sir David Gill's photograph, to have lost, since 1837, nearly all its light. Close to the 'Keyhole,' the extraordinary variable η Carinæ outshone Canopus in 1843, then rapidly declined, and is now stationary at 7·5 magnitude. It shows the spectrum of coupled dark and bright rays belonging to most temporary stars. A still finer spectral display is made by the brilliant Wolf-Rayet star, γ Velorum, some of the constituent lines in which have been identified through Professor Pickering's discovery of a second hydrogen series, represented by absorption in spectrographs of ζ Puppis. The brief blaze of Nova Carinæ in April 1895 would probably have escaped detection but for Mrs. Fleming's examination of the Arequipa negatives. The lustrous section of the Milky Way in Argo is emblazoned with several fine clusters, notably Messier 46, which includes the annular nebula N.G.C. 2438, and Messier 93, described by Smyth as 'of a starfish shape.' Both are situated in Puppis.



The Constellation Argo, as now divided.

Argol (*crude tartar*), a hard crystalline deposit in the vats in which wine is fermented, and in bottles of wine, where it is termed 'crust,' is an impure bitartrate of potash, or 'cream of tartar.' The salt is present in grape juice, but being insoluble in alcohol is precipitated as fermentation proceeds. Tartaric acid, cream of tartar, Rochelle salts, and tartar emetic are prepared from the substance.

Argon (Gr. 'inactive'), A. 39·9, a gas existing in the atmosphere in the proportion of about ·8 per cent., the presence of which was first suspected by Cavendish in 1785, but attracted no further notice till 1894, when Lord Rayleigh and Sir William Ramsay announced its discovery, calling it argon on account of its chemical inactivity. Lord Rayleigh found that nitrogen obtained from the air always gives a higher density than nitrogen prepared from chemical compounds, and Ramsay suggested that this was due to the presence in atmospheric nitrogen of a heavier gas. By passing atmospheric nitrogen through heated tubes which contained metallic magnesium, the nitrogen was fixed, and a residual gas was obtained; the same gas was afterwards obtained by other methods. Argon is nearly one and a half times heavier than air; it cannot be made to combine with any other element; it is more soluble in water than nitrogen or oxygen; it liquefies at −186° c., and solidifies at −190° c.; and is best recognized by the characteristic lines in the spectrum. See Ramsay's *Gases of the Atmosphere* (2nd ed. 1902), and *Position of Argon and Helium among the Elements* (1896).



Argos or Argolis.

Argonaut, or Paper Sailor, a name given to cuttles belonging to the genus Argonauta. One species, *A. argo*, lives in the Mediterranean, and is often called the paper nautilus. Its peculiarity is the presence—in the female only—of a thin translucent shell, used as a shelter for the eggs, and embraced by two of the arms.

Argonautæ, or Argonauts, sailors of the *Argo*, who voyaged to *Æa* (afterwards called Colchis) to win the golden fleece. According to the legend, Pelias was king of Iolcos in Thessaly, having ousted his half-brother Æson; and to rid himself of Æson's son Jason he persuaded him to fetch the golden fleece, which hung on an oak tree in the grove of Ares in Colchis, guarded day and night by a dragon. Jason agreed to go, and obtained Argus to build the ship *Argo*, sometimes represented as the first ship to venture on the deep. It had fifty oars, and its crew contained all the famous heroes of the day, particularly Jason himself, Castor and Pollux, Zetes and Calais (sons of Boreas), Orpheus, Hercules, Tydeus, Theseus, and Nestor. According to Herodotus, Jason made a preliminary voyage round the Peloponnesus, and was driven ashore in Libya. The final start was from Aphetæ, in Thessaly. On the way they landed at Lemnos, at Cyzicus in Mysia (where Hercules was left behind to seek for Hylas), and in the country of the Bebryces, whose king was defeated by Pollux in a boxing match; they sailed through the Symplegades—rocks which dashed together—but escaped with slight injury to the ship's stern, and ever afterwards the rocks stood fast. When they arrived at the mouth of the river Phasis in Colchis, the king, Æetes, promised to give up the fleece if Jason could harness to a plough two fire-breathing oxen, sow the field thus ploughed with dragon's teeth which should yield a crop of armed men, and slay the men. But Medea, his daughter, who loved Jason, assisted him by magic to perform the task; and Jason, after securing the fleece, sailed away by night, accompanied by Medea and her young brother Absyrtus. Æetes pursued them, but Medea killed her brother and scattered his limbs, so that Æetes was delayed while collecting them for burial. These adventures took place in the Black Sea. We next find the wanderers at the mouth of the Eridanus (Po): it was evidently supposed that the Adriatic could be reached from the Black Sea by a passage north of Greece. After a storm the vessel spoke, declaring that the Argonauts must visit Circe in Ausonia, in order to obtain purification for the murder of Absyrtus. Thence they sailed southward, passing the Sirens while Orpheus sang to drown their enticing chants. Then they passed between Scylla and Charybdis (Straits of Messina) to the land of the Phæacians (Corcyra). Thence, after visiting Crete and Ægina, they returned to Iolcos. For the later story, see Jason, Medea, and Pelias. *Cf.* Pindar's longest ode, the 4th Pythian; Euripides's *Medea;* and Apollonius Rhodius's *Argonautica.* See also Kingsley's *Heroes* (1856).

Argos, Argolis, Argia, or Argolice, dist. and tn. of anc. Greece, lying around the Argolic Gulf, bounded w. by the Arcadian Mts., s. by Laconia, and e. by the territories of Trœzen and Epidaurus. In early days it became the predominant state in the Peloponnesus, but early in the 6th century b.c. Sparta reduced it to a secondary place. The state, however, retained its independence until the Roman conquest (146 b.c.). The town Argos, with its citadel Larissa, lies on a plain w. of the Inachus R., 7 m. n.w. of Nauplia, and was noted for the worship of Hera (Juno), whose temple, the Heræum, lay between it and Mycenæ. Its pop. (1896) was 9,980. Argolis, with Corinth, now forms one of the sixteen nomarchies of modern Greece (area, 1,442 sq. m.; pop. (1896) 157,578).

Argostoli, seapt. on gulf of same name, cap. of Cephalonia, in the Ionian Is., Greece; seat of a Greek bishop; chief port in the Ionian Is., and affording good anchorage; exports currants and wine. Pop. (1896) 9,241.

Argot. See SLANG.

Arguelles, AUGUSTIN (1778-1844), Spanish statesman and orator. He assisted in producing the liberal constitution of 1812; was imprisoned (1814-20) on the restoration of Ferdinand VII.; and was in exile (1823-32). Afterwards he became a leader of the Moderates, and guardian (1841) to Queen Isabella. See *Life* by San Miguel (1851).

Argument, a reason offered for or against a proposition, opinion, etc.; a debate or disputation. Certain types of argument have received special names—*e.g.* (1) the *argumentum a fortiori*, an argument from the truth of a more general or difficult proposition to the truth of a related proposition of less generality or difficulty; (2) the *argumentum ad hominem*, an argument applied to the particular man one is addressing, based on his principles or conduct, his prepossessions or prejudices; (3) the *argumentum ad rem*, an argument drawn from the nature of the subject-matter; (4) the *argumentum ad populum*, an argument based on prevailing opinions or sentiments; (5) the *argumentum ad verecundiam*, an appeal to an opponent's unwillingness to contradict the opinions of eminent authority; (6) the *argumentum e consensu gentium*, an argument from the general acceptance of a proposition to its truth; and (7) Addison's *argumentum baculinum*, 'which is very well expressed in our English words *club law*. When they were not able to confute their antagonist, they knocked him down' (*Spectator*, No. 239).

Argun, riv., Siberia, joins the Shilka to form the Amur; rises in the Great Kinghan Mts., flows N., and drains the E. of Transbaikalia, passing through Nerchinsk, and forming the frontier between Siberia and China. Length, 440 m.

Argus, son of Arestor. As he had a hundred eyes, only two of which were closed at one time, Juno set him to watch Io, whom Jupiter had changed into a heifer; but Mercury, who was sent to carry her off, managed to surprise and kill Argus, whereupon Juno transferred his eyes to the tail of a peacock, her favourite bird.

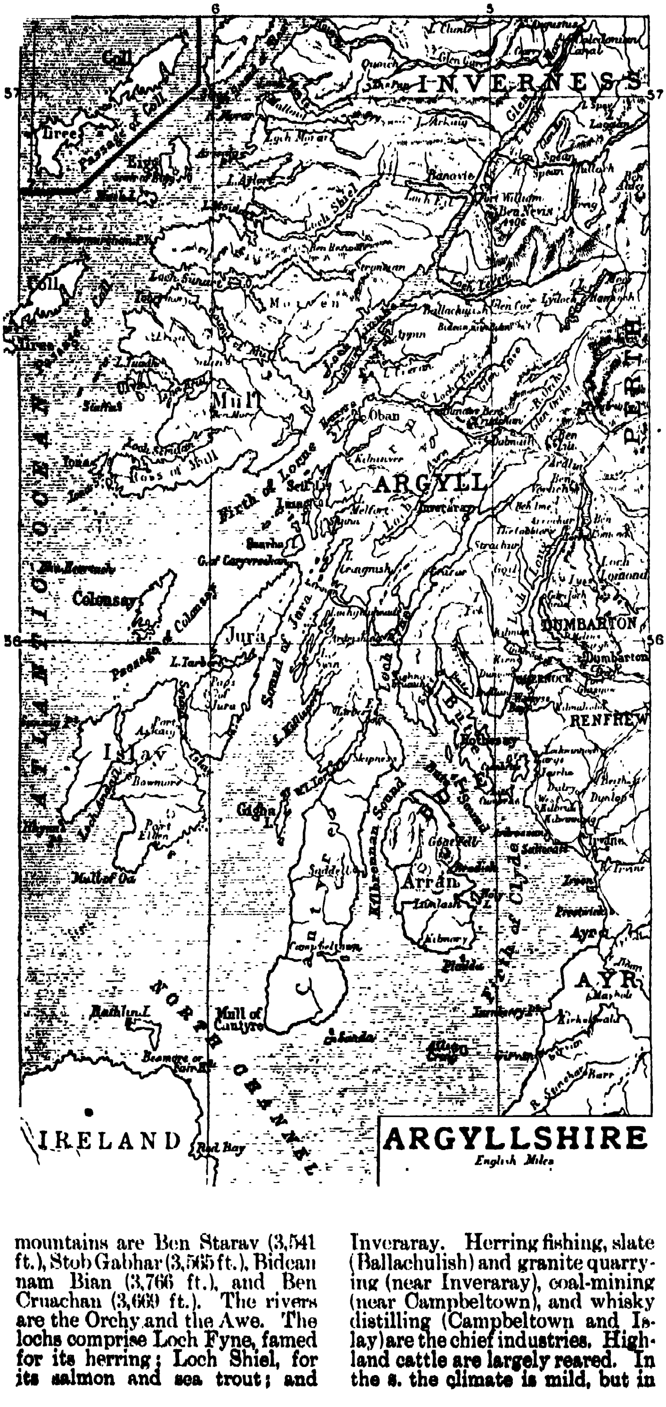
Argus Pheasant (*Phasianus argus*), a native of the Indo-Malay region, so called because certain of the wing and tail feathers in the male bear a series of ocellated spots, these feathers being much elongated. See Darwin's *Descent of Man*.

Argyll. The first earl of this title, Lord Colin Campbell (d. 1493), was descended from an Anglo-Norman family. He obtained the estates of Lorne by marriage; and the family influence was further increased by Archibald, second earl, who shared with the Earl of Huntly the lordship of the Isles, and was killed at Flodden; by Colin, third earl (d. 1530); and by Archibald, fourth earl (d. 1558). Archibald, fifth earl (1530-73), headed the Lords of the Congregation in their successful efforts to thwart the policy of the queen regent; was involved in the murder of Darnley; and intrigued to deliver Mary from prison. Under the regency of Morton he was, however, made lord chancellor. His half-brother Colin, sixth earl (d. 1584), headed the conspiracy in 1578 against the regent Morton; was one of the jury by whom Morton was condemned in 1581; and was implicated in the Raid of Ruthven (1582) and in the plot to release James (1583). Archibald, seventh earl (?1576-1638), shares with Huntly the discredit of almost extirpating the Macgregors in 1608. To escape his creditors he had to leave the country. Before leaving England he had ceded his estates to his son Archibald (1598-1661), afterwards eighth earl, who was created marquis in 1641. This earl, depicted in Scott's *Legend of Montrose*, supported the Covenanters; and although, in 1641, he was created marquis, he nevertheless bore arms against Charles I., and in 1644 was defeated by Montrose. He took up the cause of Charles II. against Cromwell in 1651; but at the restoration he was called to account by Charles II. for submission to Cromwell's usurpation, and was executed at the Cross of Edinburgh in 1661. The fate of his son Archibald, ninth earl (d. 1685), was equally tragic. His support of the Highland rising in favour of Charles II. in 1654 led to his condemnation; but he was released in 1663, and restored to his estates and titles as earl. He suppressed the risings of the Covenanters in 1665 and following years, though always advising gentler measures; and for resisting the Test Act of 1681 he was found guilty of treason. Escaping from prison, he went over to Holland, whence in 1685 he returned to Scotland, and associated himself with the Monmouth rebellion, when he was taken prisoner and beheaded at Edinburgh. The restoration by William of Orange of Archibald, tenth earl and afterwards duke (d. 1703), to his estates, was one of the causes of the rising in the Highlands under Dundee in 1689. Argyll shares with Dalrymple the responsibility for the massacre of Glencoe. He was created duke in 1701. His eldest son, John, second duke (1678-1743), was created a peer of England for his services in supporting the Union, and served under Marlborough. He took a leading part in promoting the accession of George I.; was appointed commander-in-chief in Scotland, and led the Royalist troops against the Jacobites at Sheriffmuir. In 1718 he was created Duke of Greenwich. He figures in *The Heart of Midlothian*. He was succeeded by his brother Archibald, third duke (1682-1761), who became keeper of the Great Seal and main counsellor of the government in its dealings with Scotland. It was on his advice that the Highland regiments were enrolled. Both John, fourth duke (1693-1770), and John, fifth duke (1723-1806), won some renown as generals. George Douglas, eighth duke (1823-1900), second son of the seventh duke, was a distinguished orator and politician, and an able writer on ecclesiastical matters, on geology, and on economics. From 1853 he was a member of most Liberal governments, successively Lord Privy Seal, Postmaster-general, and Secretary of State for India: but in 1881 he resigned office on the question of the Irish Land Bill. Among his principal works are *The Reign of Law* (1866; 19th ed. 1890); *Primeval Man* (1869); *The Unity of Nature* (1884; 2nd ed. 1888); *Poems* (1894); and *The Philosophy of Belief* (1894). His eldest son, John Douglas Sutherland, ninth duke (b. 1845), married, in 1871, Princess Louise, daughter of Queen Victoria. From 1878-83 he was governor-general of Canada. He is the author of *Canadian Pictures* (1884); *Imperial Federation* (1885); *Life of Lord Palmerston* (1892); and a popular *Life of Queen Victoria* (1901).

George Douglas, eighth Duke of Argyll (1823-1900).

(*Photo by Elliot and Fry.*)

Argyllshire, a maritime co. in the W. of Scotland, with an extreme length from N. to S. of 115 m., and a coast-line, owing to its numerous sea lochs, of 2,290 m. It has an area of 3,165 sq. m., and is very mountainous. The chief mountains are Ben Starav (3,541 ft.), Stob Gabhar (3,565 ft.), Bidean nam Bian (3,766 ft.), and Ben Cruachan (3,669 ft.). The rivers are the Orchy and the Awe. The lochs comprise Loch Fyne, famed for its herring; Loch Shiel, for its salmon and sea trout; and Loch Awe (fresh water), for its salmon, trout, and eels. Glencroe and Glencoe are the most picturesque glens. The principal islands are Coll, Mull, Staffa, Iona, Islay, Jura, Lismore, Tyree, and Colonsay. The chief town is Inveraray. Herring fishing, slate (Ballachulish) and granite quarrying (near Inveraray), coal-mining (near Campbeltown), and whisky distilling (Campbeltown and Islay) are the chief industries. Highland cattle are largely reared. In the S. the climate is mild, but in the N. it is severe, the snow lying on the hills for months. Argyllshire returns one member to Parliament, and Argyll and the Islands forms one of the seven bishoprics of the Scottish Episcopal Church. Pop. (1901) 73,642. See Lord A. Campbell's *Records of Argyll* (1885).



Argyria, a dark gray permanent pigmentation of the skin, caused by the internal use of compounds of silver, and most pronounced in those parts exposed to the light.

Argyrokastron. See ERGERI.

Argyropulos, JOANNES (1416-1486?), humanist, was born in Constantinople, but on the fall of that city he went to Rome (1453), where he soon became a renowned Greek teacher, passing from Rome to Padua, and from Padua (on the invitation of Cosimo de' Medici) to Florence (1456), where among his pupils were Piero and Lorenzo de' Medici. In 1471 he moved to Rome, where he died. Among his pupils were Poliziano and Reuchlin. His principal works were translations of Aristotle's treatises, with commentaries.

A.R.H.A., abbreviation for Associate of the Royal Hibernian Academy.

Ari Thorgilsson (1067-1148), surnamed 'the Learned,' or 'the Wise,' Icelandic historian and genealogist, one of the first to reduce to writing, in Roman characters, the traditional tales of the Norsemen. He also wrote or compiled the *Landnamabok*, the 'Domesday Book' of Iceland; the *Konungabok*, a history of Norway; *Islendingabok*, an account of the old Icelandic constitution; and *Kristni Saga*, the story of the Christianizing of Iceland.

Aria (It.), a rhythmical air, song, or tune. The term is commonly applied to a song for a single voice with instrumental or vocal accompaniment, and introduced into such works as oratorios, operas, and cantatas. Beethoven's *Ah, Perfido* and Mendelssohn's *Infelice* are model specimens.

Ariadne, daughter of Minos, king of Crete, the lover and helper of Theseus, to whom she gave the clue of thread whereby he extricated himself from the labyrinth after slaying the Minotaur. She left Crete as Theseus's promised wife, but, according to Homer, was killed by Artemis in Naxos. Another legend relates her desertion by Theseus and her succour by Dionysus, who married her, and placed her among the stars. Her name is attached to the 43rd asteroid.

Ariana, a prov. of ancient Persia, coinciding roughly with the modern Khorassan; in a wider sense it embraced the E. half of the Persian empire, and extended E. to the Indus and N. to the Oxus and Jaxartes.

Arian Controversy. See Arius.

Ariano di Puglia, tn. and episc. see, prov. Avellino, Italy, stands on the Apennines, 2,505 ft. above sea-level, 24 m. by rail E. by N. of Benevento. Sulphur is mined and marble quarried; the liqueur *rosoglio* is also made. Pop. incl. comm. (1901) 17,653.

Arias Montanus, Benedictus (1527-98), Spanish theologian and Orientalist, member of the Council of Trent. He edited the Antwerp Polyglot Bible (1568-72); wrote *Jewish Antiquities* (1593). See *Life* by Louinyer (1842), and Antonio's *Bibliotheca Hispana Nova.*

Aribert, or Heribert (d. 1045), was of a noble Lombard family, and became archbishop of Milan in 1018. He was a partisan of the Ghibelline (Imperial) party, and invited to Italy the Emperor Conrad II., whom he crowned as king of Milan in 1026.

Arica, a roadstead on the coast of S. America, N. of Chile, connected by a railway (39 m. long) with Tacna. Goods are landed here for Bolivia. Forty per cent. of the customs is paid to Bolivia. Some guano, salt, copper, and sulphur are exported. It had formerly 30,000 inhabitants, but has suffered repeatedly from earthquakes, and was bombarded by the Chileans in 1880. Pop. (1895) 2,853.

Arichat, fishing tn. on S. side of Madame I., Nova Scotia, Canada; chief town of Richmond co.; has a fine harbour, and is the seat of a Roman Catholic bishop.

Ariège, dep., S. France, on frontier of Spain and Andorra, with the main ridge of the Pyrenees running W.N.W. (highest point in the department, Pic d'Estats, 10,300 ft.) as the S. limit. It lies mainly in the valley of the Ariège and its tributaries, the W. part of the department draining to the Garonne. In spite of its general altitude the climate is not cold, and there are some delightful summer resorts. The lower plains are fertile—cereals, vegetables, fruits, and vines being grown—and the pasturage of the highlands supports great flocks of sheep. Reforestation has begun. The industries are wool-working and iron-mining. Lead, copper, zinc, and manganese occur. Area, 1,893 sq. m. Cap. Foix. Pop. (1901) 210,527.

Ariel, the name of two individuals in the Old Testament (Ezra 8:16; 1 Chron. 11:22). In Isa. 29:1, 2, 7, Ariel is used of Jerusalem. It may mean 'lion of God,' or 'hearth of God;' but Isaiah probably intends by paronomasia to predict that Uriel (*i.e.* Urusalem or Jerusalem), 'God's enclosure,' was to become Arial, a sacrificial hearth—*i.e.* a place of slaughter. See Cheyne's *Isaiah.* For Shakespeare's Ariel, see *The Tempest.*

Aries, a zodiacal constellation which originally marked the first sign of the zodiac, entered by the sun at the vernal equinox, and denoted by the symbol ♈. Owing to the effects of precession, the passage of the sun through Aries has been shifted forward from April 16 to May 13.

Aril, or Arillus, an additional coat formed in some plants from the placenta or from the funicle of an ovule, which grows up incompletely around the ovule while it is ripening. Examples of the aril are the scarlet coat of a yew seed and the mace of nutmeg.

Arimanes. See Ahriman.

Arimaspes, or Arimaspians, a mythical people of Asia, who were supposed to live on the east coast of the Caspian Sea. They had only one eye, were warlike, and continuously at war with the Griffins for the possession of the gold dust of the river Arimaspius.

Ariminum, the ancient name of Rimini, Italy.

Arion of Methymna, in Lesbos, lived at Corinth about 625 B.C.; was one of the earlier Greek lyric poets, and developed the dithyramb or choral song in honour of Dionysus—an important step in the development of Greek tragedy. The one extant fragment attributed to him is probably a forgery (see Bergk's *Poetæ Lyrici Græci,* new ed. 1900).

Ariosti, Attilio (*c.* 1660-1740), Italian musician and composer. Handel, Bononcini, and Ariosti were employed together to produce Italian opera in England in 1720. He composed fifteen operas, of which the most popular was *Coriolano.* He has been credited with the invention of the *viol d'amore.*

Ariosto, Lodovico (1474-1533), Italian poet, was born at Reggio in Emilia. In 1503, after he had written two comedies, *La Cassaria* and *I Suppositi,* and several lyric poems, he was taken into the service of Cardinal Ippolito d'Este. While residing in Ferrara, Ariosto wrote his great poem *Orlando Furioso,* which was published in 1516 in its first form, in forty cantos. Quarrelling with the close-fisted cardinal in 1518, Ariosto transferred his services to Alfonso of Ferrara. Soon after the 2nd edition of his *Orlando* appeared, in 1521, the duke sent Ariosto to the wild province of Garfagnana, to suppress various robber bands. After returning to Ferrara he produced three new comedies—*La Lena, Il Negromante,* and *La Scolastica.* He also wrote seven satires, after the manner of Horace, and a tract, entitled *Erbolato,* on the dignity of man and the science of medicine. For some years he laboured anew at the *Orlando,* which appeared in its final form in 1532, in forty-six cantos. He died in the following year, and was buried in the church of San Benedetto at Ferrara, where a splendid tomb of marble was erected over his remains.

The *Orlando Furioso,* upon which Ariosto's immortality rests, is one of the great poems of the world, and one of the very first epics in the sphere of chivalry and romance. Taking up the theme first undertaken by Boiardo in the *Orlando Innamorato,* Ariosto elaborated it, celebrating the origin of the family of Este, and the loves and exploits of Ruggieri and Bradamante. The second part of the argument deals with the wars between Charlemagne and the Saracens, while the madness and recovery of Orlando form the third argument or action of the poem. A good new edition of the *Orlando Furioso* was issued by Picciola in 1885. The best-known translations into English are those by Harrington (1591), Hoole (1773-83), and Stewart Rose (1823). The *Satires* have been translated by Markham (1608) and Croker (1759). See Life prefixed to Cappelli's *Lettere di L. Ariosto* (3rd ed. 1887); and *Life* by G. Campori (3rd ed. 1896).

Ariovistus, German chief, requested by the Sequani to help them against the Ædui, by whom they were hard pressed. He subdued the Ædui, and seized territory from the Sequani as his reward. Sequani and Ædui now combined, and invoked the aid of Cæsar, who defeated Ariovistus and his hordes about 50 m. from the Rhine (B.C. 58). Ariovistus escaped across the river in a small boat, and nothing more is known of him.

Arison, Charles (1710-70), English musical composer, born at Newcastle; organist of St. Nicholas Church in Newcastle from 1736. In 1752 he published an *Essay on Musical Expression,* upholding the Italian school of composition against the German. He wrote concertos for stringed instruments, with several sonatas for harpsichord and two violins—a form of composition till then almost unknown in England.

Arista, Mariano (1802-85), Mexican general and statesman. In the war with the United States in 1846 he was defeated by General Taylor at Palo Alto and Resaca de la Palma. He was war minister under Herrera in 1848, and was elected president in 1851. He resigned in 1853, and was banished.

Aristæus, a Greek deity, according to tradition the son of Apollo and the nymph Cyrene. At Thebes he learned the art of healing and prophecy, and married Autonoë, the daughter of Cadmus. In the Theban legend they were the parents of Actæon. He was worshipped as the protector of vine and olive plantations, hunters, and herdsmen.

Aristagoras OF MILETUS (d. 497 B.C.), brother-in-law of Histiæus the despot, who left him governor of the town while he was at the Persian court. In 501 B.C. Aristagoras failed to capture Naxos for the Persians, and, fearing punishment, initiated the Ionian revolt against Persia. Sparta refused aid; but Athens sent ships and troops, with which he burnt Sardis, though he was soon driven back to the coast. The Athenians went home, and the Persians took most of the Ionian cities -Aristagoras fleeing to Thrace, where he fell in battle against the Edonians.

Aristarchus OF SAMOS (c. 280-264 B.C.), ancient Greek astronomer, whose one surviving work treats of the distances of the sun and moon from the earth. He appears to have believed the sun to be at rest and the earth in motion.

Aristarchus OF SAMOTHRACE (c. 150 B.C.), ancient Greek grammarian and critic, was educated at Alexandria, and founded a school of criticism himself, which flourished there, and afterwards at Rome. He is said to have left Egypt in his old age, as Ptolemy Physcon, the reigning monarch, treated scholars badly, and to have retired to Cyprus, where, at the age of seventy-two, he starved himself to death, as he was suffering from an incurable dropsy. His whole life was devoted to the study and criticism of the Greek poets, and especially Homer. It was by his labours that the text of Homer as we possess it, with the division of both *Iliad* and *Odyssey* into twenty-four books, was constituted, though later corruptions have overlaid his edition to some extent. His aim was to restore the genuine text: verses which he considered spurious he marked with an obelus, and those of particular beauty with an asterisk. None of his writings survive in integrity. See Lehr's *De Aristarchi Studiis Homericis* (3rd ed. 1882); Ludwig's *Aristarchs Homerische Textkritik* (1885).

Aristides (fl. 360-330 B.C.), Greek military painter, whose work, *The Capture of a City*, was taken by Alexander the Great to Macedon; while *A Battle with Persians*, containing a hundred figures, was purchased by Mnason of Elatea; and a portrait of *Bacchus* was bought by Attalus, king of Pergamus, and brought to Rome by L. Mummius.

Aristides OF ATHENS (c. 530-468 B.C.), son of Lysimachus, surnamed 'the Just,' was a leading Athenian statesman at the time of the Persian wars and afterwards. In 490 B.C. he commanded his tribe at Marathon; the next year he was archon; in 482 he was ostracized -*i.e.* banished by popular vote—for five years, as a result of his rivalry with Themistocles. Returning in 480, he rendered conspicuous service at the battle of Salamis, commanded the Athenian forces at Platæa (479), and drew up the assessment of the confederate states which joined Athens in the Delian League (476). He proposed, or supported, the throwing open of the archonship to all Athenians (c. 478). He died so poor that his funeral expenses were paid by the state, which also portioned his daughters, and gave a grant of land to his son Lysimachus. As compared with his rival Themistocles, his policy was lacking in foresight and breadth. He has been represented as an oligarchical and conservative politician, and probably favoured friendship with Sparta. See Plutarch's *Life of Aristides*.

Aristides, PUBLIUS ÆLIUS, surnamed THEODORUS (129-189?), Greek rhetorician, was born at Adriani in Mysia, and studied under Herodes Atticus and Polemon of Pergamus. After his return from travels in Greece, Italy, Egypt, and Asia, he was seized (155) with an illness which lasted for seventeen years, and is described in his six *Sacred Discourses*, which contain descriptions of visions, dreams, and cures. His account of these cures has excited attention, because of their similarity to the effects of hypnotism. Removing to Smyrna, he became a favourite of the Emperor Marcus Aurelius; and when the town was destroyed by an earthquake (178), he induced the emperor to rebuild it. He died at Smyrna about 189. Fifty-five of his orations and two treatises of rhetorical and technical importance are still extant. The best complete edition of his works is that of Keil (1898, etc.). See Baumgart's *Aristeides* (1874).

Aristippus OF CYRENE (c. 430-360 B.C.), founder of the Cyrenaic school of philosophy, was a pupil of Socrates, lived at the court of Dionysius, the tyrant of Sicily, but returned to Cyrene in his old age. He was the first of Socrates' followers to take pay for teaching; and for this reason, and because of his philosophy of pleasure, he was attacked by Plato and Xenophon. Aristippus developed the utilitarianism of Socrates into an acknowledged hedonism: the pleasure of the moment is the sole end of action; pain is the greatest evil; knowledge also is purely sensational; truth exists simply in relation to each individual, and universal truth is impossible. Aristippus is mentioned by Plato, Xenophon, Aristotle, and Diogenes Laertius. See also Zeller's *Socrates and Socratic Schools* (Eng. trans. by Reichel, 1877).

Aristobulus (c. 150 B.C.), founder of the Jewish-Alexandrian philosophy. He endeavoured to show that the Greek poets and philosophers drew their matter from the sacred books of the Jews.

Aristobulus I. (d. 105 B.C.), high priest of the Jews, a son of the Maccabean prince, John Hyrcanus. In 107 B.C. he was the first after the Babylonian captivity to assume the title of king in Judæa. He conquered Ituræa, and attempted to proselytize the inhabitants.—His nephew, ARISTOBULUS II., led a successful rebellion of the Sadducees against his brother, Hyrcanus II., in 69 B.C. He was captured by Pompey in 63 B.C., and taken to Rome.

Aristocracy (Gr. 'rule by the best') is a government controlled by the nobility or privileged class. See GOVERNMENT.

Aristodemus, hero of the first Messenian war with Sparta (743-724 B.C.), belongs to legend rather than history. He slew his daughter as a sacrifice to save his country; was elected king in 731; and killed himself on his daughter's tomb.

Aristolochia, a genus of plants found in temperate and tropical countries, except Australia. The only species in Britain is *A. clematitis* (birthwort). The corolla forms a trumpet-shaped tube similar to the spathe of the arum, which attracts and imprisons insects until fertilization is effected. Many of the species form twining lianas, the best known being the plant that produces the enormous 'pelican flower,' sometimes seen in hothouses. *A. sipho* is an American species known as Dutchman's pipe. *A. serpentaria* (Virginian snake-root) and other species supply remedies for snake-bite.

Aristomenes, the chief figure on the Messenian side in their second war with Sparta (685-668 B.C.); elected king of the Messenians in 684 B.C.; resisted the Spartans in the mountain fortress of Ira for eleven years, and, when the fortress was captured, retired (668) to Rhodes.

Aristophanes (c. 444-380 B.C.), the greatest comic poet of Athens and of Greece. His father Philippus came from Ægina, which cast some doubt on the Athenian citizenship of Aristophanes; and the popular statesman Cleon brought more than one unsuccessful action against him to deprive him of civic rights. This partly accounts for Aristophanes's extreme bitterness against Cleon. His first play—the *Banqueters*, which is lost—was produced for him by a friend (427 B.C.), as he was too young to compete. Of his greater works, the *Acharnians* appeared in 425, the *Knights* in 424, the *Clouds* (probably) in 423, and a revised edition in 422; the *Birds* in 414, the *Frogs* in 405, and the *Women in Parliament* in 392. His last play seems to have been acted in 387 B.C. Aristophanes was by far the greatest poet of the old Attic comedy, which was distinguished by its bold and outspoken criticism and caricature of public men by name; indeed, leading men were often made characters in his comedies—as Nicias, Cleon, and Demosthenes in the *Knights*, Socrates in the *Clouds*, and Euripides in the *Acharnians*. It is this personal criticism which gives a great historical value to his plays; but his excellence as a comedian depends more truly on other qualities—the originality of his plots, the humour of the situations, the keenness of his wit, the vigour, grace, and delicacy of his language, the smartness of his dialogue and repartee, and the perfection of his lyrical passages. Two of his favourite artifices are what is called the 'unexpected' joke (*i.e.* finishing a sentence with a quite unlooked-for word), and the use of new and extraordinary compound words—in which he was assisted by the aptitude of Greek for forming compounds—such as 'signet-ringed, long-haired dawdler,' denoting the fop; and a word of about 170 letters, describing a dish composed of every possible ingredient—fish, flesh, fowl, and vegetable. Aristophanes was a conservative, and disliked the new school of philosophy, education, and poetry represented by Socrates and Euripides. The *Birds*, perhaps his finest play, supposed the foundation of a 'Cloud-cuckoo-city,' in ridicule of the ambitious aspirations of his day. In the *Women in Parliament* he caricatures Plato's *Republic*, which contended for the perfect equality of the sexes. The *Wasps* ridicules the excessive litigation of the Athenians. As a comic genius he was on a level with Shakespeare and Molière. Editions: text alone, Blaydes (1886); with notes, the editions of separate plays by Kock (German) and Merry (1887-1901). Mitchell has translated the *Acharnians*, *Knights*, *Clouds*, and *Wasps* (1822); Frere the same without the *Wasps*, but including the *Frogs* and *Peace* (1871); B. B. Rogers various plays (1867-1902). Racine's comedy *Les Plaideurs* is an imitation of the *Wasps*.

Aristophanes OF BYZANTIUM (c. 264 B.C.), Greek scholar and critic, pupil of Zenodotus and Eratosthenes, and master of Aristarchus, was chief librarian of the Great Library at Alexandria. He introduced the use of accents in Greek. Some fragments of his works remain in the scholia to various poets, and some plots prefixed to tragedies and comedies.

Aristotle is rightly called by Dante 'the master of them that know' (*Inf.*, iv. 130); for he first marked out the path all science was to follow, and first took all knowledge to be his province, although he had little appreciation of mathematical ways of thinking. Aristotle is called 'the Stagirite,' from Stageira (or Stagiros), in Chalcidice, where he was born in 384 B.C. The profession of medicine was hereditary in his family. At the age of seventeen he came to Athens, now 'the school of Greece,' in search of that wider culture of which Isocrates was then the great professor; but it was in the Academy, the school of Plato, alone that he could find intellectual satisfaction. Plato was then about sixty years old. Aristotle always speaks of him with reverence, though he was driven to reject his most characteristic doctrine, that of 'ideas,' or rather 'forms' (see PLATO), at least in its original shape.

Aristotle agreed with Plato in holding that all science is of the 'form,' the universal element in things; but he would not draw the inference, so natural to a mathematician like Plato, that the 'forms' alone were real, and that the manifold objects of sense only existed in so far as they 'partook of' them. Still less could he follow him in his later reduction of the 'forms' to 'numbers' or mathematical formulæ. As a biologist, he was most interested in those 'forms' which constitute the genera and species of animals and are reproduced by generation, and these, though the true object of science, are actual only in individuals. There is a 'form of man,' because 'man begets man;' but it is not a one 'alongside of the many,' but a one which is true 'of the many.'

Aristotle was about thirty-seven when Plato died (347 B.C.). He is said to have been disappointed at not being chosen head of the Academy. It was natural that Plato's nephew, Speusippus, should be preferred, for he was in full sympathy with the later mathematical development of Platonism, which Aristotle did not care for or perhaps even understand. However that may be, Aristotle left Athens in company with Xenocrates, who succeeded Speusippus later on, and the two found a patron in Hermeias, prince of Atarneus in Mysia, whose niece, Pythias, Aristotle married. Before long, however, he was invited by Philip of Macedon to direct the education of his son Alexander; but no trace of Aristotle's influence can be discovered in the career of Alexander the Great. The fusion of Greeks and Persians, which was Alexander's ideal, is directly opposed to Aristotle's doctrine of a 'natural' distinction between the free Hellene and the 'barbarian,' for whom it is better to be a slave. On the other hand, Aristotle never saw that the foundation of a military empire by his brilliant pupil had made his favourite city-state an anachronism. Each had, doubtless, too original a mind to be much influenced by the other. On the accession of Alexander, Aristotle returned to Athens in 335 B.C. Isocrates was now dead, and Speusippus had been succeeded by Xenocrates, so the way was clear for him to found a school of his own on the model of the Academy.

Like Plato, Aristotle set up his school in a 'gymnasium' outside the town. This was the Lyceum, once a favourite haunt of Socrates; and the school itself came to be known as the Peripatos, from a covered walk (περίπατος) in which the lectures were given. The term 'peripatetic' is later, and is due to a confusion, for it implies that the followers of Aristotle derived their name from some custom of walking about while teaching. The school was a society with a regular organization and a corporate life. Scientific work was done in common, and its results were embodied in courses of lectures (ἀκρόασεις), which were constantly revised and kept up to date by Aristotle himself. It is these lectures that have come down to us as the works of Aristotle. But we also possess numerous fragments of discourses and dialogues in the manner of Plato and Isocrates; and in 1891 a whole treatise on the *Constitution of Athens*, discovered on a papyrus roll in Egypt, was published for the British Museum by Mr. Kenyon. Cicero admired the style of the dialogues, and speaks of Aristotle's 'golden stream of language' (*Acad. Post.*, ii. 38, 119). It is very important, in comparing Aristotle with Plato, to bear in mind that we possess all Plato's literary works, and not a word of his lectures in the Academy; while we have only Aristotle's lectures, and no more than scraps of his published writings.

The death of Alexander revived the activity of the nationalist and democratic party at Athens, and Aristotle was threatened, like Socrates two generations earlier, with a prosecution for 'impiety.' He fled to Chalcis in Eubœa, and died the next year (322 B.C.).

Aristotle's most original creation was the science afterwards called Logic, as contained in the collection of treatises to which the name *Organon* ('instrument') was given at a later date. The first of these, the *Categories* (probably post-Aristotelian), gives the forms of predication—substance, relation, quality, quantity, etc. The *De Interpretatione* (περὶ ἑρμηνείας, 'on the expression of thought by language') deals with affirmation, negation, and the like. The *Prior Analytics* treats of the syllogism, with its moods and figures; while the *Posterior Analytics* gives the theory of demonstrative science based on this. The term 'analytics' is taken from mathematics, and describes the scientific process. Each science has certain 'starting-points' (ἀρχαί) or 'principles' (*principia*), which cannot be demonstrated any more than the individual at the other end of the scale. Science lies between these extremes, and analysis consists in discovering the intermediate steps, or 'middle terms.' It therefore finds its proper expression in the syllogism, in which a conclusion is shown to follow necessarily from two premises, each containing the middle term, which does not itself appear in the conclusion. As 'first principles' cannot be known in this way, our knowledge of them is 'immediate' or 'intuitive' in the sense that there truth is apprehended by perception alone. It does not follow, however, that they are easily apprehended; a long process of 'induction' may be required.

In the middle ages this logical system, as is well known, dominated all thought; but it was apt to be used as a mere device for developing conclusions from 'given' premises. The revolt against Aristotelian logic was really a revolt against this misunderstanding; for to Aristotle himself no syllogism was scientific unless its premises were 'true and more known than the conclusion,' and unless they expressed 'the cause of the conclusion.' Reasoning of the other sort—that based upon premises admitted or assumed is necessary, indeed, in rhetoric, and in subjects which do not admit of scientific accuracy; and this forms the subject of the *Topics* (τόποι, *loci communes*), the last book of which deals with fallacies, and is known by the distinctive title of the *Sophistici Elenchi*. The 'organon' forms a propædeutic to all science.

Science itself was divided by Aristotle into theoretical and practical. The objects of theoretical science are either unmoved, or have their source of motion in themselves; and it has three branches—mathematics, physics, and first philosophy, or theology. The first of these Aristotle left practically untouched. By physics (φυσική) he meant the science of everything that has its source of motion or efficient cause in itself, including, of course, organic life. This has to be studied in the light of the four causes—the material, the efficient, the formal, and the final. As, however, the final cause or 'end' of a thing is to attain its form, and as it is the form appearing as an end that is ultimately the efficient cause of the process from potentiality (δύναμις) to actuality (ἐνέργεια), the four may be reduced to two—matter (ὕλη) and form (εἶδος). This amounts to a theory of teleological evolution. Matter is purely negative; it only exists potentially- *i.e.* in so far as it is capable of becoming actual through form. The course of lectures specially called the *Physics* (Φυσικὴ ἀκρόασις) deals with this process, and in particular with motion, time, space, and the like; while the *De Generatione et Corruptione* (περὶ γενέσεως καὶ φθορᾶς) treats of coming into being and ceasing to be. The *De Cœlo* (περὶ οὐρανοῦ) applies the theory to the structure of the universe; while the *Meteorologica* deals with particular phenomena. Coming to organic life, the *De Anima* (περὶ ψυχῆς) explains the soul or vital principle as the formal cause of a body potentially living. The *Historia Animalium* contains an astonishing mass of observations made chiefly from a teleological point of view, and thus prepares the way for the great biological treatises on the *Parts of Animals*, the *Locomotion of Animals*, and the *Generation of Animals*.

First philosophy, or theology, is said to be the science of 'the real as real.' It is represented in the Aristotelian corpus by certain treatises which do not stand in any clear order of connection, and some of which seem to be unfinished. They were placed after the *Physics*, and from this fact received the title Τὰ μετὰ τὰ φυσικά—an accident to which we owe the name *Metaphysics*. It appears that Aristotle never finished this part of his system, or harmonized it with the rest. The source of all motion is itself unmoved, and the way in which it acts can only be expressed by saying that it 'moves as an object of love.' It is pure actuality, in which there is nothing merely potential. It is pure mind, with no object but itself; it is thought, with thought as its object—pure self-consciousness, with nothing beyond. It is God, and yet it enters somehow into man, and can only be described in the language of mysticism. The aspect of reality, which Aristotle had sought to ignore by his rejection of Plato's 'forms,' forced itself upon him here; but there is much uncertainty as to the real meaning of particular doctrines.

Practical science has to do with things that have their source of motion in us; in it we are not merely spectators, but actors. Its 'first principle,' then, will not be a statement of what is, but a definition of something that is to be, of an end, and its 'middle terms' will be the means of realizing that end. The good for man was called 'happiness' (εὐδαιμονία) in the Academy, and Aristotle adopts the term. He prefers, however, to say 'the good life' (τὸ εὐφῆν), as this brings out his characteristic doctrine that it is an activity, not a mere state or condition, as the Academy taught. The treatise called the *Nicomachean Ethics* (perhaps because it was edited by his son Nicomachus) discusses this end, and analyzes the means of its realization. Happiness is an activity, and it is an activity in accordance with the best form of goodness. Goodness is of two kinds - intellectual goodness, and goodness of character. Goodness of character is a habit of feeling and acting in a mean between extremes—*i.e.* of feeling and doing neither too much nor too little, but just what is right; and this is shown by a detailed description of the various forms of goodness, along with the forms of badness arising from deficiency or excess in each case. But the mean must have a standard to fix it; for it is not merely quantitative, as we might suppose. This is found in practical wisdom (φρόνησις), the wisdom of the lawgiver who has in his soul the 'form' of goodness, as the doctor has that of health. Now this wisdom belongs to intellect, not to character; but it is not the highest form of intellectual goodness. That is theoretical wisdom (σοφία), which has to do with the loftiest things in the world. This, then, is the highest form of goodness, and an activity according to it will be the highest happiness. It cannot, however, exist unless the state is organized in such a way as to make it possible. This brings us to the *Politics*, which teaches us how the state, having once come into being, through the family and the village, for the sake of mere life, exists for the sake of the good life, and how the best may be made of it in all circumstances.

One department of human activity is production, and the theory of this would include all the arts. The highest of these are the arts of imitation (μίμησις), which arise from an instinct of human nature. The fragment called the *Poetics*, which deals with tragedy, is practically all that remains under this head. It shows that the function of tragedy is that

Aristotle, the 'Master of them that know (384-322 B.C.). Statue in the Palazzo Spada, Rome.

of a 'purge' (κάθαρσις) in medicine. The emotions of pity and fear are apt to accumulate in the mind, and to produce a morbid condition. Tragedy works off these feelings on a noble object in which we have no mean interest. The technical discussion of the structure of tragedy—the 'unities' and the like has had more influence upon the history of literature and criticism than the main theory, which has generally been misunderstood. It is convenient to mention the *Rhetoric* along with the *Poetics*, though Aristotle hardly intended it to occupy this place in his system. It is a fulfilment of the demand, made by Plato in the *Phædrus*, that the art of rhetoric should be based upon psychology and treated in a philosophical spirit.

Such, in bare outline, is the system of Aristotle; but no outline can give any suggestion of the enormous mass of detailed observation upon which it is built up, and by which it is illustrated. Aristotle had a love of facts for their own sake, but he always saw them in the light of universal principles. His immediate followers lost themselves in detail, and became antiquarians and collectors of scientific curiosities. The revived Aristotelianism of the middle ages was weak on the other side. The leading principles were grasped clearly enough, but the content was unscientific. The true heirs of Aristotle's spirit are the scientific men of our day.

See Zeller's *Aristotle and the Earlier Peripatetics*, trans. by Costelloe and Muirhead (2 vols. 1897). The chief English works are Grote's *Aristotle* (2 vols. 1872)—deals with the life of Aristotle—the *Organon*, *De Anima*, and *Metaphysics*; G. H. Lewes's *Aristotle: a Chapter from the History of Science* (1864)—deals chiefly with the physics and biology. For the *Ethics* and *Politics*, see the essays in Sir Alexander Grant's edition of the *Nicomachean Ethics* (4th ed. 1884), 2 vols., and the introduction to Newman's edition of the *Politics* (4 vols. 1887-1901). For the *Poetics*, Butcher's *Aristotle's Theory of Poetry and Fine Art* (3rd ed. 1903); and for the *Rhetoric*, the edition by Cope and Sandys (3 vols. 1877).

Aristotle's Lantern, a masticatory apparatus found in sea urchins, consisting of five large ossicles, forming sockets or alveoli, in each of which is a long, sharp-edged tooth. Through the centre of these alveoli the gut runs, and the five protruding teeth perforate the membrane which surrounds the mouth. The lantern lies within the shell, but can be bulged outwards by a series of muscles. By means of the apparatus the sea urchins can crop weed.

Aristoxenus (*c.* 350 B.C.), Greek philosopher, born at Tarentum; was a pupil of Aristotle. He wrote principally on music, his chief work being *Elements of Harmony* (ed. with German trans. by Marquard, 1869).

Arita, tn., Japan, in the W. of Kiushiu, 25 m. N. of Nagasaki; noted for its porcelain. Pop. 6,000.

Arithmetic is that branch of the science of mathematics which treats of the properties of numbers, and of the operations which can be performed with them. The development of the science has had close relation to the method used to express numbers—the Greeks, otherwise clever mathematicians, and after them the Romans, making but little progress, because of the clumsy modes of notation they used. The Roman system was in general use throughout Europe until the end of the 16th century, and is still occasionally seen in dates, numbering of chapters in books, on clock dials, etc. The symbols now in use were introduced some time before 1200 A.D., from the Arabs, who derived them from the Hindus, to whom also is to be ascribed the introduction of the symbol 0, the greatest step ever taken in the history of arithmetical science, and one which completely escaped the Greeks and Romans. By the use of the ten symbols it has been possible to develop the decimal system of numeration by grouping numbers into tens and giving names to the groups (tens, hundreds, thousands, etc.). Of this decimal system, which doubtless arose from the fact that man had ten fingers, traces are found in the early inscriptions of Babylonia and Egypt. Following the introduction of the Arabic system about 1200 A.D., the science of arithmetic advanced rapidly, two important stages being marked by (1) the discovery of the double rule of three (compound proportion) in the 16th century, and (2) the invention of logarithms by Napier of Merchiston in the 17th century; while a fundamental development was effected by the extension of notation to express what part one quantity is of another, thus introducing the study of fractions. The elementary operations of arithmetic are *addition*, *subtraction*, *multiplication*, and *division*. The complete investigation of arithmetical rules and of the properties of numbers has been hindered by the prejudice against the employment of literal symbols, which have been considered to belong exclusively to the domain of algebra. For such investigations, more fully developed on the Continent, see J. Bertrand's *Traité d'Arithmétique*

Arithmometer. See CALCULATING MACHINE.

Arius (256-336), founder of Arianism; an Alexandrian theologian, and one of the two principal figures in the first great controversy of the early church. Upon being advanced to the priesthood he was assailed by his bishop, Alexander of Alexandria, as a heretic for maintaining that Jesus Christ was an originated being, denying that Christ was 'unoriginate, or part of the unoriginate, or made of the same substance (ὁμοούσιον), or of any previously existing substance.' For this the Egyptian bishops excommunicated him. The result was a fierce dispute in the church, to settle which the Emperor Constantine called (325) the Council of Nicæa—the first œcumenical council. After a long controversy Arius was defeated, and the Nicene Creed, brought forward by Athanasius, prevailed. Arius and Eusebius, who would not accept the creed, were banished to Illyria and Gaul respectively. Soon after the accession of Athanasius to the see on the death of Alexander, Arius, having obtained the support of Constantia, the sister of the emperor, was allowed to return to Egypt, where the strife was renewed. The emperor ordered Athanasius to reinstate Arius, and on his refusal he was banished (336). Eventually the bishop of Constantinople agreed to reinstate him; but on the eve of the ceremony the great controversialist suddenly died. Arius is described as 'a rigorous ascetic, a persuasive advocate, an ardent propagandist. Tall, gloomy, fanatical, with downcast eyes and tangled hair, he went about singing his doctrines, which he had set to the music of the theatres' (Chadwick). See Newman's *Arians of the Fourth Century* (1833); Stanley's *Eastern Church* (1861); Gwatkin's *The Arian Controversy* (1889).

Arizona (abbreviated ARIZ.), a territory in the S.W. part of the U.S.A., organized in 1863; area, 113,020 sq. m. The N.E. part is a high plateau, ranging in altitude from 6,000 to 8,000 ft., traversed by the Colorado R., which sweeps round N.W. and W. in a great cañon 5,000 to 6,000 ft. in depth. This plateau ends on the S. in a line of cliffs, the Mogollon, by which the level of the country descends greatly. The S. and W. parts of the territory consist of low, hot desert valleys, separated by narrow, abrupt ranges of mountains. The Colorado R. flows along the W. boundary, separating this territory from Nevada and California. The S. part of the territory is traversed by Gila R., a large branch of the Colorado. These two rivers, particularly the latter, furnish most of the water used in irrigation. Owing to scanty rainfall and to distance from markets, agricultural development has been slow. At present sheep-breeding is the most important industry connected with agriculture. Industries are confined almost entirely to copper-smelting, but mining is developing rapidly. In 1900 the principal products of Arizona were as follows:—Gold, value £500,000; silver, 1,578,000 oz., valued at £215,000; copper, 52,820 tons; and lead. In copper production Arizona stands third among the states, only Montana and N. Michigan producing a greater amount. The territory sends one delegate to Congress. The population was 122,961, or a little over one per sq. m., in 1900, having more than doubled in the preceding ten years. Cap. Phœnix (pop. 5,544). Nearly one-fifth of the population is of foreign birth.

Ark OF NOAH, a huge vessel of gopher wood (possibly cypress), built by the patriarch for the purpose of preserving the race of man and of the land animals during the flood. (See DELUGE and ARARAT.) It was 120 years in building, measured 300 cubits in length, 50 in breadth, and 30 in height; it had three stories, and was divided into 'nests.' (See Gen. 6 and 7.)

Ark of the Covenant, THE, also called the 'ark of Jehovah of hosts,' 'ark of God,' and 'ark of the testimony,' was a chest of shittim (acacia) wood, containing the stone tablets on which were inscribed the ten commandments, and held in the highest veneration among the ancient Israelites. According to the latest source of the Pentateuch (P; see HEXATEUCH), the ark was constructed according to directions given to Moses, and was located in the most holy place of the tabernacle. It accompanied the Israelites in their march through the desert, and was a prominent factor in such events as the taking of Jericho. It was subsequently deposited at Shiloh, Ashdod (the Philistines having captured it), Beth-shemesh, and Kirjath-jearim, whence David had it conveyed to Jerusalem; and again it occupied the most holy place in Solomon's temple. What ultimately became of it is unknown. The ark seems to have been regarded not only as a symbol of the Divine presence, but actually as the *dwelling-place* of Jehovah; yet, arguing that the fact of its containing the tables of the law would rather indicate the *absence* of the Lawgiver, some have thought that it really held a sacred stone, or stones, of fetish origin; while its long residence at Shiloh has prompted some to infer that it was originally a kind of clan talisman belonging to the tribe of Joseph. See Ex. 25: 10-22.

Arkansas (abbreviated ARK.; pron. *Ar'k'nsaw*), one of the southern states of the U.S.A., bounded on the E. by the Mississippi R., a large part of its area being in the low alluvial land forming the immediate valley of that river; area, 53,850 sq. m. The N.W. part of the state rises into hills known as the Ozark Hills or Mountains. South of the Arkansas R. these consist of crooked, branching ridges of sandstone or quartzite, alternating with limestone valleys. North of that river they take the form of a plateau, deeply cut by streams. Lying between 33° and 36° 30′ N., in the middle of the Mississippi valley, the state has a warm climate and an ample rainfall. The dominant industry is agriculture. Apples, peaches, strawberries, and other fruit are extensively grown in the N.W. The chief product of the state is cotton, which yields in the rich bottom lands a fibre of exceptional length and value. The cotton crop of 1899 was 669,385 bales, valued at $24,298,676. The mineral production (whetstones, coal, limestone) of the state is not large, nor are its manufacturing industries of much importance. The state was originally covered almost entirely with forests, consisting largely of fine yellow pine timber; and, except where they have been cleared away for settlement, they still stand, although of late years the axe of the lumberman has begun to work havoc among them. The population in 1900 was 1,311,564—an increase of 19 per cent. during the preceding decade, and the density of population was 25 to the sq. m. Only 5 per cent. of the inhabitants were found in the cities, of which the chief is Little Rock, the capital. The foreign-born constituted little more than 1 per cent.; while, on the other hand, negroes formed 28 per cent. of the entire population. Wage-earners formed 45 per cent. of the population over ten years of age, 74 per cent. of these being engaged in agriculture. Arkansas formed part of the Louisiana territory until 1812, and of the Missouri territory until 1819, when it was organized as Arkansas Territory; it became a state in 1836.

Arkansas River, U.S.A., one of the great W. branches of the Mississippi. It rises in the high mountains in central Colorado, which it traverses through cañons to the plains. Flowing out of Colorado, it crosses S. Kansas, N.E. Oklahoma, Indian Territory, and central Arkansas to its mouth in the S.E. part of the last-named state. Its principal branches are the Cimarron and Canadian Rs. Its drainage area is 185,671 sq. m.; total length, 2,000 m.; navigable, 650 m.

Arklow, seapt., Co. Wicklow, Ireland, 13 m. S.W. of Wicklow, on the r. bk. of the Avoca, in a district noted for its scenery. The fisheries are important, and in the vicinity are large oyster beds. The town and castle were granted in the time of Henry IV. to Theobald Fitzwalter, who founded here a Cistercian monastery. Battles, in which the Irish were defeated by the English, were fought in 1281 and 1316; in 1647 the castle was taken, and the garrison put to the sword; and it was again captured in 1649 by Cromwell, and subsequently demolished. In the rebellion of 1798 the insurgents were defeated in a battle near Arklow Bridge. Pop. (1901) 4,944.

Arkona, or ARCONA, cape on N.E. of Rügen I., Baltic Sea, Germany. A lighthouse (1827) was erected on the top of the chalk cliffs 177 ft. high. Here are the ruins of a very strong fortress, destroyed in 1168 by Waldemar I., king of Denmark, which surrounded the sanctuary of the Wend god Svantevit.

Arkwright, SIR RICHARD (1732-92), cotton-spinning inventor, born at Preston, Lancashire. He learned the trade of barber, and became a dealer in hair, adding to his profits by the invention of a successful hair-dye. About 1767 he began to turn his attention to the invention of a machine or frame for carrying out all the operations of spinning at one time, and by one application of force. In 1768 he set up in Preston his first spinning-frame; it consisted principally of two pairs of rollers, the first pair moving slowly in contact, passing the sliver to a second pair, which revolved with greater velocity, and drew out the cotton to the necessary degree of tenuity. The sliver was then attached to a spindle and fly, whose revolutions twisted the cotton into a thread, and at the same time wound it on a bobbin. By increasing the length of the rollers and number of spindles, a corresponding number of threads could be spun and wound at once by the same motive power. His patent was obtained in 1769, when he set up near Hockley his first mill, driven by horses. In 1771, with two capitalists (Strutt of Derby and Need of Nottingham), he built a mill at Cromford, in Derbyshire, the motive power of which was derived from the Derwent; and in 1790 he introduced the steam-engine into his Nottingham mills. Arkwright's invention met with intense opposition, one of his factories being destroyed by the mob. He, however, amassed a large fortune, and was knighted (1786). See Baines's *History of Lancashire* (new ed. 1886-93).

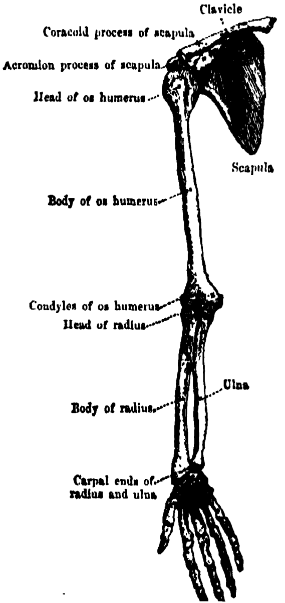
Arlberg, Alpine pass (5,912 ft.) leading from Feldkirch, in Austria (near the Rhine valley), to the Inn valley, near Landeck. It is traversed by a carriage road, while beneath it a railway tunnel (6 m. 650 yds. long) was pierced in 1880-3, connecting Vorarlberg with the Tyrol. The Arlberg railway is 85 m. long, and reaches an alt. of 4,300 ft.

Arles (anc. *Arelate*), tn., dep. Bouches-du-Rhône, on l. bk. of Grand Rhone, 53 m. N.W. of Marseilles; has a trade in corn, oil, wine, fruits, *saucisson d'Arles*, etc. The industries are chiefly silk-spinning, hat-making, and shipbuilding. Known as the 'Gallic Rome,' and a favourite residence of Constantine, Arles was colonized in 100 B.C., and is said to have had a population exceeding 100,000. Later it became the capital of the Visigoths; and was an independent republic from 1150-1251, when it began to share the fortunes of Provence. The chief Roman remains are the amphitheatre, which accommodated 26,000 persons, and was turned (8th century) into a fortress; the theatre, where the Venus of Arles was discovered in 1651; the cathedral of St. Trophimus (7th century); the Roman and Christian burial-grounds. Important ecclesiastical councils were held in Arles: in 314 the Donatists were condemned; in 353 the Arians were favoured; in 452 certain disciplinary canons were adopted; and in 1234 the persecution of the Albigenses was organized. Arles was an archiepiscopal see from the time of Constantine to 1801. Pop. (1901) 29,314.

Arlington, HENRY BENNET, EARL OF (1618-85), a statesman of the reign of Charles II.; joined the royal army in the civil war; was severely wounded at Andover; knighted by Charles II. at Bruges in 1658; and sent as an envoy to Spain. He became principal Secretary of State in 1663; was a constant opponent of Clarendon; created a baron and Earl of Arlington in 1672. He is said to have brought about the first Dutch war, and was concerned in the treaty of Dover; was unsuccessfully impeached by the Commons in 1674; sold his secretaryship, and purchased the office of lord chamberlain, which he held till 1681. See his *Letters to Sir W. Temple*, published posthumously in 1701; the *Lauderdale Papers*; and *Diaries* of Evelyn and Pepys.

Arlon (Flem. *Aarlen*), cap. of prov. Luxembourg, Belgium, 17 m. by rail N.W. of Luxemburg. It has woollen and iron industries. Here the French general Jourdan defeated the Austrians in 1793. Pop. (1900) 10,044.

Arm. The upper limb may be divided into a proximal part or shoulder, a distal part or hand, and an intermediate shaft which consists of an upper arm and a fore arm. The bones are: in the shoulder, the clavicle (collar bone) and the scapula (shoulder blade); in the upper arm, the humerus; in the fore arm, the radius and ulna; in the hand, the carpal and metacarpal bones and the phalanges. The smooth, round 'head' of the humerus articulates with the glenoid cavity of the scapula, forming the shoulder joint—a ball-and-socket joint. At the lower end of the humerus are two articular surfaces for the bones of the fore arm the outer rounded for the head of the radius, the inner a pulley for the ulna. These form the elbow joint—a hinge joint. At their lower extremities the radius and ulna articulate with the carpus to form the wrist joint—a hinge joint. The arm receives its blood supply from the brachial artery and its branches, and the veins finally unite in the axillary vein. The nerves pass down by the side of the brachial artery, then are distributed as musculo-spiral, ulnar, and median.

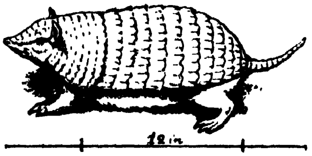


Bones of the Arm

Fractures of the Arm.—No bone except the radius is more frequently broken than the clavicle, or collar bone. This is due to its exposed position, and to its buttress-like action in keeping out the point of the shoulder. The treatment consists in correcting any displacement, and afterwards keeping the broken ends apposed. If the patient can be depended on to lie quiet, it is enough to keep him in bed on his back, with a pillow between his shoulders; but if bandaged in such a way that the shoulders are braced back, the elbow supported, and the upper arm kept fixed to the side, he may go about. In fractures of the neck of the scapula the arm must be kept to the side and the elbow supported. In fractures of the humerus place a pad in the axilla, bind the arm to the side, and keep the hand supported by a sling. In fractures at the elbow joint much care is needed to prevent, by suitable splints, ankylosis or deformity. Fractures of the radius and ulna are treated with appropriate splints. The lower end of the radius is frequently broken, constituting what is known as Colles's fracture—almost invariably due to falls on the outstretched palm. The deformity produced by the fracture is very characteristic. The hand is deflected to the radial side, and usually pointed, with the fingers somewhat flexed (dinner-fork deformity). The styloid process of the radius is higher than that of the ulna, and of course there is crepitus. To reduce the deformity, extension and manipulation are necessary, followed by immobility, secured by means of a Gooch splint. In fracture of the metacarpal bones there is generally little displacement; rest, with the hand fixed in an extended or clenched position, will generally soon cure the mischief. For the phalanges a small zinc splint may be moulded to the front of the finger. In dislocation of the shoulder, reduction may sometimes be made by traction on the arm. The manipulation method of Kocher is less violent and often more easily managed, but the elbow must be afterwards supported in a sling. Speedy correction of all displacements, followed by rest, to allow reunion, is the common-sense treatment of all fractures.

Armada, THE SPANISH. In 1583 Philip of Spain was urged by his admiral, the Marques de Santa Cruz, one of the heroes of Lepanto, to attempt the conquest of England; and these proposals were renewed in 1586, in consequence of the action of Queen Elizabeth's seamen in the W. Indies and elsewhere. Although Santa Cruz died in February 1588, the suggestion, ere that time, had so completely taken possession of the mind of Philip that a huge fleet was then ready for the adventure. Its command was entrusted to the Duke of Medina Sidonia, a man of no naval experience. He was instructed to proceed to the Strait of Dover, avoiding unnecessary fighting on his way up Channel, and to embark from Flanders a large army which lay there under the Duke of Parma, to effect an invasion. The Spanish fleet, called *La Felicisima Armada*, left Corunna on July 12, 1588. It consisted of 130 ships, many of which were very large, with 28,000 men. The whole number of English ships available to meet it was 101; but of these only 28 belonged to the royal navy, and several even of them were small, while the total number of men on board was only 9,000. The English were under the lord high admiral, Lord Howard of Effingham (in the *Ark*), Sir Francis Drake (in the *Revenge*), Sir John Hawkins (in the *Victory*), and many famous captains, including Lord Henry Seymour, Lord Thomas Howard, the Earl of Cumberland, Lord Sheffield, Sir William Winter, Sir Martin Frobisher, Edward and William Fenner, and Richard Hawkins. The greater part of the English fleet was at Plymouth when, on July 19, news of the approach of the enemy was brought thither by Captain Flemyng of the *Golden Hind*. Howard warped out, and on July 20 first caught sight of the Spaniards. On the 21st he began a running fight with them. This was continued on the 22nd. A more general but indecisive engagement took place off Portland on the 23rd. On the 25th there was another fierce battle off the Isle of Wight. On the 27th the Armada entered the roadstead of Calais, by which time nearly the whole English fleet was united. On the night of the 28th Howard sent fire-ships among his enemies, so that they, in panic, slipped or cut their cables and made off in confusion. They were followed, and so badly mauled off Gravelines on the 29th that they never afterwards formed a coherent body. Most of them fled north-about, and were chased as far as Newcastle-on-Tyne. The remains of the Armada passed between the Orkneys and the Shetlands, and then rounded the west coast of Ireland, suffering even more from the elements than from the English. Of its 128 sail, 2 were abandoned to the English, 3 were wrecked on the French coast and 2 on the coast of Flanders, 2 were sunk in action off Gravelines, 19 were known to have been wrecked off Scotland and Ireland, and 35 others never returned to Spain. Thus 63 in all were lost. The effect upon the naval power of Spain was great, though not absolutely crippling. The effect upon the prestige of the Elizabethan navy was immense. See Duro's *La Armada Invencible* (1884–5); Laughton's *State Papers relating to the Defeat of the Spanish Armada* (Navy Records Soc., 1894); Clowes's *The Royal Navy* (6 vols. 1897–1901); also Macaulay's ballad, and Charles Kingsley's *Westward Ho!* (1865).

Medal struck to Commemorate the Defeat of the Armada.



The Six-banded Armadillo (Dasypus sexcinctus).

Armadillos, S. American animals belonging to the mammalian order Edentata, with bodies covered by an armour of bony plates. Numerous species exist, examples being *Priodon gigas*, the great armadillo, and *Dasypus sexcinctus*, the six-banded armadillo. Most are nocturnal in habit, and all are omnivorous. In addition to the protection of their bony scutes, they are armed with strong claws on the fore limbs, by means of which they burrow; and they can also run with great rapidity. They range from Mexico to Patagonia, and are prized as food by the natives. In the caves of Brazil fossil armadillos have been found, one of them as large as a rhinoceros. The largest existing form is 3 ft. in length, exclusive of the tail; the smallest measures less than a foot.

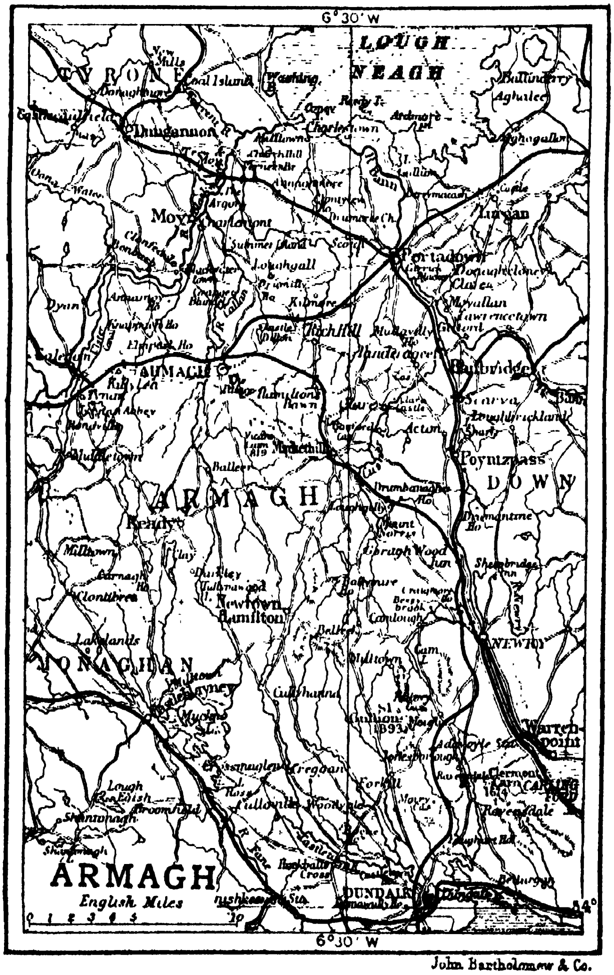
Armageddon (R.V. 'Har-Magedon'). The name as used in Rev. 16:16 is probably derived from Megiddo, an important Canaanite fortress in Issachar (Josh. 12:21, etc.); placed by most writers at Lejjûn (Legio), w. of the plain of Esdraelon. The association of Megiddo with many battles—*e.g.* the defeat of the Canaanites by Barak, of the Gibeonites by Midian, of Saul by the Philistines, and of Josiah by the Egyptians—probably suggested it as the scene of the culminating conflict between good and evil referred to in the Apocalypse.

Armagh, co., prov. Ulster, Ireland, lying s. of Lough Neagh and w. of Co. Down, with a few miles of coast on Carlingford Lough. Length (N. and S.), 37½ m.; breadth (E. and W.), 21 m. Its surface is fairly wooded and generally hilly, the highest point being the granite mass of Slieve Gullion (1,895 ft.), towards the s. The drainage is chiefly to Lough Neagh and Dundalk Bay; the principal rivers are the Upper Bann, the Blackwater, and the Newry R., the latter flowing into Carlingford Lough, and being joined to the Bann by the Newry Canal. The Ulster Canal enters the county in the w., and runs N. to the Blackwater. Peat bogs occupy nearly 6,000 ac., but more than two-fifths of the county is under oats, potatoes, turnips, mangel-wurzel, and flax. Building-stone, limestone, gravel, and clay are worked; and the staple industry is linen, bleach-greens being numerous. The county returns a member for each of the three divisions (North, Middle, and South). Ecclesiastically it is chiefly included in the diocese of Connor, a part being in that of Dromore. Area, 238,086 ac. Pop. (1901) 125,238. *Map, p. 362.*

Armagh, city and mrkt. tn., cap. Co. Armagh, eccles. metropolis of Ireland, 30 m. s.w. by s. of Belfast. The city stands on and at the foot of a hill crowned by a handsome cruciform cathedral (11th or 12th century), which probably incorporates part of St. Patrick's 5th century building burned by the Danes in 836. The city and district are rich in antiquarian remains, such as the ruins of a Franciscan abbey in the palace grounds, and, 2 m. distant, *Emania*, or 'Navan Fort,' the site of a very ancient royal residence. 'The Book of Armagh,' preserved in Trinity College, Dublin, was partly written before A.D. 807; and the 'Shrine of Armagh Bell,' also in Dublin, is of exquisite 12th century workmanship, and contains the bell of St. Patrick, presented to the church of Armagh by St. Columba. In the 5th century St. Patrick founded the bishopric and an Augustinian monastery, which ultimately became renowned as a seat of learning. The see became an archbishopric in 1142, but a dispute as to its ecclesiastical supremacy was not settled until the 17th century. Pop. (1901) 7,588.

Armagnac, former sub-prov., France, in Guienne. The dep. of Gers coincides with the 'Comté d'Armagnac' proper, but in the 14th and 15th centuries it extended beyond that limit. The capital was Auch, then Lectoure. It was united to the crown of France in 1607.

Armagnacs, a name given to a body of French troops in the 15th century, raised (1410) by the Comte d'Armagnac against the Duke of Burgundy. They afterwards took part in the war against the English, but later got out of control and plundered the country, whereupon they were nicknamed *Ecorcheurs.* Charles VII. of France sent about 40,000 of them in an expedition against Alsace (1442-4). Soon after their return they were disbanded.



John Bartholomew & Co.

Armament Major, in the British army an officer of the royal artillery who is placed in charge of the armament and stores of one or more artillery sub-districts, and who is told off to the particular command of a fort, or a group of guns, in manning the works for defence. He is responsible that all guns, ammunition, and stores are kept in fighting order and ready for immediate use, and that the officers and men under his charge are kept constantly exercised in working the range-finders and other instruments in the use of which they have been trained.

Armansperg, JOSEPH LUDWIG, COUNT VON (1787-1853), Bavarian statesman, born at Kötzting in Lower Bavaria. His advanced liberalism brought him into contact with the Camarilla and the Jesuits, and forced him into retirement (1831). He was president of the regency of Greece (1833-5) and Chancellor of State (1835-7).

Armatoles, warlike Christian tribes of N. Greece; who from the fifteenth century protected their southern neighbours from the Albanians, Servians, and Turks.

Armature. See DYNAMO.

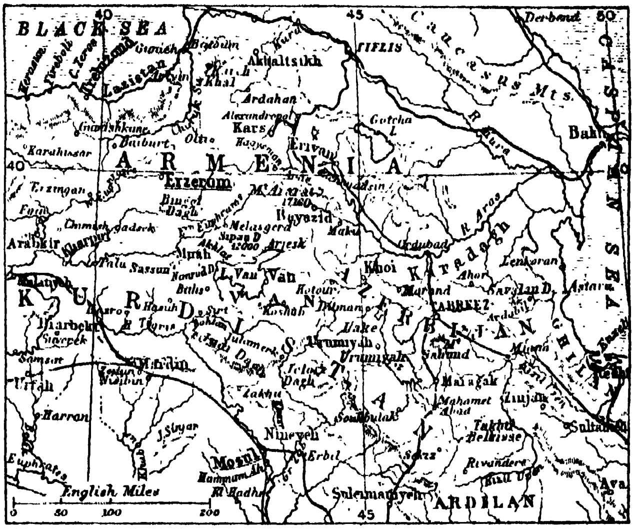
Armed, in heraldry said of the fiercer animals, and of birds of prey, when their natural weapons—teeth, claws, horns, etc.—are blazoned of a particular colour or metal; also of the human figure, or parts thereof, when *in armour.*

Armed Neutrality. The Armed Neutrality of the Northern Powers—Russia, Denmark, Sweden, with Russia as controlling member—was formed (1780), and asserted the principles (1) that neutral vessels shall freely navigate, to the extent of carrying goods belonging to the subjects of powers at war, provided such goods are not contraband; (2) that no blockade shall be recognized unless there is a sufficient blockading force. Prussia and Austria accepted the principles in 1781. Britain refused this interpretation of maritime and commercial law. After 1783, when peace was made, the principles continued in suspense. In 1793 both Russia and the United States, by treaty with Britain, recognized the right of search over neutral vessels; but in 1800, owing to the diplomatic skill of Napoleon, the Armed Neutrality was revived. It had a short life, owing to the British bombardment of Copenhagen and capture of the Danish fleet, and the assassination of Czar Paul I. in March 1801. The questions, however, were raised later, as in 1807; and not till 1856, in the Declaration of Paris, was a definitive settlement at international law adopted, unfavourable to Britain's past contentions. See Wheaton's *International Law* (3rd. ed. 1889) and *Hist. of the Law of Nations* (1845).

Armenia (the Scriptural *Minni*), a country in the N.E. of Asia Minor, bounded on the N. by Trebizond and Transcaucasia, on the S. by Kurdistan, and on the E. by the Caspian Sea. It consists of three sections: the W. (Erzerum and Diarbekir) belongs to Turkey, the N. (including the districts of Kars, Erivan, and Tiflis) to Russia, and the S.E. (the prov. of Azerbaijan) to Persia. For the most part consisting of table-land, with an average elevation of over 5,000 ft. (the culminating point being Mount Ararat, 16,900 ft., the meeting-place of the three divisions), it contains the head-waters of the Euphrates and Tigris, and of the Kura and its tributary the Aras. The salt lakes, Van in the Turkish division, Urmia in the Persian, and Gokcha in the Russian, are formed by depressions in the plateau. The climate is varied, being very cold in the highlands and exceedingly warm in the lowlands, while the plateau lands have severe winters and short, hot summers. The soil is generally fertile, producing abundance of tobacco, grain, cotton, and grapes; the valley pasturage is good. Many minerals—copper, silver, lead, and iron—are found. The Armenians are Caucasians, and speak a branch of the Aryan language. They have long been noted for their enterprising commercial spirit, and are to be found in all the Turkish possessions. The most important towns are Van, Erivan, Erzerum, and Arabkir. In Armenia the Armenians do not exceed one million; in Russia there are about half as many; in Asia Minor, outside of Armenia, about 150,000; in Europe, mostly in Turkey, some 420,000; and in Persia, 40,000—altogether about a little over 2,000,000. In their native country they follow agricultural and pastoral occupations. They dress like the Turks, but instead of the turban, wear a tall fur cap. Carpets, shawls, rugs, and similar articles are woven; and fruit, silk, and wine are produced. Apart from the Armenians, the inhabitants consist of Kurds, Turks, Georgians, Jews, and Gypsies. See Tozer's *Turkish Armenia* (1881); Warkworth's *Notes from a Diary in Asiatic Russia* (1898); Lynch's *Armenia* (2 vols. 1901); Bryce's *Transcaucasia and Ararat* (4th ed. 1896); Supan, in *Petermann's Mitteilungen* (1896); Hogarth's *The Nearer East* (1902).

History.—The name Armenia first appears in the 5th century B.C. Previous to this, however, the country was known to the Assyrians as Nairi or Urartu, the latter being identical with the Alarodians of Herodotus and the Biblical Ararat; and, after the chief god Chaldis, the people were also called Chaldini, a name which is not to be confused with that of the Chaldæans. To what race this people belonged, whether to the Hittites or to the Indo-Germans, is at present quite uncertain. Their history extends from at least the 12th century to the second half of the 7th century B.C., when it ceases as suddenly as it had begun. In all probability this is due to the fact that the country was overrun by the great Indo-Germanic invasion of barbarians, among whom the ancestors of the present people would be included. The original home of the Armenians is therefore unknown, and whilst old classical writers suppose it to have been Phrygia or Thessaly, modern critics have argued in favour of Cilicia, or perhaps even a district north of the Black Sea.

Armenia, like Asia Minor in general, has never really had a history of its own, its fortunes always having been closely linked with those of the greater empires of Media, Persia, Rome, Byzantium, and Turkey. The country is called Haykh or Hayastan, after Hayk, son of Thorgom (the Septuagint form of Togarmah), son of Japheth; and the legendary accounts of its early days, as related by the native historians, are curiously influenced by the Old Testament narrative. In 546 B.C. it was conquered by Cyrus, whose schoolfellow, Tigranes, was the son of the defeated king of Armenia, and afterwards became the national hero. Tradition has much to say respecting this figure, ascribing to him, amongst other deeds, the overthrow of the Median empire. The last (the fifty-ninth) king of this highly legendary dynasty was Vahi, who was defeated by Alexander the Great in 328 B.C. During the succeeding years, with the exception of a short-lived independence under Ardvates, Armenia was ruled by governors appointed by the Seleucidæ. When Antiochus the Great was defeated by Scipio Africanus in 190 B.C., Zariadris (Zadriates) and Artaxias, the governors in W. and E. Armenia respectively, asserted their independence, and founded new dynasties. Artaxias, whose realm was by far the greater, may well be called the founder of the Armenian kingdom. Ultimately Artaxias was taken prisoner by Antiochus Epiphanes IV., and the country again fell into the hands of the Seleucidæ. In the middle of the 2nd century B.C. the Parthian Arsaces VI. (Mithridates I.) set upon the throne of Armenia his brother Valarsaces (Wagharshag I.), who became the founder of one of the greatest branches of the Arsacid family. His dynasty practically extended from 149 B.C. to 428 A.D. Under his great-grandson, Tigranes II. (90-55 B.C.), Armenia attained the height of her power; the rival district of W. Armenia was annexed, and the outlying smaller states became vassals. Tigranes (with whom tradition has probably confused Tigranes I.) became the most powerful monarch in Asia; but through his connection with his father-in-law, Mithridates the Great, king of Pontus, he found himself involved against Rome in the campaigns of Lucullus (69 B.C.) and Pompey, and at the conclusion of peace, in 66 B.C., Armenia was reduced to its former limits. His son Artavasdes, for treacherous dealings with Antony, was carried off to Rome, and ultimately beheaded by Cleopatra (30 B.C.). In the following years Armenia suffered from the rival schemes of Parthia and Rome to gain possession of the country. In 114 A.D. a Roman army under Trajan invaded Asia Minor, and Armenia, in company with other states, was forced to do him homage. In 238 Chosroes the Great was assassinated by one Anak, at the instigation of Persia, and the royal family, with the exception of one son, was entirely exterminated. From this time onwards the country came under the power of the Sassanids. Tiridates III., son of Chosroes, through the help of Rome, where he had been educated, ascended the throne in 259. He began his reign by persecuting the Christians; but on his conversion, by Gregory the Illuminator (according to tradition a descendant of Anak), he used his energies on their behalf, with the result that Armenia was the first country to make Christianity the state religion, and Gregory became known as the historical founder of the Armenian Church. This new policy of Tiridates, though it led to friendship with Greece, involved the country in frequent quarrels with Persia and Rome; and finally, in 387 A.D., the eastern



portion was ceded to the former (whence it received the name of Persarmenia), whilst the latter annexed the western. Artases (Artaxes) IV., last of the Arsacid dynasty, was removed in 429 through the machinations of the Armenian nobles, and the country was taken by the Persian king Bahram V., and until 632 was ruled by Persian governors (*marzbans*), several of whom were actually of Armenian origin. This period is marked by internal anarchy, by the persecution of the Christians, and by ever-recurring insurrections, the most remarkable of which was that of Vartan, as recounted by the native historian Elisaeus (trans. Neumann, 1839). Meanwhile the Armenian Church, which had never accepted the decisions of the Council of Chalcedon (451), separated itself from the Orthodox Church in 491, and named itself after Gregory the Illuminator. At the Synod of Duin (551) the Armenian calendar was regulated, and a new era introduced, the first year beginning July 11, 552. Shortly after the invasion of Heraclius (624) Armenia gained her first experience of the newly arisen Mohammedan power, whose hordes overran the land in 637, and until 855 held it in bondage. Under the dynasty of the Pagratides (Bagratides), a family claiming descent from an exiled Jewish prince, Armenia recovered some of her independence; but on the assassination of Gagik in 1079 the country fell into the hands of the Byzantines on the one hand, and of the Seljuk Turks on the other. At this time, too, the rival dynasty of the Artsrunian family, who claimed descent from the sons of Sennacherib (see 2 Kings 19 : 37), and had held Vasbaragan and the surrounding district, were swallowed up by Byzantium, and practically the whole of Armenia proper was in the hands of foreigners. The invasion of the Seljuk Turks, however, had driven out a number of the inhabitants, who, crossing the Euphrates, founded settlements on the slopes of the Amanus and Taurus. Here a dynasty was founded by Rhupen (Reuben), a relative of Gagik, which not only held sway over Cappadocia and N. Cilicia, but was eventually able to extend its borders to the Mediterranean. This kingdom of Lesser Armenia became the last stronghold of Christianity in the East, and played no small part in the wars of the crusades. The kingdom allied itself with the invading Mongols against the Egyptian Mamluks; but when, in 1305, the former adopted Islam, and the crusaders were no longer a power to aid, it was exposed to the vengeance of Egypt. Its last king, Leon (Levon) VI., of the house of Lusignan (Cyprus), was taken prisoner in 1375, and ultimately died in Paris (1393). Lesser Armenia then became an Egyptian province. Thus Armenia slowly decayed. In 1604, the Persian Shah, Abbas, laid waste the land, and carried off 40,000 of the inhabitants to Persia, where some attempt was made to revive the national feeling. But Armenia ceased to hold any position as a nation, and its subsequent history belongs to that of Turkey and Persia, and, as regards the last century, also of Russia.

Language and Literature.—The Armenian language is to be kept quite distinct from that of the pre-Armenian population of Urartu (see above), known to us from the cuneiform inscriptions of Van, which have been deciphered by Sayce (*Jour. of the Royal Asiatic Soc.*, 1882, 1893-4). The position of this language is still obscure. Armenian itself belongs to the Indo-Germanic family of languages, and has frequently been assigned to the Iranian branch. This view, however, is no longer held, and it is recognized that the Persian elements, in common with features of Persian religion and culture, were borrowed by the Armenians in later historical times. In fact, Armenian forms a more or less independent branch of its own, but appears to be more closely akin to the European than to the Asiatic representatives—a circumstance that is in substantial agreement with the theories respecting the origin of the people. The language is hard, rough, and remarkably rich in consonants, especially in sibilants. The accent is on the last syllable. Syntactically it bears a close resemblance to classical Greek. It has no grammatical gender. The nouns have seven cases (including an instrumental), and the adjective is declined like the noun. There is neither dual nor superlative. There are four conjugations, characterized by the vowels *a*, *e*, *u*, and (passive) *i*. The ancient language still survives in the church and literature, but in popular usage has been replaced by several dialects, the chief being the Western (Constantinople) and the Eastern (Tartary, Persia, India): the latter adheres more closely to the ancient language. The leading grammars are those of Ancher (Venice, 1819), M. Lauer (Vienna, 1869), H. Petermann (Berlin, 1872), Carrière (Paris, 1883); for the modern dialects, E. Riggs (Constantinople, 1856) deals with the Western, and Petermann (Berlin, 1867) with that of Tiflis. To these may be added the works of Hanusz (Polish-Ar.; Vienna, 1889) and Thomson (St. Petersburg, 1887, 1890). Among the various dictionaries, mention may be made of Bedrossian (Ar.-Eng.; Venice, 1878-9), and Ancher and Brand (Eng.-Ar.; Venice, 1868). For Armenian philology in general, the works of Lagarde (*Armenische Studien*, Göttingen, 1877), Fr. Müller, and Hübschmann should be consulted.

Armenian literature begins with Mesrop (439 A.D.), who introduced an alphabet of thirty-six characters, to which two more were added in the 12th century. It was probably reconstructed and elaborated from several sources, some scholars having argued in favour of a Greek origin, whilst others have derived it from the Aramæan, through the Pehlevi. Previous to Mesrop, at all events, the Pehlevi, Greek, or Syriac alphabet—perhaps even the language—was doubtless in use. To this Mesrop, and to Sahak (Isaac) Bartevatsi, is due the Armenian version of the Bible which was made between 432 and 437. It is not certain whether it was based upon the Syriac or the Greek alone; it seems to contain both elements, and, in particular, has been carefully revised by the help of the Hexaplar version of the latter. The best edition is that by Zohrab (Venice, 1805). Armenian literature is very largely theological, and contains many translations from the Greek and Syriac, chiefly made in the 5th century. In a number of cases works have fortunately been thus preserved which are no longer extant in their native language; among these are the first part of the Chronicle of Eusebius, various writings of Philo, etc. (see Wenrich, *De Versionibus*, etc., Leipzig, 1842). The historical works are numerous, but, as regards the early history of the country, contain much unsound matter, and must be used with caution. On the other hand, they frequently offer important material relating to the several peoples with whom Armenia came into contact (Persians, Byzantines, Turks, and Mongols), and on this account are of considerable value. Among the best-known historians are Agathangelos, secretary to Tiridates the Great, continued by Faustus of Byzantium; Zenob, a pupil of Gregory the Illuminator; Moses of Choren, styled the 'Herodotus of Armenia,' in whose writings are embedded some fragments of the early literature previous to Mesrop's time. In the 7th century the chief names are John the Mamikon, Sebêos (author of a history of the wars of Heraclius), and Ghevond (Leontius), who wrote a history of the Mohammedan invasions of 661-788. For the 10th century, mention may be made of John Catholicus and Thomas Artsruni. Among the biographical works, the best are Korium's *Life of Mesrop* (Ger. by Welte, 1841), and the *Life of Nerses the Great*, by Mesrop the priest. Armenian folk-lore has always been rich in epic and legendary poems of very ancient date; but the introduction of Christianity in particular, if it did not lead to their suppression, at all events afforded no encouragement to their preservation in writing. A number of them have been recently published in the *Theologisch Quartalschrift*, vol. lxxvi., 1894 (Tübingen). Of the sacred poets, the best known is Nerses Klaietsi, called Shnorhali (1102-73). Among the more general literature are the fables of Vartan (ed. Saint Martin; Paris, 1825) and the astronomical and mathematical works of Ananias of Shirak (7th century). In the 18th century Armenian literature received a noteworthy stimulus by the erection of printing-presses at Amsterdam, Moscow, Smyrna, Vienna, etc., and more especially by the foundation of the Armenian Mekhitarist monks at San Lazzaro, Venice. Among the notable works printed by this community are the *History of Armenia*, by Michael Chamchian (Eng. by J. Avdall; Calcutta, 1827), and its *Antiquities and Archæology*, by Lucas Intshitshean (1835). For fuller surveys of Armenian bibliography, see the related works by Neumann (Leipzig, 1836); Somal (Venice, 1825, 1829); Langlois (Paris, 1867-9); Patcanian, *Mélanges Asiatiques*, iv. (1860), and sketch of the literature (Russ.: St. Petersburg, 1880); Dulaurier (Venice, 1894). For the history of Armenia in general, see the writings by the Armenian scholars already named, to which add M. Brosset (St. Petersburg, 1874-6), Gatteyrias (Paris, 1883), and Fr. Murad's recent contribution to Armenian history and literature, *Ararat und Masis* (Heidelberg, 1901), in which numerous bibliographical references will be found.

Armenian Atrocities. Within the last twenty years the juxtaposition of turbulent and bitterly hostile Mohammedans and Armenians in the Turkish empire, especially in Asia Minor, has resulted in the continued persecution and brutal massacre of the latter. In 1885 a revolutionary propaganda on the Nihilist plan commenced among the Armenians of Turkish Armenia, but it was easily suppressed. In the summer of 1893 there was a recrudescence of the propaganda, and the Kurds, the national police, were ordered to raid the mountain districts. Regular Turkish troops were sent to their assistance, and in August 1894 there was a terrible slaughter at Sassun, which roused deep indignation throughout Europe. In November of the same year a Turkish commission of inquiry, accompanied by the consular delegates of Britain, France, and Russia, was sent to Armenia. This commission took evidence, which showed that there was no justification for the barbarity practised by the authorities; nevertheless the massacres continued. The three powers then pressed the Sultan for administrative reforms, especially in the vilayets of Erzerum, Van, Bitlis, Sivas, Mamuret-el-Aziz, and Diarbekir; but the Porte met the demand in the traditional Turkish manner with delays and counter-proposals, and the Sultan decorated the officials concerned in the Sassun massacre. On May 11, 1895, a complicated scheme of reforms was presented to the Porte, and was accepted in November of the same year. Meanwhile disturbances continued, and massacre after massacre took place in quick succession until Jan. 1, 1896. Intervention was proposed, but Russia would not agree to coercion, and Britain refused to act alone. In the summer of 1896 there were massacres at Van, Egin, and Niksar. Entire villages were desolated, and plague and famine attacked those whom the sword had spared. In August 1896 the Armenians of Constantinople seized the Ottoman Bank, to call attention to their desertion by the powers. In retaliation a Turkish mob, instigated by the government, massacred some seven or eight thousand Gregorian Armenians. No reparation could be demanded for this outrage, inasmuch as it arose out of the riotous conduct of the Armenian revolutionists. Since 1896 the massacres have been sporadic, and the Armenians are still at the mercy of their Mohammedan rulers. It is estimated that (excluding the slaughter at Constantinople) from twenty to fifty thousand men, women, and children have been put to death, and the destruction of property has been enormous. Efforts to relieve the destitute widows and orphans of the slain have been made by Britain and the United States, and, though opposed by the Turkish authorities, have met with some success. Kurdish outrages occurred again in 1904, and were the subject of questions in the British Parliament. See J. Bryce's *Case for the Armenians* (1896); Green's *The Armenian Crisis* (1895); Lepsius's *Armenia and Europe* (1897); MacColl's *England's Responsibility* (1895), and *Sultan and Powers* (1896). Correspondence—*Asiatic Province of Turkey* (1895), gov. pub.: Turkey, No. I. Parts I. and II. give the proceedings of the commission of the powers to inquire into the massacres. See also speech by Lord Rosebery, and articles in *Nineteenth Century* (vol. xl., pp. 654-680), *Contemporary Review* (Jan. and Feb. 1897), and *New Review* (vol. ix., pp. 201-210, 456-465, 648-654).

Armenian Church, the oldest of all national churches. It owes its foundation traditionally to St. Bartholomew, historically to St. Gregory the Illuminator, in A.D. 276. The Armenian state was the first formally to adopt Christianity as the religion of the state. After resolutely opposing the Nestorian heresies, the Armenian Church embraced the doctrines of Eutyches (Eutychianism), holding, against the Council of Chalcedon (451), that Christ possessed but one nature, the divine—the final separation from other Eastern churches on this point occurring in 554. The Armenians gradually formulated a system of theology differing from that of the other Eastern churches, while their liturgy remained practically the same. In baptism they considered it necessary to sprinkle and to dip, three times each, and to conjoin confirmation with baptism. In the celebration of the Lord's Supper pure wine and leavened bread must be used. Extreme unction must be given only to ecclesiastics, and that after death. They worshipped the saints, but did not believe in purgatory.

In 1439 certain foreign members, especially those in Constantinople, met the overtures of the Pope for reunion in so far as to give up belief in the one nature of Christ. There were thus introduced two sects in the church—the Schismatics, who adhered to the traditional beliefs; and the Catholics, who gave up the Monophysite heresy. From their geographical position, the Armenian Christians have borne the brunt of cruel and incessant Mohammedan persecution, even as recently as 1895-6. The head of the (Schismatic) church is the Katholikos of the Etchmiadzin monastery near Erivan, under whom are the patriarchs of Jerusalem and Constantinople. See Tozer's *The Church and the Eastern Empire* (1888).

Armentières, tn., dep. Nord, France, on river Lys, 10 m. N.W. of Lille, close to the Belgian frontier; largely manufactures cloth and table linen. Occupied by the English in 1339; captured by the French in 1668. Pop. (1901) 29,401.

Armes Parlantes, in heraldry the term applied to such armorial devices as a pun on the bearer's name or attributes. Also called rebuses.

Armfelt, Gustaf Mauritz (1757-1814), Swedish statesman; distinguished himself in the Danish war of 1788 and the Russian war of 1788-90, and was the Swedish plenipotentiary at the Congress of Värälä (1790). Being sent as ambassador to Naples, he plotted against the Swedish government, for which he was condemned to death in absence; but on Gustavus IV. attaining his majority, Armfelt returned to Sweden. In 1805-7 he successfully commanded the Swedish troops in Pomerania. His support of the claims of Gustavus IV.'s son to the throne caused his arrest, and in 1811 he was banished. Thenceforth he became a Russian subject, and Alexander I. made him governor-general of Finland in 1812-13. He encouraged the Czar to resist Napoleon I., and drew up for him the plan of the Russian campaign of 1812. See E. Tegnér's *Gustaf Mauritz Armfelt* (2nd ed. 1883-94); Ingman's *G. M. Armfelt* (1900).

Armida, in Tasso's *Jerusalem Delivered*, an enchantress, who by means of a magical girdle attempted to seduce the crusaders from their vows to deliver Jerusalem from the Saracens. Overcome by a Christian talisman, and conquered by Rinaldo, she turned Christian, adopting Rinaldo as her knight. The story has been made the subject of operas by Gluck (1777) and Rossini (1818).

Armillary Sphere is an instrument formed by a combination of several rings, showing the relative positions of the imaginary circles of the celestial concave to which astronomers refer the situations of the sun, moon, and planets. The zodiac, or belt of the sky in which the movements of the greater planets take place, the equinoctial circle, the tropics of Cancer and Capricorn, the meridian and horizon, are represented, with the earth as centre. The instrument, by whose aid astronomical problems could be solved, has been superseded by the celestial globe.

Arminius (18 B.C.-19 A.D.) served in the German auxiliary troops with the Roman army. When Varus, the Roman governor, aroused the German tribes by his exactions, Arminius secretly raised the country against him, cut off his outlying forces, and annihilated his main army in the Teutoburger Wald. The disaster caused great consternation at Rome. Tiberius led a force to the Rhine, which again became the Roman frontier. From 14 to 17 A.D. Germanicus fought with varying success against Arminius, but was recalled by Tiberius in 17. On the ground of seeking absolute power over his countrymen, he was slain by his relatives. See Tacitus's *Annals*; Merivale's *Romans under the Empire* (1859-62).

Arminius, Jacobus (1560-1609), whose proper name was Harmensen, founder of Arminianism, was born at Oudewater, S. Holland. He joined the ministry at Amsterdam (1588), and became a leading theologian and preacher. He was invited (1589) to refute the attack of Coornhert on the extreme predestinarianism in the Netherlands; but abandoned the task, convinced of the untenableness of either the higher or lower predestination. He then successfully defended himself before the ecclesiastical courts. In spite of the opposition of Gomarus of Leyden, whom he defeated in argument, he succeeded Junius in the university (1603). Gomarus next traduced him as a Papist, a Pelagian, and a 'Coornherter;' whereupon he was proscribed by the clergy, and his students were subjected to persecution, although the States-general reported that he taught nothing but what could be tolerated. Prostrated by persecution, Arminius died at Leyden. Arminianism is the antithesis to Calvinism. It maintains that in respect of responsibility, guilt, and penalty, there must be a free and unpredestined will. It gave rise subsequently to the Remonstrant Church of the Netherlands, and left traces of its influence upon the Church of England. Arminius's *Works* were translated into English by James Nichols (1825-75). See Brandt's *Life of Arminius* (1724); Eng. trans. Guthrie (1854).

Armistice. Agreements for the temporary cessation of hostilities are (according to Hall's *International Law*) called suspensions of arms when they are made for passing and merely military ends, and take effect for a short time and within a limited space. When concluded for a longer term, especially if they extend to the whole or a large part of the belligerents' forces, or have a political object, they are known as armistices or truces.

Armisticio, territory of Venezuela (area, 7,040 sq. m.) on the S.W., including the country of the Upper Apure and its tributaries, and stretching W. to the Tachira R.

Armitage, Edward (1817-96), a historical and mural painter, born in London. He was a pupil (1836) of Paul Delaroche, to whom he gave assistance in the celebrated *Hemicycle* in the Ecole des Beaux Arts. For many years from 1842 he exhibited at the Royal Academy and elsewhere. In 1843 and following years he won three prizes for frescoes for the Houses of Parliament, the subjects being *The Landing of Cæsar* (1843), *The Spirit of Religion* (1845), and *The Battle of Meeanee* (1847)—as an oil picture now at St. James's Palace. A visit to the Crimea in 1855 led to his painting *The Guards at Inkermann* and *A Cavalry Attack at Balaklava.* He also painted a fine series of frescoes for St. John's (R.C.) Church in Islington. He was elected an A.R.A. in 1867, an R.A. in 1872, and in 1875 was appointed lecturer on painting to the Royal Academy; in 1883 he published *Lectures on Painting.*

Armitage, Thomas Rhodes (1824-90), English physician, born in Sussex; practised in London. Failing sight compelled him to retire in 1860, and he devoted the rest of his life, and his means, to the interests of the blind. He brought the Braille system into general use in England, reorganized the Indigent Blind Visiting Society, and founded the British and Foreign Blind Association. The Royal Normal College was established Mar. 1, 1872, by Dr. Armitage, the Duke of Westminster, and others.

Armley, tnship. in the parl. bor. of Leeds, W. Riding of Yorkshire, 2 m. N.W. of Leeds and on river Aire. Several woollen mills.

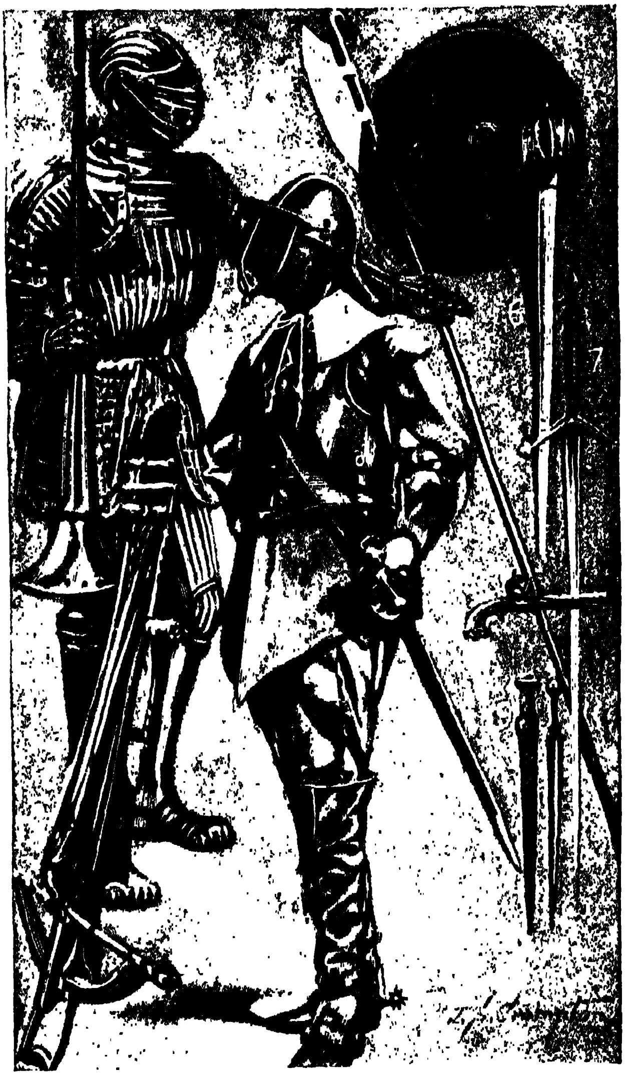
Armorial Bearings, the generic term for insignia treated of in heraldry; strictly, those *borne* on the shield.

Armorica, div. of pre-Roman Gaul, identified with Brittany, and inhabited by the Armorici. During the Roman occupation it comprised the whole of the country N. of the Loire. After the German invasion the 'tractus Armoricanus' became a sort of federal republic, until annexed to the French crown by Clovis about 500 A.D. See Brittany.

Armour, strictly, garments of defence, but also applied to weapons. Previous to the discovery of metal, weapons and hunting-gear must have consisted of clubs, axes of stone, and flint arrow-heads. Axe-heads of many different kinds of stone and of a great variety of shapes and sizes are very characteristic implements of the earliest period. In addition to spear-heads and arrow-heads of exquisitely finished workmanship in flint, the art of fabricating weapons in this material reached its highest point in the knife-daggers, which, especially those of Scandinavian origin, display on their edges what is technically known as 'ripple-flaking.'

With the use of bronze the variety of weapons increased, in the form of axes, daggers, swords, and shields. The earliest form of bronze dagger is a thin, knifelike blade about six inches long, broad at the hilt, and fastened to the handle by large rivets of bronze. The leaf-shaped sword, found all over Europe, was cast with the handle-plate in one piece, and was without a guard. Scandinavian bronze swords are longer than British. A narrow rapier-shaped variety occurs frequently in Ireland. Spear-heads of bronze are chiefly leaf-shaped, though barbed examples have been found. The shields of the Bronze Age were circular, with concentric ridges and rows of studs, and the handle was fixed beneath the boss. In Central Europe the Early Iron Age produced swords of iron formed in exact imitation of the leaf-shaped sword of the previous age. The Heroic Age in Greece is characterized by a bronze sword, double-edged, long and sharp, having gold or silver studs set in the hilt and scabbard; and its defensive armour consisted of helmet, cuirass, greaves, and shield, all of bronze. In the earliest Egyptian period the archers were provided with arrows made of a reed tipped with bronze. Their swordsmen carried straight, double-edged weapons of bronze, tapering from hilt to point. Their shields were of peculiar form, round-headed but square below, and the spears used at this time were fitted with bronze leaf-shaped heads. The armour of the Etruscans was, in the main, similar to that of the Greeks.

About the 1st century B.C. the Romans used two varieties of sword - the short, double-edged *gladius*, and the long, single-edged *spatha*. But of all the weapons carried by the Romans the most characteristic was the *pilum*, a wooden shaft fitted with a stout iron head resembling the modern pike. It could either be hurled, javelin-wise, or used like a bayonet, as well as to ward off sword-strokes. On the Trajan Column there are shown two varieties of shield—one oblong, rectangular, and highly convex; the other oval and flattened, the latter being borne by knights. During the Merovingian period (450-760 A.D.) the *francisca* or battle-axe was the characteristic weapon. It was hurled with unerring aim at an antagonist. The Frankish *angon* was a development of the Roman *pilum*.

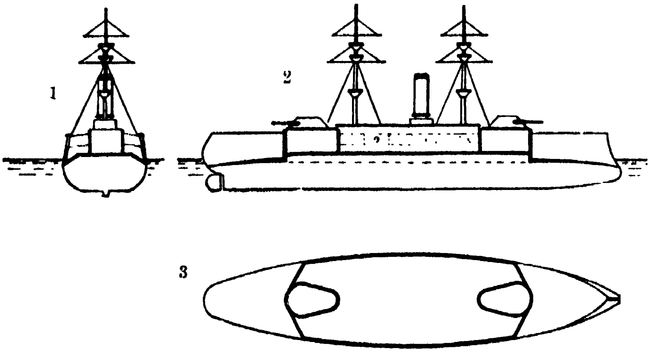


Specimens of the Armour and Weapons in use in bygone days.

1. Knight with lance, early 16th century. 2. Crossbow with windlass, 15th century. 3. Cromwellian trooper. 4-9. Scottish arms—(4) Lochaber axe, (5) targe or shield, (6) broadsword, (7) two-handed claymore, (8) steel pistol, (9) dirks

Nearer the period prior to the Norman conquest, most weapons were of iron, consisting of broadswords with or without guards, and the curved blade called in A.S. *seax*, with sheaths of wood or leather. The longbow became of great importance, and mace-heads of iron and bronze were much in vogue. The shield, oval or circular, was of wood covered with leather, and had a high conical boss. Body armour consisted chiefly of the *byrnie* (chain-mail), the *lorica*, and crested helmets. For two centuries after the conquest our principal authorities are the royal and baronial seals, in one of which Alexander I. of Scotland is depicted wearing hauberk and tunic, and bearing a lance and kite-shaped shield. A Norman knight was clad in hose of mail, steel knee-caps, a byrnie, gambeson, and helmet, and bore two swords, dagger, spear, and shield. Archery was encouraged in England by statute. The crossbow, at first prohibited by papal decree, came into use towards the close of the 12th century. With the 13th century we have fresh information in the knightly effigies which are extant. Archers and crossbowmen increased; and the varieties of armour, weapons, and decorations largely multiplied, including hoods of chain-mail, greaves of metal or of *cuir bouilli*, banded armour, the dagger or *miséricorde*, horse caparisons, and banners of display. With the advent of gunpowder in the 14th century, the use of body armour naturally decreased, chain-mail hauberks being discontinued. Leather and whalebone were much used in addition to metals in the manufacture of elbow-guards, gauntlets, knee-pieces, and sollerets (armed shoes). From the 14th to the 16th century Scottish Highland armour attained distinction by the fine interlaced-work carving of dirk handles, the iron-handled circular shields of wood and leather decorated with brass studs, the richly-carved powder-horns, steel pistols of fine workmanship, the Jedburgh staff, the Lochaber axe, and the claymore. See Ducange, Froissart, Hefner, in *Archæologia*, *Recherches Historiques*, and Du Sommerard's *Les Arts au Moyen-Age* (1838 46), Brett, *Ancient Arms and Armour* (illus. 1894).

Armour, Naval. The introduction of armour for ironclads was the result of the invention of shell fire. Apart from some experimental craft never tried in warfare, the first armoured vessels were built in 1854-6 in France, for the purpose of attacking the Russian shore batteries in the Black Sea. At almost the same time several armoured iron floating batteries of similar type were built in England, the earliest being the *Trusty*, *Thunder*, *Glatton*, and *Meteor*. None of these were seagoing vessels in the ordinary sense of the term; but soon afterwards M. Dupuy de Lôme, in France, designed and built the sea-going armoured frigate *Gloire*, which began a new era in naval construction. The British Admiralty followed in May 1859, by laying down the large armoured ship *Warrior*, which was launched in December 1860. A somewhat similar vessel, the *Black Prince*, was launched in 1861. For the sake of economy, the French framed the *Gloire* of wood and plated her with iron. The *Warrior* and the *Black Prince* were built of as well as armoured with iron; and although, for some years later, it was the practice in England as well as abroad to armour wooden ships, the superior strength and lasting qualities of iron ones soon drove wood, as a constructive material, from the field. Against the guns of the *Warrior's* day her 4½ in. of iron armour with 18 in. of teak backing and ½ in. interior iron skin were proof. As guns grew more powerful, 5½ in. armour, such as was carried by British ships of the *Agincourt* class, came in. In 1865 the *Bellerophon* was launched, with armour 6 in. thick; in 1868 the *Hercules*, with 9 in.; and in 1871 the *Devastation*, with 12 in. So the increase went on, until the *Inflexible*, launched in 1876, bore some armour which was as much as 24 in. thick. It had already become necessary to look for armour offering greater resistance than mere iron, as it was obvious that no vessel could carry much armour of such extreme weight. The difficulty was met to some extent by providing armour which, though still mainly of iron, had a steel face. This 'compound' armour, which was applied in certain positions to the *Inflexible*, marks the beginning of the complete supersession of iron by steel. Nearly all battleships built between 1880 and 1890 had 'compound' armour; but this then gave way gradually to armour composed throughout of steel, the natural resisting qualities of which were later immensely improved by the tempering process known as Harveyizing (see Harvey Steel), and by the mixture with the steel of small proportions of other metals, and notably of nickel. The latest and best is known as Krupp armour. The necessary thickness has therefore decreased, and instead of the 24 in. of wrought-iron armour used on the *Inflexible*, from 12 to 14 in. of Harvey nickel steel, or even less of Krupp armour, has been found to be far more efficacious, in spite of the greatly increased power of guns. Indeed, at the end of the 19th century, the major part of the armour of most new battleships was not more than 6 to 9 in. thick. In the earlier type of ships it was thought necessary to protect only the battery with thick armour, the sides of the ship being merely cased. The transition stage was marked by partial protection of the battery (turret, barbettes, and armoured casemates for separate guns), and by partial protection of the sides. Later developments are characterized by the entire protection of the battery, and by protection of about two-thirds of the water-line, with thick armoured bulkheads joining the ends of the side armour, and with a curved steel deck rising from a little below the water-line to a little above it. The 'protective deck,' however, which is now universally applied to large cruisers as well as to battleships, was introduced in some vessels as early as about 1872. The development of armour for warships marks, in its various stages, the course of the long struggle between artillery and artificial protection, and should, of course, be studied in connection with it. See Very's *Navies of the World......Construction*, etc. (1880); Orde Browne's 'Present Position of British and Foreign Armour' (in *United Service Mag.*, 1891); papers on armour in successive issues of Brassey's *Naval Annual*; *General Information Series* of U.S. Navy Department, especially v. p. 239, vi. p. 322, x. ch. vi., xi. ch. vi.; *Notes on Naval Progress* (Navy Dep., Washington); and *Proceedings* of U.S. Naval Institute.



Position of Armour on H.M.S. 'Majestic.'
1, Cross section; 2, longitudinal section; 3, plan.
(The black line shows the protective armour.)

Armour, Philip Danforth (1832-1901), American merchant and philanthropist, born at Stockbridge, N.Y. In 1863 he founded Armour, Plankinton, and Co., which, as Armour and Co., became the most extensive pork-packing business in the world. Remarkable for business acumen and directive ability, he was no less distinguished for his benefactions. He founded the Armour Institute of Technology and the Armour Mission in Chicago, with endowments amounting to two and a half million dollars.

Armoured Trains. See Trains, Armoured.

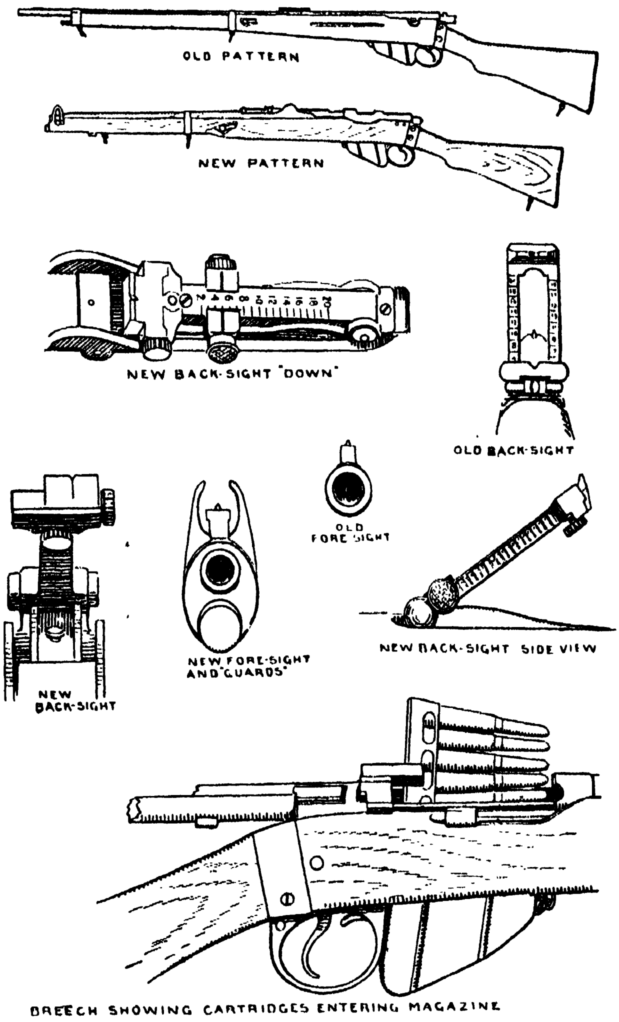
Armourer, in mediæval times a maker of armour; now a skilled artificer employed (1) in each troop of cavalry or company of infantry of the army, and (2) in each ship of the navy, to see that the rifles, bayonets, etc., are kept in proper repair.

Armourer-Sergeants. Candidates for enlistment in the armourer section of the British Army Ordnance Corps are selected from the trained workmen of the Royal Small Arms Factory at Birmingham. The men are taken on probation as privates for three months, and, if found satisfactory, are then promoted to the rank of sergeant. Armourer-sergeants are attached either to a unit or to a circuit which comprises the stations of a number of units. Their duties are to examine and repair all small arms and machine guns of the troops, and to make good minor defects in the metal work of accoutrements and other equipment.

Armpit. See Axilla.

Arms, a general name given to portable weapons of offence. Modern arms are classed as firearms, and those wielded at close quarters with a cut or thrust. The modern rifle, carbine, and revolver used by the European powers differ only in slight points of detail, and there is but little choice between them as effective weapons. The Lee-Enfield rifle is a breech-loader on the bolt system, with a detachable magazine for ten cartridges. The barrel is made of steel, and has five grooves with twist towards the left of one turn in thirty-three, the back part being cased in wood to protect the hand from the heating of the barrel. The charge is 31½ grains of cordite, by means of which an elongated bullet weighing 215 grains is discharged with a velocity of 2,000 ft. per second. The bayonet is double-edged, and makes the effective thrusting length of the rifle a little over five feet. The carbine used by cavalry is simply a short rifle with a smaller magazine, being a weapon lighter and more suitable to a mounted man. The modern tendency appears to be to reduce the length of the ordinary infantry rifle and make it available for all services, while for purely infantry purposes a lengthy sword-bayonet may be attached when wanted. The cylinder of a revolver is usually chambered to hold six cartridges. The calibre of the barrel is larger than that of a rifle, as the weapon is only used at short ranges, and it is necessary to have the bullet of a weight that will not only wound a man, but stop him from closing. Of the ancient and mediæval weapons in use before the introduction of gunpowder—such as the sword, pike, mace, javelin, axe, etc.—there only remain the various types of bayonet, sword, and lance. The ordinary sword or sabre has a blade of fine steel, and is adapted both for cutting and thrusting. The British cavalry sword has a blade of 32 in., and with its hand-guard weighs 2 lbs. The Oriental sabre or scimitar and the naval cutlass are short weapons with a broad curved blade adapted for cutting only. On the other hand, the sword blade, when straight and narrow, is called a rapier, and is used only for thrusting. The ordinary sword of an infantry officer is of the rapier type, but is used more as a badge of authority than as a weapon of offence. In the S. African campaign the dismounted officers carried carbines or rifles instead of swords, in order to avoid being singled out for special attention by the enemy's riflemen. The lance used by cavalry has a shaft of bamboo or ash, with a head and shoe of steel. The British lance is 9 ft. long, and weighs about 4 lbs. There has always been a controversy about the respective merits of sword and lance at close quarters. The good points of each weapon are perhaps best utilized in the existing system of arming front-rank men with the lance, while the remainder of a squadron trust to their swords. See GUNS and RIFLE; also Williamson's *Engines of War* (1841); Greener's *Science of Gunnery* (1841); Jervis's *Our Engines of War* (1859); Tennant's *Story of the Guns* (1864); Kensington's *Artillery Machines* (1881); Greener's *The Gun and its Development* (1881; 7th ed. 1899); Bartlett's *Some Weapons of War* (1883); Bond's *Treatise on Military Small Arms* (1884); Burton's *Book of the Sword* (1884); Hutton's *Cold Steel: Treatise on the Sabre* (1889); *Treatise on Service Ordnance* (1900); and Maindron's *Les Armes* (1900); also Gerrare's *Bibliog. of Guns and Shooting* (1896).

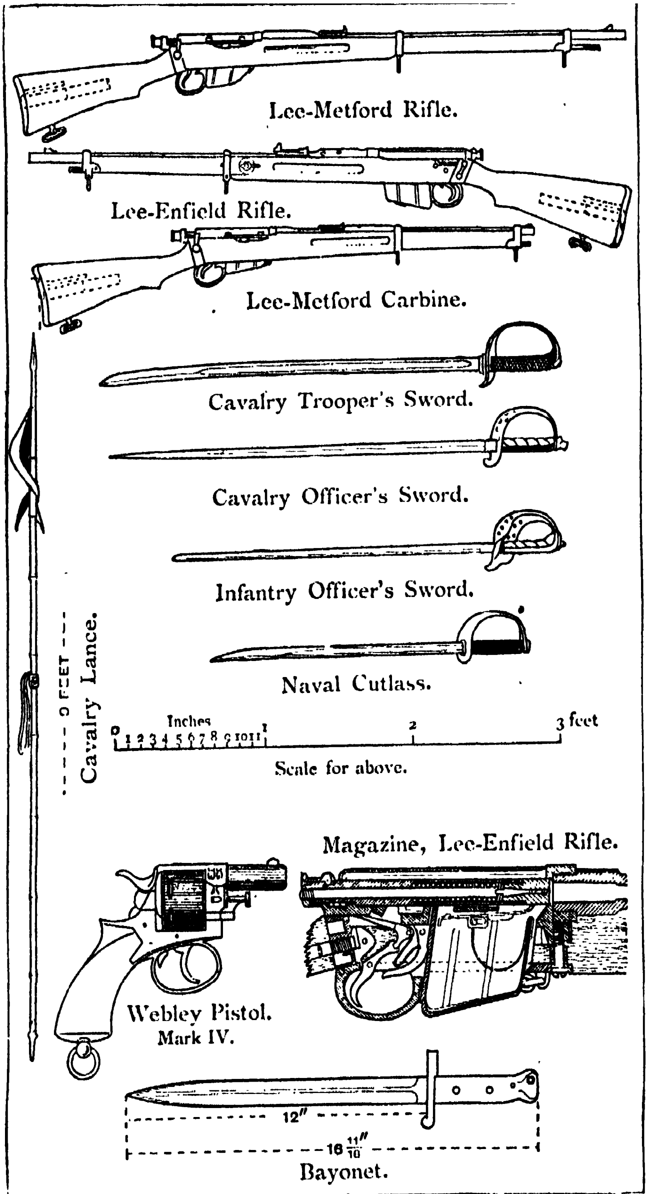
Arms, Coat of, the bearings on an individual shield. Originally embroidered on the *surcoat;* hence the name. See HERALDRY.



The New Short Rifle.

Armstead, Henry Hugh (1828), English sculptor; educated at the Royal Academy under Professors Bailey, Leigh, and Carey; became R.A. in 1879; modelled several of the allegorical groups on the south and east sides of the base of the Albert Memorial, Kensington Gardens, London; carved oak panels in H.M. robing-room in the New Palace, Westminster, illustrating the history of King Arthur and Sir Galahad; and executed many portrait-busts and statues, as that of Lord John Thynne in Westminster Abbey.

Armstrong, 'Archie' (d. 1672), a well-known Eskdale sheep-stealer, who became official court jester, and was notorious for his freedom of speech, an example of which was the grace he said in Archbishop Laud's presence: 'Great praise be given to God, and little *laud* to the devil.' But having ridiculed Laud once too often, he was banished from court, and spent his closing years in luxury in London and in Cumberland. He is introduced by Sir W. Scott into *The Fortunes of Nigel.* See Doran's *Hist. of Court Fools* (1858); Chambers's *Book of Days*, vol. i. pp. 180-5.


Lee-Metford Rifle.
Lee-Enfield Rifle.
Lee-Metford Carbine.
Cavalry Trooper's Sword.
Cavalry Officer's Sword.
Infantry Officer's Sword.
Naval Cutlass.
Cavalry Lance.
0 FEET
Inches
0 1 2 3 4 5 6 7 8 9 10 11 1 2 3 feet
Scale for above.
Magazine, Lee-Enfield Rifle.
Webley Pistol.
Mark IV.
12″
16 11/16″
Bayonet.

Modern British Arms.

Armstrong, John (1709-79), physician, poet, and miscellaneous writer, was born at Castleton manse, Roxburghshire. He practised in London, writing several medical treatises. In 1746 he became physician to the Hospital for Sick and Lame Soldiers, and from 1760 to 1763 was an army doctor in Germany. He published in 1736 a rather objectionable poem, *The Economy of Love*, which hurt his reputation; but in 1744 he atoned for this in his *Art of Preserving Health*, one of the best didactic poems in the language. He was a friend of Thomson, Wilkes, Mallet, and Fuseli.

Armstrong, William George, first Baron Armstrong (1810-1900), was the son of a Newcastle merchant. As a boy he took considerable interest in mechanical devices, and learned the use of tools. After leaving school he was articled to a Newcastle solicitor, with whom he afterwards entered into partnership. He early began investigations on electricity. In 1845 he invented the hydraulic crane—which procured him the fellowship of the Royal Society—and soon afterwards the hydraulic accumulator. He next applied hydraulic power to hoists, machines for opening and closing dock gates and spring bridges, capstans, turn-tables, wagon-lifts, etc. The Elswick Engine Works, near Newcastle, were founded for the manufacture of the rifled ordnance gun that bears his name. It was adopted by the government, and in 1859 he was appointed government chief engineer of rifled ordnance. The English government introduced 3,000 Armstrong guns into the service between 1859 and 1862. In 1863, however, it ceased to use the gun, which requires expert handling, and practically returned to the simpler muzzle-loading type, which it retained until 1880. Armstrong, resigning his appointment, returned to Elswick, where he developed his works, which were now free to supply heavy ordnance to foreign countries. When president of the British Association meeting in 1863, Armstrong's speech on the probable early exhaustion of our coal fields led to the appointment of a royal commission on the subject. Besides the Elswick gun factory, he also founded the Elswick shipyards for the construction of steel warships. He was created a peer in 1887. See his *Electric Movement in Air and Water* (1897).

Armstrong, William (fl. 1596), or Kinmont Willie (from the name of his castle), 'the starkest man in Teviotdale,' and the dread of the English border, is known to fame through the ballad of *Kinmont Willie*, which records his rescue by Scott of Buccleuch, the Scottish warden, from Carlisle Castle (1596), in which he had been imprisoned by the irritated English borderers. See Scott's *Minstrelsy of the Scottish Border*, ed. T. F. Henderson (1902).

Army. An army, in its broadest sense, signifies a body of armed and trained men organized for warfare. The term is applied to three different things—*viz.* national, regular or standing, and field armies. A national army is the total available force of men trained (or partially trained) in the use of arms which a nation can call upon to fight in time of war. A regular or standing army is that portion of the national army which is actually serving with the colours. Field armies are those portions of the national army which are engaged in a campaign, and are chiefly composed of regulars. In all ages the maintenance of a force of armed men has been a paramount factor of national existence. A large and well-organized standing army is the main element in the composition of a first-class power, though notable exceptions to this rule are furnished by Great Britain, whose national defence lies primarily in her navy, and the United States, whose geographical position and foreign policy render superfluous any great military strength. The continental military nations of Europe raise their armies on the principle of universal military service—*viz.* compulsory enlistment, short service in the regular army, and a long period in the reserve. Consequently the armies of the chief continental powers far exceed those of Great Britain and the United States, who follow a system of voluntary enlistment.

The strength of a field army chiefly depends on the nature of the operations to be undertaken, and the character and numbers of the enemy's forces. For example, the four German armies which invaded France in 1870 consisted of 45,000, 136,000, 118,000, and 70,000 men respectively. On the other hand, the British-Egyptian army which completed the conquest of the Sudan in 1898 was only 22,000 strong. In the one case the enemy consisted of a large and, it was supposed, well-organized modern army; in the other they were merely savage tribesmen. Though a field army varies in numbers, it is divided into certain parts—battalions, batteries, brigades, divisions, etc.—each of fixed strength. It chiefly consists of infantry, cavalry, artillery, engineers, and commissariat and medical corps. The whole is under the command of one man, who, with the aid of various staffs, feeds, transports, and manœuvres his troops.

Infantry forms the bulk of a field army; the proportions of the other arms depend on circumstances, the chief of which are the nature of the country in which the campaign takes place, and the special character of the operations. In a mountainous country horse and field artillery and cavalry are at a disadvantage, and their proportion to infantry is smaller than if the ground were flat and open. In the former case the engineers are increased for improving communications. In a country devoid of railways, the army service corps is increased for the extra transport required; where lines exist, the engineers are increased for their repair and maintenance, and for working the traffic. For the operations of siege warfare, the heavy artillery and engineers are increased for carrying out bombardments and constructing siege works respectively, and the mounted troops are decreased. When fighting an unusually mobile enemy, the mounted branches are increased—*e.g.* at the beginning of 1901 the cavalry and mounted infantry in the British army in S. Africa amounted to nearly half the infantry.

Historical Sketch.—1. Ancient armies. The military forces of the earliest times were little better than armed multitudes, possessed of a certain amount of rough organization, but unable to travel great distances, or carry out any very serious operations. In the 16th century B.C., the Egyptian forces under Sesostris, numbering, according to tradition, over half a million men, conquered and laid waste all the country as far east as India. Chariots and horsemen were important factors in the Egyptian method of fighting; but victory depended on the infantry, which formed the bulk of the army. The reverse was the case with the well-organized Persian armies which existed about a thousand years later, the horsemen far exceeding the foot-soldiers. The Spartans, Athenians, and Macedonians were the first European nations to possess good armies. The general Greek military organization was on a militia basis, and no standing army was maintained. Every freeman was bound to take up arms at the age of eighteen. For the first two years he served at home, but after that, until he was forty, in any foreign country where the state was at war. The most important element in the army was infantry, which was divided into two main branches, the *hoplitai* and *psiloi*. The former were heavy troops, and in action were arranged in the favourite Greek fighting formation, the phalanx—a body of 4,000 men drawn up in lines from eight to sixteen deep. The *psiloi* were lightly-armed troops, who carried out the skirmishing duties of the army, harassed the enemy, and hung round the flanks and rear of the phalanx with the cavalry in time of battle. The Greek army reached the zenith of its efficiency under Alexander. The recruiting, transport, and provisioning branches were all well organized.

The Roman armies which ruled the world from about the 3rd century B.C. to the 8th A.D. were probably the finest, comparatively, that have ever existed. They were at first formed entirely of militia. Every one between the ages of seventeen and forty-six—except the very lowest and poorest class—could be called on to bear arms in the service of the state. Consular armies were raised every year for some expedition or campaign, at the end of which they returned home and were disbanded. This course was found impracticable for some armies which were employed in very distant lands, and so they were often kept under arms for several years, a fact that eventually led to the formation of a standing army distinct from the militia, by which it was augmented for the prosecution of great foreign wars. The legion was the chief feature of Roman armies. It was composed of about 4,000 infantry and 300 cavalry, and was lighter and more extended in formation than the Greek phalanx. It was consequently superior in mobility, and better adapted for offensive operations. The infantry of the legion were divided into four classes—*hastati,* young men lightly armed, forming the first line; *principes,* heavily-armed men of great strength, forming the second line; *triarii,* the oldest men, heavily armed and armoured, in the third line; and *velites,* or light troops, corresponding to the Greek *psiloi*. The first three classes were each divided into ten *manipuli,* commanded by centurions. After the adoption of standing armies the legion was increased to over 6,000 men, and was divided into ten *cohorts.*

Infantry was still the main element in an army throughout the long period during which the Frank and German armies ruled Europe, after they had overthrown the Roman power. All freemen bore arms, and in war were obliged to follow and obey the rulers of their respective tribes. No standing army was kept up, but the warlike spirit of the nation was so strong that it was considered the highest honour to bear arms, and every man was practically a trained soldier.

2. Mediæval armies. About the 9th century, the 'feudal system,' which had been slowly developing for some time past, finally established itself as the basis of European army organization. It arose originally through the young men of a nation gathering round the nobles, serving under their banners in war time and garrisoning

their castles during peace. Each of these bands practically formed a small standing army, being paid for their services by gifts of booty or land. The profession of arms came to be regarded in time as an honourable and profitable calling, and the bands grew stronger and more numerous. The nobles owed allegiance to the king, and when the latter required an army it was formed of these feudal bands, supplemented by a levy of militia from the freemen of the nation. The chief arm of the feudal armies was cavalry. It was divided into two classes—the knights and their retainers, the men-at-arms; and the hobelers, or light horsemen. In the former the horses were protected by armour. The riders were armed with lance, sword, and mace, and were covered from head to foot with very heavy armour, which rendered them quite helpless when unhorsed. The foot-soldiers were also divided into two classes—archers, with bucklers and steel caps, and armed with longbows, swords, battle-axes, and brownbills; and the light infantry, with iron gloves and long knives. The infantry branch of the army was greatly neglected, its training uncared for, and its fighting power regarded with contempt by the leaders and mounted soldiers.

Table showing the relative Proportions of the various Arms in an Army, 1800-1900.

Date.	Infantry.	Cavalry.	Artillery.	Engineers.	Train.
Napoleon's armies, 1802.	1	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{40}$	$\frac{1}{30}$
Second German army, 1870	1	$\frac{1}{5}-\frac{1}{6}$	$\frac{1}{7}-\frac{1}{8}$	$\frac{1}{22}$	$\frac{1}{13}$
A British army,* 1900 .	1	$\frac{1}{5}$ $\frac{1}{6}$	$\frac{1}{4}-\frac{1}{5}$	$\frac{1}{15}-\frac{1}{16}$	$\frac{1}{5}$ $\frac{1}{6}$

* An army corps with a cavalry division has been taken as an example.

Comparison of the World's Armies.

Country.	National Army.	Regular Army (in peace).
Austria-Hungary	5,872,000*	362,000
Belgium	183,000	51,000
British Empire	1,050,000†	227,000‡
China	1,000,000	300,000
Denmark	62,000	10,000
France	4,300,000	628,000
Germany	3,000,000	600,000
Greece.	178,000	25,000
Italy	3,200,000	268,000
Japan	603,000	158,000
Netherlands	500,000	25,000
Persia	105,000	24,000
Portugal	157,000	32,000
Russia	4,600,000	1,100,000
Servia	353,000	22,000
Spain	1,000,000	98,000
Sweden-Norway	600,000	57,000
Switzerland	515,000	—
Turkey	1,500,000	180,000
United States	106,000	70,000

* Includes the levy-in-mass, 4,000,000.
† Includes all the armed forces of the empire.
‡ Exclusive of the Indian native regular army.

The events which led to the downfall of the feudal system were as follows:—(1.) The success of the English archers against the French at Creçy in 1346, at Poitiers ten years later, and at Agincourt in 1415, England having practically abandoned the feudal system under Edward III. (See ARMY, BRITISH, *Historical Sketch.*) (2.) The victories of the Swiss infantry, which was armed with sword and halberd, wore no armour, and fought in wedge-shaped masses, at Morgarten (1315), Sempach (1386), Granson (1476), Morat (1476), and Nancy (1477). (3.) The introduction of standing armies, chiefly infantry, and at first largely composed of foreign mercenaries, but later assuming more of a national character. Charles VII. of France was the initiator of this movement, which he originally started with the idea of rendering himself independent of the barons. The *compagnies d'ordonnance* in 1445, the *francs-archers*, and, later, the pikemen and *landsknechte*, proved completely the superiority of a standing army to a feudal militia.

3. Armies after the introduction of gunpowder. The rise of standing armies and the development of the use of gunpowder proceeded contemporaneously, but it was long before firearms superseded bows and pikes. Although a small cannon was used at Creçy, the musket did not become the recognized arm of the foot-soldier until over two hundred years later. During this period every improvement in firearms gave increased value to infantry, and it gradually took the place of cavalry as the principal arm. The feudal militia of the middle ages was followed by a system of voluntary enlistment in time of peace; if necessary, the standing army was increased by compulsory levies in time of war. Armies were raised by contract, the king paying a fixed annual sum for this purpose to certain of his nobles. The latter commanded the regiments which they enlisted, and selected captains, who usually raised and commanded the companies under a further contract with the nobles. Regiments were at first very strong, often mustering 3,000 men; but as the use of firearms increased, a more open fighting formation was adopted to avoid severe loss. The old company, 500 or 600 strong, became thereby too extended for efficient control by its captain, and was reduced in number, with the consequent reduction in strength of the regiment.

The 18th century practically witnessed the foundation of present-day army tactics and organization. Under Frederick the Great the Prussian army gained a high reputation among European nations for manœuvring power; and the efficacy of a combination of rifle and bayonet in fighting was firmly established by the experiences of the Seven Years' war (1756-63). The armies of the French revolution a few decades later were organized on Frederick's system of brigades and divisions, and at first were raised entirely by voluntary enlistment. The extraordinary success of Napoleon's arms attracted recruits, and for some time no difficulty was experienced in raising enormous armies. But the long-continued wars with almost every nation of Europe eventually drained the country of the class willing to volunteer for service, and compulsory enlistment became necessary. In 1798 a law was made authorizing conscription, by which every able-bodied man was compelled, if called out, to serve for at least five years. To keep pace with France, other nations were forced to adopt the new system, until, finally, England was the only European exception to the rule of compulsory service. A further development of the scheme occurred later, when Prussia originated the idea of short service in the regular forces, followed by a long period in the reserve, every man in the latter being liable to service in an emergency, and being obliged to go through an annual training. In this way the whole manhood of a nation became trained in the use of arms. The system was copied by other powers, with the result that now the principle of 'compulsory enlistment, short service, and reserve' is in universal vogue among the continental nations of Europe. See Jerram's *Armies of the World* (1900); *Armies of To-day* (various writers, 1893); Köpper's *Armies of Europe* (trans. by Count Gleichen, 1897).

Army, British. The military requirements of a nation depend on its geographical position, national wealth, and various political considerations. The expenditure necessary to maintain an army may be looked upon as an insurance which, up to a certain point, is a necessary precaution. The territories of continental powers are open to sudden invasion, and can only be effectively guarded by an armed nation. Great Britain, isolated and surrounded by the sea, has more time to prepare in case of hostilities, and, in consequence of her naval strength, and the difficulties attending the transport of troops by sea, can rest secure with a comparatively weak land force. The defence of the United Kingdom is but one factor in a great imperial problem. India must be held by a large military force, and the relief and reinforcement of its garrison require the occupation of strategic points. For the purpose of passive defence, troops are required in every part of the globe, and expeditionary forces have to be provided for emergencies.

Regular Army.—The regular troops on a peace footing have to be divided into two approximately equal portions—one at home and one abroad—in order to carry out the reliefs of the foreign garrisons. The normal distribution of the regimental establishments of the regular army may be illustrated by that laid down in the Army Estimates for 1905–6 as follows:—

Home Establishment, including depôts and staff of auxiliary forces	156,223
Colonies and Egypt . . .	61,425
Indian Establishment (European)	75,008
Total Regular Army .	292,656

The British army is recruited on the voluntary system. It is impossible to train men at home, send them abroad, acclimatize them, and then bring them back for discharge within the short periods of service that are necessary under any system of compulsion. A distinct separation between the forces for home and foreign service has often been suggested, so as to admit of compulsory short service for a home army combined with a voluntary long-service engagement for foreign garrisons. The disadvantages of having two different methods of enlistment are obvious, while any compromise between voluntary and compulsory service would inevitably lead to substitution in some form or other, and interfere with the labour market and the supply of recruits.

Militia.—In addition to the standing army, a militia has been in existence in England from the earliest days. The militia is a partially-trained body available in case of imminent national danger or great emergency to supplement the regular army in the defence of the country. The sovereign may in such cases direct by 'proclamation' that the whole or part of the force may be embodied for military service within the United Kingdom, in which case the militia for the time being becomes a part of the regular army for home service, and amenable to military law. The 'constitutional force,' whose theory is conscription, but whose practice is voluntary engagement, plays an important part in the system on which British forces are raised. The volunteered services of embodied militia have been accepted on many occasions for duties abroad, and even for active service. By the Militia Bill (Feb. 1905) the militia is made liable for service abroad, and thus becomes *ipso facto* a reserve of the regular army. Each unit has attached to it a 'permanent staff,' consisting as a rule of an adjutant, a quartermaster, and a certain number of non-commissioned officers and drummers, all supplied from the corresponding arm of the regular army, and in the case of infantry by preference from the territorial regiment to which the militia unit belongs. To secure the services of trained officers in the militia battalions, encouragement is given to retired officers of the regular army to take commissions in the militia. The force is also made a stepping-stone for admission to first appointments in the army, and a number of subalterns are thereby ensured. The militia is, in a limited sense, a reserve force. It increases the popularity of the military profession, and gives many recruits to the service. Till 1901 the militia reserve consisted of a number of men in each militia unit who, in consideration of a retaining fee, agreed to join the regular forces when the reserve was called out. (See below, *Reserves*.)

The militia is divided into infantry, artillery, engineers, and medical corps, and under the territorial system the whole is affiliated to corresponding branches of the regular army. In 1905 the establishment of the militia (excluding the permanent staff) amounted to 104,654 men. See Militia.

Reserves.—In case of war it is of vital importance that the army should be increased in numbers rapidly, and to effect this it must have a large body of trained reserves. To obtain such a body without inordinate expense, the conditions of service had to be modified, and the short service system of European armies in some form adopted. Up to Oct. 20, 1904, a recruit was not to engage for more than twelve years' service, and might engage to serve the whole time with the colours, or part of the time with the colours and part in the army reserve. On Oct. 20, 1904, an order was issued that all enlistments until further notice were to be for a period of nine years with the colours and three in the reserve. The army reserve thus formed consists of 104,000 men. In 1903 it was decided to create a new militia reserve of 50,000 men, which will fulfil the same functions for the militia that the army reserve does for the army. In time of war or national emergency the militia will thus be raised to a war footing without any disturbance of regimental organization. In 1905 the strength of the new militia reserve was 7,500.

Yeomanry.—The mounted troops termed yeomanry were originally raised in 1804, when the invasion of the country by Napoleon was imminent. The force is liable to be called out for active service in case of national danger or great emergency. It differs from the volunteer force in that at training and exercise its members are subject to military law, and that pay is issued in consideration of the men providing themselves with horses. A contingent allowance is also issued to each corps to assist in the provision of clothing, saddlery, drill grounds, and the many expenses entailed by being called out. For recruiting purposes it is desirable that the yeoman should have a handsome uniform, and be drilled as a mounted man. On the other hand, neither men nor horses can be sufficiently trained to become efficient cavalry in the short time their services are available. The present tendency is to arm the yeoman with a rifle, and teach him to fight dismounted, while he may still be used as a cavalry soldier for the purposes of reconnoitring and scouting. The Imperial Yeomanry in 1905 numbered 25,217 men.

Volunteers.—The present volunteer force owes its origin to the patriotic feeling engendered by the fear of a French invasion in 1859. The policy of giving assistance in proportion to efficiency was from the first adopted by the government, and it is probably to this as much as to any other cause that the system has developed lasting qualities. The formation of companies and small detached corps in towns and country districts was followed by the grouping of these units into administrative battalions. After the creation of the territorial system, the volunteer force became a component part of the regular army, and the infantry and artillery were attached to the regular forces belonging to the district.

The training of volunteer corps is carried out under the immediate instruction of the permanent staff, consisting of the adjutant and a number of sergeant-instructors. Pecuniary assistance is given by government mainly in the form of a capitation grant to the corps for each officer and soldier in it who attains a certain standard of efficiency. It is now contemplated that further aid in the provision of ranges, training camps, equipment, and transport, combined with regular summer manœuvres with regular troops, will make the citizen army a still more valuable factor in defence.

The elements composing the volunteer force are as follows: artillery, engineers (including submarine miners), mounted infantry, cyclist infantry, and infantry. There are also a railway staff corps and a medical corps. The total number of the volunteer establishment in 1905 amounted to 261,886 men.

Army in Peace.—The introduction of short service in 1870 and the formation of reserves was followed by the localization scheme which is the basis of our present organization. Great Britain is at present divided into a number of commands, which are subdivided into regimental districts, each of which is assigned as a recruiting area for a territorial regiment. Each regiment of infantry comprises normally two line battalions (one at home and one abroad), two militia battalions, a regimental depôt, and such volunteer battalions as exist within the area. The garrison artillery and the militia and volunteer engineers have also a territorial connection, but the details of the localization of troops are still in process of modification.

The result of the campaign in S. Africa made it evident that the army must not only be increased in numbers, but that the latent military resources of the nation must be developed. It was therefore decided that the United Kingdom should be divided into six great commands (Aldershot, Salisbury Plain, Ireland, Colchester, York, and Scotland), each sufficiently large to embrace the amount of raw military material which could be built up together, progressively trained, and turned into an army corps, and that each of these territorial areas should be provided with a general staff, transport, and equipment. This arrangement was upset by an Army Order, dated Jan. 6, 1905. The army corps were described as commands, and constituted as follows:—(1) Aldershot, (2) Southern, (3) Eastern, (4) Irish, (5) Scottish, (6) Northern, (7) Welsh and Midland. London forms a separate command. The reserve system of the regular army and militia provides for raising the fighting units of each command from a peace to a war strength. The regimental establishments in prospect were thus briefly summarized in the Army Estimates for 1905-6:—

Regular Forces (regimental), Home and Colonial	197,366
Colonial and Native Indian Corps .	12,762
Army Reserve	104,000
Militia (including permanent staff)	132,408
Militia Reserve Division . . .	7,500
Militia, Channel Islands (including permanent staff) . . .	3,159
Militia, Malta and Bermuda (including permanent staff) . .	2,585
Imperial Yeomanry (including permanent staff)	27,638
Volunteers (including permanent staff)	341,045
Total, Home and Colonial Establishments . .	831,463
Regular Forces (regimental) on Indian Establishment . .	75,011
Total . .	906,474

The British army as above is that portion of the land forces of the empire which is paid for by imperial taxation. There is in India, besides, a native army of some 130,000 men, while in the colonies troops are raised for the purposes of local defence.

Infantry.—The infantry comprises the regiments of the guards and of the line. The guards consist of four regiments—the Grenadier Guards, Coldstream Guards, Scots Guards, and Irish Guards—or ten battalions in all. The guards seldom serve outside the United Kingdom except in time of war, and have many privileges as household troops of the sovereign. The brevet rank of captains and lieutenants was abolished in 1871, as detrimental to the interests of the service. The regiments have a common depôt at Caterham for training recruits, and the battalions generally are not quite so strong as those of an ordinary line regiment.

The infantry of the line consists of 67 territorial regiments (59 of which are composed of two and 7 of four regular battalions) and the King's Royal Rifles and Rifle Brigade of four battalions. One battalion of each territorial regiment usually serves in the United Kingdom, trains recruits, and makes good the losses of the linked battalion on foreign service. The battalions abroad are relieved every sixteen years; but this applies only to the cadre of the battalion, as neither the short-service system nor conditions of health permit of men serving in tropical climates for more than seven or eight years at a time. Where both battalions of a regiment are, owing to exceptional circumstances, abroad, the regimental depôt is increased in strength, or provisional battalions formed, in order to supply the necessary drafts.

The battalion is the tactical unit of British infantry, and is divided normally into eight companies. On the Continent battalions are grouped into regiments for administrative purposes, but in England the formation into regiments is solely for the purposes of the promotion of officers and the recruitment of the men. Each battalion is administered apart, and maintains its independence under all circumstances. A battalion is commanded by a lieutenant-colonel, who is assisted in his duties by the senior major, who is second in command. The adjutant and the quartermaster relieve the commanding officer of many of the details of office and administrative work; and in time of war one of the lieutenants is appointed to look after the regimental transport. The establishment of battalions varies according to whether they are at home or abroad. The strength for foreign service and for war purposes is practically identical—*viz.* 29 officers, 1 warrant-officer, 51 sergeants, 16 drummers, etc., and 913 rank and file. Total, 1,010. The home battalions have to be sufficiently strong to supply the annual drafts for foreign service, and at the same time to be a unit for home defence capable of expansion to war strength by calling in the reserves. These conditions are satisfied by a strength of 750 rank and file, with a smaller proportion of officers and non-commissioned officers.

The distribution of the battalions of infantry of the regular army at the present time is 83 on the home establishment, 52 in India, 10 in S. Africa, 17 in other colonies, and 4 in Egypt. Total, 166 battalions.

The depôts are grouped together under the new scheme of Jan. 6, 1905, into 14 districts, and are situated at Perth, Hamilton, Newcastle-on-Tyne, Preston, Pontefract, Wrexham. Lichfield, Warwick, Taunton, Winchester, Warley, Guildford, Armagh, and Clonmel.

The transport of a battalion in war consists of 1 machine gun and carriage, 4 S.A.A. carts, 1 tool cart, 4 general service wagons, 1 Maltese cart with medical stores, 2 pack mules carrying ammunition.

In the British service the employment of small companies of approximately 100 men has always been adopted. On the Continent a battalion is, as a rule, divided into four companies of from 200 to 250 men, each under the command of a mounted captain. Owing to the nature of the services in which our army is likely to be engaged, the constant use of small detachments, and, above all, the exigencies of our numerous small wars, it is of the first importance to have our troops 'fully officered.' In the modern open order formation it is evident that even 100 men are more than one officer can himself personally direct and control.

In an army raised on a voluntary system a showy uniform is a necessity for recruiting purposes, and the scarlet of full dress will always remain the colour for parade. The colour is, however, too bright for war purposes, and khaki is the fighting and working habit. The 100 rounds of ammunition hitherto carried on the soldier's person will probably be increased, while the weight carried in the knapsack will be diminished. The arm at present carried is an improved Lee-Enfield magazine rifle with a detachable magazine. The use of smokeless powder is gradually tending to reduce the bore, weight, and length of the weapon carried. A new short rifle (illustrated on p. 369) has been introduced. It has, however, been adversely criticised, and its manufacture is (April 1905) suspended pending a more thorough test than has hitherto been possible.

Mounted Infantry.—Mounted infantry is an organization peculiar to the British army. In 1888 it was decided to train detachments from infantry regiments serving at home in the use and management of horses, wagons, and carts, so that in time of war there could be raised a rapidly-moving force capable of co-operating with the mounted arms. With the aid of training schools selected men are drilled on horseback so far as is necessary for the purposes of mounting, dismounting, and moving to the field of battle. In the camps at Aldershot, Salisbury Plain, and the Curragh, Ireland, a limited number of horses is kept for the purposes of giving men two and a half months' training in riding and the care of horses. In time of war a company consists of 141 mounted men, and a section of the company is in some cases provided with a machine gun. The training and organization of the force, which proved its value in the South African campaign, is in course of development. The estimates for 1905-6 provided for an establishment of 2,196 horses for mounted infantry at home. The yeomanry (see p. 373) is gradually being turned into a species of mounted infantry, while the volunteer force is encouraged to secure mobility by the formation of cyclist detachments.

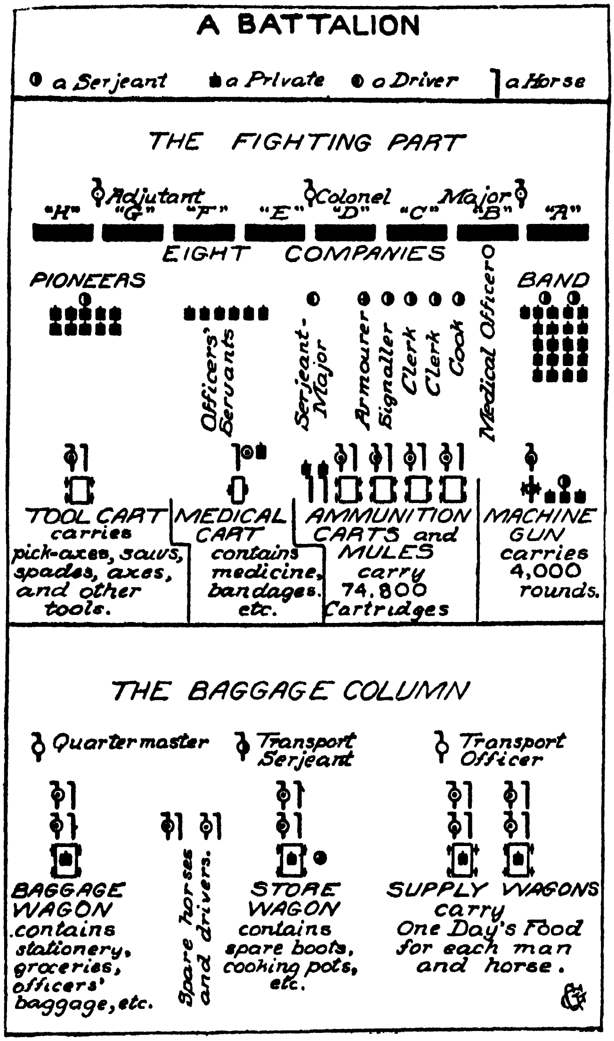
Cavalry.—British cavalry consists of regiments of guards and of the line. The three Cuirassier regiments—the Life Guards and the Royal Horse Guards—are household troops, and are permanently garrisoned in London or Windsor. The establishment of these regiments is considerably weaker than that of those of the line, each consisting of 420 men and 300 horses. The principal duties of the guard regiments are in connection with the sovereign and his court; and the men are of exceptional stature, and handsomely equipped. The cavalry of the line is organized into 28 regiments, of which 15 are at home, 4 in South Africa and the colonies, and 9 in India. The heavy cavalry is composed of 7 regiments of dragoon guards, 3 regiments of dragoons, and 6 regiments of lancers; while the 12 regiments of hussars are usually termed light cavalry. Of the regiments at home, it is proposed under the scheme put forward in the army estimates for 1905 to have a uniform establishment of three strong squadrons with a total strength of 565 of all ranks. Two depôts, one for dragoons and lancers and the other for hussars, will take the place of the fourth or reserve squadrons of the regiments. Regiments on the Indian establishment are kept practically on a war footing of 626 men and 525 horses. The mounted combatants consist of 3 squadrons of 6 officers, 16 non-commissioned officers, and 138 men each, while to the regiment are attached a machine gun and regimental transport amounting to 13 vehicles with 3 pack animals.

Regiments of cavalry are divided into 3 active and 1 reserve squadrons, each commanded by majors and senior captains. The senior major of the regiment acts as second in command, while the troops into which each squadron is subdivided are under the charge of captains and subalterns. As soon as a regiment is raised to war strength, the reserve squadrons form a depôt to supply wastage in men and horses. The relief of regiments in India is effected by the exchange of officers and men, the horses being taken over at both places by the incoming troops. The total strength of the cavalry force at home and abroad is about 20,000 men and 16,000 horses.

Artillery.—The Royal Regiment of Artillery has recently been subdivided into the Royal Horse and Field Artillery and the Royal Garrison Artillery, and comprises a force of 55,000 men and 19,000 horses. The Horse Artillery is recruited by picked men and horses, and wears an especially brilliant uniform. Equipped at the present time with a light 12-pounder gun, its function is to move with great rapidity and manœuvre with cavalry. There are 28 batteries organized in 14 brigades, each under the command of a lieutenant-colonel, as well as 2 depôt batteries. Batteries on the lower home establishment have only 4 guns, and the strength of batteries varies considerably according to whether they are on the higher, lower, Indian, or war establishment. A battery on a war footing comprises a total of 179 of all ranks and 191 horses, with a transport equipment of 6 guns, 6 wagons, and 5 other vehicles. The normal establishment of the force is 5,000 men and 3,000 horses.

The Field Artillery consists of 151 batteries and 7 depôt batteries. A field battery differs from a battery of horse artillery in that its gunners are dismounted, and are carried on the guns and wagons when a rapid movement is contemplated. The present gun is a 15-pounder, but a limited number of batteries are equipped with a 5-inch howitzer. The *personnel* varies according to whether the batteries are on the higher or lower establishment, or are serving abroad. The war strength of a battery amounts to 171 of all ranks, with 131 horses and 10 carriages. Brigade divisions of field artillery consist of 3 batteries, and a brigade of artillery is an integral part of an infantry division, with the troops of which it is expected to work. The numbers of the Field Artillery amount to 25,000 men, with 15,000 horses. The rearmament of the artillery, horse and field, with new pattern quick-firing guns is at present going on. It is to be completed by March 1907, at a cost of £3,150,000.

The Royal Garrison Artillery consists of 107 service companies and 6 depôts, divided into 6 groups, each of which furnishes the men for a certain number of fortresses or garrisons at home, and periodically relieves the foreign garrisons attached to it. The depôts and headquarters of the groups are at Dover, Gosport, Plymouth, Seaforth, Scarborough, and Yarmouth respectively, and to each depôt are affiliated the militia and volunteer corps in the recruiting areas attached to it. To the Garrison Artillery belong the 9 mountain batteries serving abroad, and the heavy and siege-train batteries required at all times in India and elsewhere in time of war. The strength of the service companies varies according to station and the work to be done. The ordinary company at home numbers 150 of all ranks, while as a unit for siege or fortress artillery in time of war it is raised to 200 of all ranks. The main work of garrison artillery is in connection with a complicated heavy armament, and in its *personnel* are all artillery specialists, armament and ordnance officers, and those connected with artillery schools and the manufacturing departments. The total force of the Garrison Artillery is some 23,000 men.


A BATTALION
● a Serjeant
▮ a Private
● a Driver
⌉ a Horse
THE FIGHTING PART
Adjutant
Colonel
Major
"H" "G" "F" "E" "D" "C" "B" "A"
EIGHT COMPANIES
PIONEERS
Officers' Servants
Serjeant-Major
Armourer
Signaller
Clerk
Clerk
Cook
Medical Officer
BAND
TOOL CART carries pick-axes, saws, spades, axes, and other tools.
MEDICAL CART contains medicine, bandages, etc.
AMMUNITION CARTS and MULES carry 74,800 Cartridges
MACHINE GUN carries 4,000 rounds.
THE BAGGAGE COLUMN
Quartermaster
Transport Serjeant
Transport Officer
BAGGAGE WAGON contains stationery, groceries, officers' baggage, etc.
Spare horses and drivers.
STORE WAGON contains spare boots, cooking pots, etc.
SUPPLY WAGONS carry One Day's Food for each man and horse.

Composition of a Battalion of British Infantry.

Colonial Corps.—In addition to the three combatant arms of the service there are some 10,000 Colonial and Native Corps on the Imperial establishment, such as the Royal Malta Artillery, local artillery for Sierra Leone, 3 West Indian battalions, the Chinese and Hong-kong regiments, the West African and the King's African Rifles.

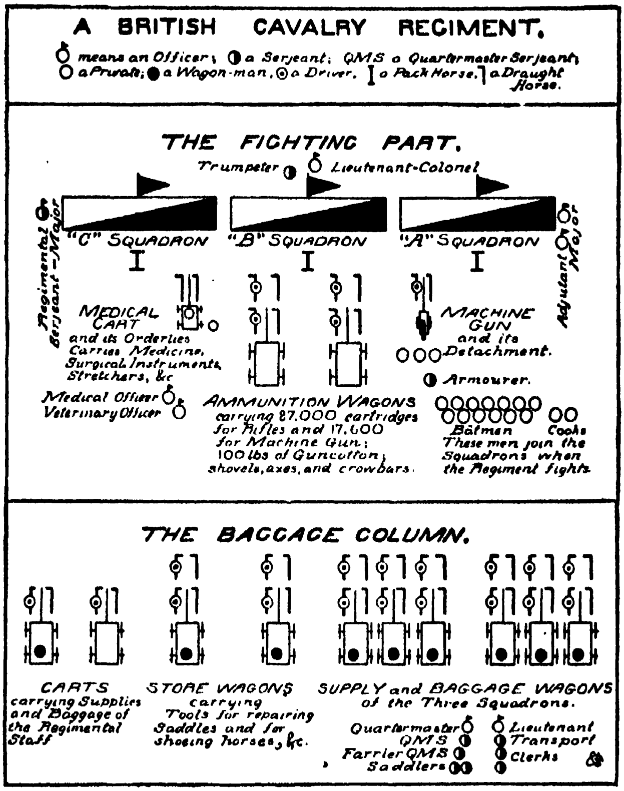
Remaining Components.—The corps of Royal Engineers, the Army Service Corps, and the Royal Army Medical Corps are elsewhere described in detail, and the distribution of the regimental establishments of the British army in 1905 may be summed up as follows, the permanent staffs of the auxiliary forces, the military police, etc., being included with the regular troops:—

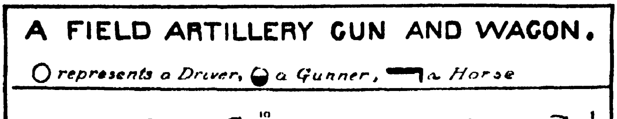
Cavalry	19,520
Artillery	54,259
Engineers	11,134
Infantry	178,778
Army Service Corps. .	7,036
Royal Army Medical Corps	5,142
Colonial and Indian Corps	12,762
Departmental Corps. .	2,581
Total Regular Forces .	291,212

To the above total must be added some two thousand officers and men (exclusive of the Indian establishment) on the general and departmental staff, and those employed at military and technical schools, ordnance factories, and miscellaneous establishments, such as prisons. The headquarters staff of the army is dealt with under the head of **War Office**, and the remaining members of the general staff are those attached to army corps or to local commands at home and abroad. Officers who receive appointments on the general staff must either have passed through the Staff College (at Camberley, near Sandhurst), or have been reported as specially qualified for the position, and usually hold their appointments for five years. The officers of the general staff are divided into five classes—member of the army council, director, assistant director, deputy assistant-quartermaster-general or deputy assistant-adjutant-general, and staff captain. The last class but one includes the officers of the general staff who are attached to brigades, and called brigade-majors. The functions of the quartermaster-general's department are mainly connected with the supply, transport, quartering, and movements of troops, and in the minor commands these duties are carried out by the appointment of an officer of the Army Service Corps to the staff. The following is the composition of the staff of the Aldershot Army Corps, which may be taken as a typical example: Lieutenant-general, with 1 aide-de-camp, 1 chief staff officer (brigadier-general), 1 assistant-adjutant-general and his deputy, 1 assistant-quartermaster-general with his deputy, officers commanding Royal Artillery and Royal Engineers, each with a staff officer, colonel on the staff for artillery, director of supplies, director of transport, and heads of the medical, ordnance, veterinary, and pay departments.

In all civilized armies troops are grouped in brigades, divisions, and army corps, and the conjunction of army corps forms the army. The battle units of the British army are, as a rule, smaller than those of the continental powers. The *infantry brigade*, under a major-general, is composed of 4 battalions of infantry, a supply column, a bearer company and field hospital, with a war strength of 4,346 men, 373 horses, 4 machine guns, and 85 other carriages. Besides providing supplies, the Army Service Corps furnishes the transport for the bearer company and field hospital, and conveys the baggage not handled by the regimental transport. The field hospital has stores for 100 beds. Corresponding to the above unit is the *cavalry brigade*, a force of 3 regiments of cavalry, 1 battery of horse artillery, an ammunition column, 2 companies of mounted infantry, with supply and medical details—a total number of 2,497 men, 2,448 horses, 6 guns, 5 machine guns, and 136 carriages. A mounted detachment of engineers is also attached if required. The principal combined unit is the *infantry division*, commanded by a lieutenant-general, and consisting of 2 infantry brigades, with, in addition as divisional troops, 1 squadron of cavalry, 1 brigade of 3 field batteries, an ammunition column, a field company of engineers, and supply and medical details. At war strength the division numbers 10,034 men, 1,780 horses, 18 guns, 8 machine guns, and 306 carriages. The engineer field company, besides its technical equipment, is provided with a certain proportion of bridging stores. An army corps is commanded by a general officer, and is composed of 3 complete infantry divisions, with a number of corps troops, of which the principal are a brigade of horse artillery, 2 brigades of field artillery, a cavalry regiment, a pontoon troop, a telegraph section, a balloon section, a railway company and an ammunition column, a field park, and details of engineer, medical, and supply services. The total number of an army corps is 36,230 men, 10,147 horses, 102 guns, 25 infantry machine guns, 2 cavalry machine guns, and 1,401 carriages.

Army Reform.—At present (April 1905) the British army is in a state of transition, but the above indicates the general condition of things at the moment of going to press. On March 9, 1904, the complete report of the War Office Reconstitution Committee appeared, and following upon its recommendations the Defence Committee of the cabinet was reorganized as an institution for the consideration of imperial defence. An Army Council was appointed to undertake the duties and business of the War Office, and an inspector-general of the forces was appointed to take the place of the commander-in-chief, whose office was abolished. A director of army finance was created, and numerous other War Office changes were introduced, with a view to simplifying procedure and decentralizing War Office business. Administrative districts were formed, and to these were delegated a large part of the business formerly managed by the War Office. The military commands indicated above (p. 374) were established, and the Aldershot army corps became a 'striking force' of 15,000 or 16,000 men, ready to take the field at a moment's notice. Mr. Arnold-Forster's reorganization scheme, introduced July 14, 1904, has not yet (April 1905) emerged from the arena of discussion and criticism. Its main features are:—1. A division of the regular army into two parts—(*a*) a *general service army* of long service men, to serv^


A BRITISH CAVALRY REGIMENT.
means an Officer; a Serjeant; QMS a Quartermaster Serjeant; a Private; a Wagon-man, a Driver. a Pack Horse. a Draught Horse.
THE FIGHTING PART.
Trumpeter
Lieutenant-Colonel
Regimental Serjeant-Major
"C" SQUADRON
"B" SQUADRON
"A" SQUADRON
Adjutant
Major
MEDICAL CART
and its Orderlies
Carries Medicine, Surgical Instruments, Stretchers, &c
Medical Officer
Veterinary Officer
AMMUNITION WAGONS
carrying 27,000 cartridges for Rifles and 17,600 for Machine Gun; 100 lbs of Guncotton, shovels, axes, and crowbars.
MACHINE GUN
and its Detachment.
Armourer.
Batmen
Cooks
These men join the Squadrons when the Regiment fights.
THE BAGGAGE COLUMN.
CARTS
carrying Supplies and Baggage of the Regimental Staff
STORE WAGONS
carrying Tools for repairing Saddles and for shoeing horses, &c.
SUPPLY and BAGGAGE WAGONS
of the Three Squadrons.
Quartermaster
QMS
Farrier QMS
Saddlers
Lieutenant
Transport
Clerks



British Cavalry and Artillery.—Composition of Units.

abroad in time of peace and war; and (*b*) a *home service army* of short service men, serving only at home during peace, but capable of being employed anywhere in time of war. (Recruiting for the home service army has not yet commenced, and recruits now enlist for nine years with the colours and three with the reserve.) 2. The absorption of the *militia* in whole or in part into the home service army. (This has met with opposition, and in the meantime is not being pressed.) 3. The reduction of the *volunteers* to 180,000 men in two classes—(*a*) 60,000 men with a sufficient complement of officers and transport and field organization; (*b*) 120,000 men of a lower standard of equipment. (This part of the scheme is also in abeyance at present.) 4. The creation of a *striking force*, as already described. (This has been carried into effect.)

Historical Sketch.—The history of the British army is broadly divisible into two periods—*viz.* before and after the introduction of standing armies.

1. *The period before the introduction of standing armies.*—In early days Britain had no good military organization. Armies, of course, existed, such as those of Cassivelaunus and Caractacus, the former of which fought so well against Julius Cæsar in 54 B.C. as to excite the admiration of that famous soldier. Their organization, however, was of the crudest description, and it was not until the 8th century A.D. that steps were taken to put the defensive forces of the country on a sound basis. Under the Anglo-Saxons the militia system was adopted, by which every man was compelled to present himself armed and equipped for service when required. The fighting men of a family were commanded by the head, or ealdorman, who, with the thanes (the wealthier class of landowners), was obliged to appear mounted. About the time of Alfred the knights and earls became the leaders of the army. Under Canute, mercenary forces in the form of *hus-carles* were introduced as part of the king's household and the establishment of every great noble. At the time of the Norman invasion the army was in a fairly efficient condition, well armed and experienced in warfare. Its defeat at Hastings and the subsequent Norman rule in England led to the introduction of the feudal system of raising armies, which had prevailed on the Continent for some time. The manner of its application to England was as follows:—William the Conqueror confiscated the lands of the Anglo-Saxon nobility and divided them into 60,000 *feuds*, *fiefs*, or *fees*, as they were variously called, and apportioned them as rewards to the Normans who had accompanied him on his expedition. Such rewards carried with them the condition that every tenant of a fee was liable to forty days' service annually in the king's army, completely armed and equipped. Holders of half-fees served for twenty days, and so on in proportion. Many of William's chief nobles received upwards of a hundred fees. Each could only represent one as regards attendance for military service, and was obliged to find substitutes for the others. The majority of the large grants were divided by their owners into several small *tenements*, and the tenant-in-chief exacted from his sub-tenants the same service he rendered to the king. Sixty thousand men were thus available free of cost for forty days in every year.

In addition to this feudal army a militia force existed in England, called the *posse comitatus*, which acted under the county sheriffs, and in which was enrolled every man between the ages of fifteen and sixty. This force was available for upholding the law in the various counties, and also in case of public danger, such as an invasion by the Scots. In the reign of Henry II. an assize of arms was enacted, constituting the *posse comitatus* an armed force, every man being compelled to provide himself with, and to keep in good condition, a certain quantity of arms and armour in proportion to his estate. This act was confirmed by the Statute of Winchester in 1285, which further established periodical inspections of arms.

Forfeiture of fee was the penalty for non-compliance with the conditions of tenure; but this gradually gave place to a system of *scutage* or *escuage*—payment instead of personal attendance. With the money thus obtained it was possible to prevail upon certain of the feudal bands to prolong their service, and also to engage mercenaries. The system thus initiated grew year by year; the English armies became almost entirely composed of hired troops, and the principles of feudalism in their organization less and less marked.

As in the armies on the Continent, cavalry remained for long the chief arm. The foot-soldier, however, had never been so neglected as in other countries, on account of the firm hold which archery had taken on the people. Every king from the time of William I. had recognized the value of this art, with the result that the longbow—carrying a 'clothyard shaft' from ten to twenty score yards—had become an efficient weapon in the hands of the English archer. In 1298 and 1314 the value of the foot-soldier compared with the horseman was clearly proved. At Falkirk, William Wallace's spearmen and archers, drawn up in hollow squares, resisted for hours the charges of the English cavalry. It was not until King Edward withdrew his horsemen, and brought his bowmen into action, that the Scots were defeated. Again, at Bannockburn, Bruce's Scottish foot completely routed an English army of nearly 30,000 horse. Thirteen years later, Edward III. saw the mistakes of the English military system, and took immediate steps to remedy them. He founded the system of raising armies by indenture, contracting with the prelates and barons for the supply of soldiers. The pay was good, and no difficulty was experienced in raising sufficient numbers. Archery was fostered, and the foot-soldier well drilled and equipped. The wisdom of this procedure was shown at Creçy, where the English army, with 20,000 infantry out of a total strength of 30,000, completely routed a French force of nearly four times that number mainly composed of cavalry.

2. *The standing army period.*—Charles I. was always ambitious of establishing a standing army, and both the Royalist and Puritan forces partook of this nature. Cromwell's troops were practically, though not by law, the first of England's standing armies. They were disbanded on the restoration, a small portion—two regiments of horse and six of foot—being retained as a standing army by Charles II. The militia had suffered from great neglect; so it was reorganized in 1662, on the principle of landowners supplying fully-equipped horsemen or foot-soldiers according to their means. In 1689 the Bill of Rights was passed, by which the troops of William III. became the first standing army of England recognized by Parliament. A portion of this act is read and passed annually to this day. The army was still raised by contract, but the system had developed into an arrangement between the crown and the colonel. The latter was given the regulation amount of money for the upkeep of the regiment, and managed everything connected therewith, from recruiting to discharge. After all expenses had been paid, what was left of the 'stock-purse' was divided annually amongst the captains of the regiment. Being thus closely identified with them, regiments came to be called by the names of their colonels. The contract system was ended in 1783 by Burke's Act, which established the responsi-

bility of the Secretary at War to Parliament in all army matters.

The first standing army was badly organized. Enlistment was for life, except in time of war, when recruits for two or three years' service, or until the end of hostilities, were accepted. Bounties were given, and enlistment was, as a rule, voluntary; but the requirements of the army were so great during the French wars (1793-1815) that recourse was had to impressment and to volunteering from the militia. The latter had been reorganized in 1757 on the principle of the ballot (with substitution allowed) and three years' service; and it was then illegal for militiamen to enlist in the regulars. In 1799 a bounty of ten guineas was offered to militiamen enlisting in the regular army. The effect was immediate, over 26,000 men volunteering for service within a year, and an average of 25,000 such volunteers formed part of the army annually until the end of the war. Thus the militia, contrary to principle, developed into the feeder of the army, a system which was greatly fostered by the policy of Pitt. In the period of ten years ending 1813, out of a total of nearly 250,000 recruits enlisted in the regulars, about 100,000 came from the auxiliary force. In 1803 the volunteer force was greatly increased to resist Napoleon's threatened invasion, and in the following year reached the enormous total of 463,000. In 1806 short-service enlistment was introduced, a system modified two years later by making it optional with life engagement. Bounties had been steadily growing in amount, and by 1805 had risen as high as £40. A new force, called the 'local militia,' was constituted by Act of Parliament in 1808. This was in addition to the regular militia —ballot without substitution, and service for four years, being the ruling principles. On the return of the army of occupation from France in 1818, Great Britain entered on the long period of peace which lasted until the outbreak of the Crimean war in 1854. Although the army was, as usual, greatly reduced in strength, a higher proportion was retained between peace and war establishments than had ever previously been the case. Military matters were, however, seriously neglected. No militia were enrolled, and the volunteers ceased to exist. In 1829 the system of life enlistment only was reintroduced, but was abolished again in 1847, when a period of 'ten years, with permission to re-engage to complete twenty-one,' was established. The Crimean war found the army in a very inefficient condition, the general organization being conspicuously bad. Great difficulty was experienced in getting recruits to bring the establishment up to war strength. Bounties, short terms of enlistment, even foreign mercenaries (for the last time in British history), were all tried ineffectually. The militia, however, once more proved its value as an auxiliary force. Fortunately it had been remodelled in 1852, this time on a system of voluntary enlistment, the ballot having been suspended, but not abolished. Commissions in the army were given as a reward to militia officers who induced a certain number of men to enlist in the regulars, and by this means 32,000 recruits were obtained. Regiments of militia also garrisoned the Mediterranean and home stations. That the war closed successfully was due to the splendid qualities of the soldiers. The lessons of the Crimea were not lost, and led to a series of military reforms. In 1859 the volunteers were revived, and an army reserve created for service at home in time of war. In 1867 bounties on enlistment were abolished, and the Reserve Forces and Militia Reserve Acts were passed. In 1870 three important military reforms were made. First, the reserve was rendered a strong and efficient force by the introduction of the present system of 'short service with the colours, and balance of engagement with the reserve.' Secondly, the gradual withdrawal of the strong garrisons quartered in the self-governing colonies was commenced, a step needed in view of the increased strength at which it had been found necessary to maintain the army in India since the mutiny. Thirdly, the crown was authorized to embody the militia in time of great emergency. In the following year the system of commissioning the cavalry and infantry by purchase was abolished, and the regular and auxiliary forces were combined in one organization. In 1872, infantry regiments, except the 60th and the Rifle Brigade, were allotted to territorial recruiting districts. At this time the 1st to 25th regiments each consisted of two battalions, the 26th to 59th and 61st to 109th of one battalion, and the 60th and Rifle Brigade of four battalions. By the new system, 82 of the single-battalion regiments were linked together in pairs—the 79th (Cameron Highlanders) was the exception—and, with the first 25 regiments, formed 66 'brigade sub-districts.' To these were also attached the local regiments of militia and volunteers. In 1881 the two battalions of regulars and two of militia in each sub-district were combined in a 'regiment,' which was given a territorial title. In 1898 the Special Army Reserve and the Special Service Section of Militia were established, by which a large number of men were rendered available for war service abroad. For more recent developments, see *ante;* also Goodenough and Dalton's *Army Book for the British Empire* (gov. pub., 1893), Richard's *Her Majesty's Army.*

Army Act, THE (1881), is part of the statute law of England, but with this considerable difference that it is administered by military courts and not by civil judges. It is construed in the same manner and carried into effect under the same conditions as to evidence and otherwise as the ordinary criminal law. The act has of itself no force, but requires to be brought into operation each year by an Army (Annual) Act, thus securing the constitutional principle of the control of Parliament over the discipline requisite for the government of the army. It deals with military crimes and their punishment, and embodies the law as to enlistment, billeting, and impressment of carriages.

Army Agents. To each regiment or corps the government appoints an agent, who usually carries on a private banking business. A monthly estimate of the moneys required is sent in to the Treasury, and the sum credited to the agent on the first of each month. A commission of one per cent. was formerly allowed, but this has been discontinued. The employment of these bankers enables officers to draw their pay by convenient instalments, and at the same time relieves the Army Pay Department from the necessity of keeping complicated private accounts. As a rule, army agents have nothing to do with the pay of non-commissioned officers and men, which is issued by the Treasury to the Army Pay Department, and audited by paymasters and their sub-accountants.

Army and Navy Club was founded in 1837; its membership, confined to officers of the regular army and the navy, is limited to 2,400 home members. The entrance fee is £40, with an annual subscription of 7 or 10 guineas. Address, 36 Pall Mall, London.

Army and Navy Gazette, the leading organ of the two British services, was founded in 1860 by Messrs. Bradbury and Evans, with Sir (then Dr.) Wm. Howard Russell as editor.

Army and Navy Stores. See CO-OPERATION.

Army Chaplains. See CHAPLAINS.

Army Corps. The size of armies necessitated their subdivision into army corps. Infantry divisions, supplemented by cavalry, guns, and administrative services, were accordingly combined, and the force thus created formed in itself a miniature army. The army corps organization, first definitely adopted by Napoleon in 1803, has, with certain modifications, been retained in all large armies. In Prussia the territory of the kingdom was divided into army corps districts, and the corps commanders not only became the leaders of these units in war, but the superintendents of their recruiting, training, and equipment in time of peace. The advantage of this arrangement is obvious, and after the Franco-German war of 1870 the system of territorial localization was adopted by all continental nations. The German army corps may be taken as a type. Its component parts are the general staff, 2 infantry divisions (to which cavalry and artillery are attached), 1 battalion of rifles, 1 telegraph section, corps bridge train, 6 provision columns, 7 wagon park columns, 1 field bakery column, 1 horse depôt, 1 bearer company, 12 field hospitals, 8 ammunition columns. The total strength is 38,058 men, with 11,083 horses and 1,714 carriages. The fighting strength, exclusive of officers and non-combatants, may be taken as 25,000 infantry, 900 cavalry, and 144 guns. The amount of cavalry varies considerably, according to the particular conditions of a campaign. The following changes have been recently made in organization and equipment: the corps artillery has been abolished, and its guns equally divided between the two infantry divisions; light ammunition columns form an echelon between the batteries and the heavy ammunition columns; a special telegraph unit has been formed; the infantry has been re-armed with an improved rifle, and the artillery has adopted quick-firing field guns and field howitzers. In Great Britain the army corps has never hitherto existed as a permanent fighting unit. For administrative purposes it was decided in 1902-3 to have a system of territorial organization adapted for six corps, and to follow as far as practicable the continental methods; but this organization has recently been abandoned in favour of a system of districts, or 'commands,' in which Aldershot alone retains the position of an army corps. A British command consists of three infantry divisions and a due proportion of the other units.

Army Enlistment Acts, 1867 and 1870. By the Enlistment Act of 1867 the regulations made in 1847 and during the Crimean war were somewhat modified. First, engagements were to be for twelve years for all branches of the service, with power to re-engage up to twenty-one years; and the provision as to a soldier continuing in the service after twenty-one years, until he gave three months' notice of his wish to be discharged, was re-enacted. In accordance with the Act of 1870, no recruit can enlist for more than twelve years; but he can engage either to serve the whole time with the colours, or partially with the colours and partially in the reserve. But see *Army Reform*, p. 378. A soldier now serves, as a rule, for a limited time in the active army, and then passes into civil life, with the obligation to return to the army if called up within the period of his original enlistment.

Army Examinations. See EXAMINATIONS.

Army Hospital Corps. The great loss of life in the Crimean war, incurred by defective medical administration, led to the formation of an organized military body, called the Army Hospital Corps. The ranks were filled, for the most part, by the transfer of men of good character from regiments after a certain term of service, usually two years. Each man had to pass a probationary period of three months in a military hospital before he was permanently appointed to the corps. The abolition of regimental hospitals led eventually to the system by which the Army Hospital Corps, the patients in military hospitals, and all soldiers attached to them, are placed under the direct command of medical officers. Merged for some time into the Medical Staff Corps, the original Army Hospital Corps is now represented by the warrant officers, non-commissioned officers, and men of the Royal Army Medical Corps.

Army in the Field. Before entering upon field operations, it is necessary to have a secure *base of operations*. The movement across the seas of any large body of troops, with their attendant equipment and stores, necessitates a disembarkation on a seashore, and a preliminary collection and organization of *matériel*. A maritime base is, therefore, in many cases a necessity—as, for example, Cape Coast Castle during the Ashanti war, Ismailia for the Egyptian campaign of 1882, Cape Town and Durban for wars in S. Africa, etc. Where the theatre of war is far from a seaport, the base is necessarily inland—as, for example, Peshawar and Kohat during campaigns in Afghanistan. The selection of a base in a friendly country has obvious advantages, as it gives time for preparations being made before the actual arrival of the troops. It may often happen that the situation of a base can only be secured by force, as in the case of Balaklava in the Crimean war; or by stratagem, as in the case of Ismailia in the Egyptian campaign. As an army moves forward, a *line of communications* becomes necessary, along which the *personnel* and *matériel* collected is forwarded, and by means of which sick, wounded, prisoners, etc., are removed from the theatre of actual hostilities. The length of this line may vary from a few miles, as in the Crimean war, to hundreds of miles, as in the Nile expedition or the S. African campaign of 1899-1902. The line consists of a chain of military stations connected by a route traversed by rail, road, or river transport, or a combination of all three. With an unfriendly population, such as that in the Orange State and the Transvaal, a large force is necessary to guard the line. Each station or depôt becomes a defensive fort, blockhouses protect vulnerable points such as defiles or bridges, and flying columns have to keep the enemy at a distance. As the army advances the length of the line of communications increases, and it is necessary to organize it into sections. Wherever there is a break in bulk in the conveyance of stores, a depôt is necessarily formed; and in each section at important points there must be hospitals, rest stations, and accumulations of commissariat and ordnance stores. The elaborate and detailed regulations of the great military powers are adapted only to continental and civilized warfare, but the main principles underlying them are in force in our foreign expeditions. The organization of the base of operations and the various sections of the line of communications is under one head, and the staff of the entire supply arrangements is independent of the troops utilizing them. The usual method by which an army is supplied is an adaptation of the magazine and requisition systems. Arms, ammunition, accoutrements, clothing, harness, tools, and stores in general, are forwarded to troops from the nearest magazines; but ordinary transport, and a large portion of the daily food for men and horses, are drawn from the theatre of war. In a civilized country the inhabitants may be forced to supply lodging as well as food, and requisitions may be made for staple commodities. As a general principle, everything is paid for in cash or by promissory notes, and the forcible taking of goods is limited as far as possible. Purchase in the open market is an essentially British custom, and, by establishing good relations between the natives of a country and the army, often enables supplies to be obtained which would otherwise be concealed. The object of an efficient supply system is to keep full the knapsack reserve (the food which the soldier actually carries with him) and the supply column reserve (which is carried for him on wagons which closely follow up the troops). Food has to be issued as a rule daily, and the unexpended portion of a ration can be carried on the person. In addition, each soldier is supplied with a reserve or emergency ration of biscuit, pemmican, preserved meat, etc., which may only be opened by order of a superior officer. In European warfare, railways and roads have alone to be considered; but in the Himalayas, the Sudan, the plains of India, or the forests of Burma, vastly different conditions arise. The details of transport may vary. A *general transport* of a semi-military character is worked from the base of operations to the advanced depôt in rear of an army, or to the magazines nearest to the troops to be supplied. The labour, carts, animals, etc., are mainly procured from the country, while the supervision is of a military character, and drawn from the staff of the line of communications. *Departmental transport* is of a more highly organized description. The military wagons of the Army Service Corps convey food and stores from the magazines to the vicinity of the troops that are to be supplied. The circumstances of each particular case will determine whether the actual distribution to the units is made direct by the Army Service Corps, or indirectly through the medium of the *regimental transport*, or wagons which always accompany troops on the march. Under suitable conditions, troops should be able to move on emergency for two or three days by utilizing the resources of the country, their regimental transport, and their reserve rations. The supply columns and supply parks of the departmental transport carry three to four days' provision for ordinary use, and thus extend the area in which troops can act. As soon as the limit of time is exceeded, fresh depôts must be formed, or opportunity given to allow stores to be brought up from the nearest magazines. Under favourable circumstances, such as in the Nile campaign, water transport may become as valuable as railway transport. In addition to the collection and distribution of supplies, the staff of the line of communications has to utilize and often create postal and telegraph services. The collection and dissemination of information, and preventing information reaching an enemy, is a task for special officers of the Intelligence Department; but the bulk of the work and the censorship of the press will be associated with the main centres that lie on the line of communications. The advantage of keeping up communication by telegraph, heliograph, or other means, along the route between its various magazines and depôts, is obvious, and the post of director of telegraphs in a campaign is an important one.

Army List, a monthly distribution list of officers on the active list of the army, the royal marines, militia, yeomanry, and volunteers, together with the promotions, appointments, etc., and army orders, since the last issue. The edition promulgated each quarter contains, in addition, the names of officers who have retired from the service. A bulky quarterly Army List gives the seniority, appointments, and war services of officers in detail.

Army Medical College. This is the school for the technical education of probationary medical officers for permanent commissions as lieutenants in the Royal Army Medical Corps. It was formerly situated at Netley, near Southampton, and had attached to it a large general military hospital. It is governed by a senate, under the presidency of the director-general of the Army Medical Service, and has as members the president of the Indian Medical Board, the principal medical officer at Netley, and the four professors at the school. Instruction in the school is carried on by four professors and two assistant professors, and there are also a secretary and a commandant and director of studies. Most of these are officers in the Royal Army Medical Corps. The school has now been removed to London.

Army Ordnance Department and ARMY ORDNANCE CORPS have to do with the administration of stores. (See STORES.) The organization of the officers' *personnel* is in transition. The senior officer of the department is the director of equipment and ordnance stores, a colonel who ranks as major-general, and whose duties lie at the War Office. Under him are 9 ordnance officers of the first class, with the rank and title of colonel, 17 second class (lieutenant-colonels), 29 third class, and 61 fourth class. The officers of the junior classes carry into the department the titles of the ranks they hold in their respective corps; but their seniority is regulated, while serving in the Army Ordnance Department, by their position on the list of that department only. No officer under the rank of captain is, however, admitted. The department also contains a body of officers mostly promoted from the Army Ordnance Corps, and consisting of 9 commissaries of ordnance, 27 deputy commissaries of ordnance, and 51 assistant commissaries of ordnance. The two first classes have the honorary rank of major or captain, the last that of lieutenant. There is also a body of 25 inspectors of ordnance machinery in three classes, who hold honorary rank as majors, captains, or lieutenants.

The Army Ordnance Corps is a body of warrant officers, non-commissioned officers, and men under the orders of the officers of the Army Ordnance Department, who assist in the minor duties connected with the administration and charge of stores and in ordnance offices. This corps has its headquarters and depôt company at Woolwich, and consists in addition of 19 service companies, each of 50 non-commissioned officers and men. The depôt company furnishes detachments for duty at all ordnance stations. The uniform is blue, with scarlet edgings.

Army Pay Department. This department was established on April 1, 1878, and is under the finance division of the War Office, at the head of which is the accountant-general. The officers are recruited from the officers of the combatant units of the army. There were originally but two departmental ranks—staff paymaster and paymaster; but on April 1, 1881, the rank of chief paymaster was added. The officers also bear military titles—paymasters being captains or majors, staff paymasters, majors or lieutenant-colonels; and chief paymasters, colonels. The duties of the department are to receive, issue, and account for all sums of money receivable and payable on account of army services.

One chief paymaster is at the War Office, and a chief paymaster or a staff paymaster is in charge of the central pay office of each district at home or command abroad (according to its importance), and is termed the 'district paymaster.' At all the more considerable outstations and garrisons there are station pay offices in charge of a staff paymaster or paymaster, who is termed the 'station paymaster.' The district paymaster also acts as station paymaster for the headquarters station of the district. In the larger offices junior officers assist the paymasters in charge.

Officers commanding squadrons, companies, etc., pay their own men weekly, obtaining the cash for the purpose in advance from the station paymaster, and accounting for it at the end of each month by a claim called the pay list, which is forwarded to the station pay office (in case of cavalry and infantry, through the adjutant of the corps). The station paymaster, after a preliminary examination, forwards the pay lists of all corps to the War Office, together with a monthly 'general state' of his accounts, which summarizes all disbursements and receipts made on behalf of the War Office. The officers of the Army Pay Department are assisted in the clerical part of their work by the non-commissioned officers of the Army Pay Corps.

Army Purchase Commission. Prior to the abolition of purchase in 1871, every commission in the cavalry and infantry had its recognized money value, and every step in promotion not caused by a death vacancy had to be purchased. In addition to the ordinary price or difference that had to be paid, a sum 'over regulation' was in most cases added, and, by reason of the vested right of money sunk in commissions, the army was virtually 'in pledge' to the officers. The system could not be put an end to without compensating the persons concerned, and the adjustment of claims was placed in the hands of commissioners, of whom the deputy judge-advocate-general was one. The work of the commissioners is now practically finished.

Army Sanitary Committee. The officers of the Engineers and the Medical Corps sit from time to time as a committee on all matters connected with sanitation. They report on sites and plans for new barracks and hospitals, and visit and report on existing buildings when necessary.

Army Schools. At nearly every camp and garrison, and at most depôts, there are established army schools, for the purpose of affording to non-commissioned officers and men and their children, and to the children of warrant officers, the opportunity of acquiring a sound and useful education. For the administration and inspection of the schools a director is appointed at the War Office, and under him are inspectors for each school district. The King's Regulations require the regular attendance (one attendance each day the school is open) of every non-commissioned officer and enlisted boy until he obtains a second-class certificate of education. The attendance of soldiers is not compulsory, but commanding officers are enjoined to give them every facility for joining the classes. In order to obtain a first-class certificate a soldier must pass a qualifying examination in dictation, arithmetic, geography, English history, and copying rough drafts of correspondence. For the second and third class certificates the examination is confined to writing from dictation and arithmetic of a less advanced character. A school attendance lasts, as a rule, about an hour and a half, and the times of the lessons are arranged as far as possible to suit the convenience of the men. The examinations take place twice a year, under rigid supervision. Any soldier may voluntarily apply to be examined in foreign languages, shorthand, tactics, military topography, and fortification. The course of instruction given to the elder children and infants is similar to that adopted in public elementary schools.

Army Service Act, 1847. As a general rule, until the year 1847 the term of service of men enlisted in time of peace was for life, although recourse was had to enlistment for shorter periods in time of war. The Act of 1847 limited first engagements to ten years for the infantry, and twelve years for the cavalry and artillery, but allowed re-engagements for such further periods as would make up a total of twenty-one or twenty-four years, as the case might be; and a soldier, with the approval of the military authorities, might continue his service after the twenty-one or twenty-four years, until he gave three months' notice. For present conditions, see p. 373.

Army Service Corps. Prior to 1870 the Commissariat Department was responsible for the purchase and issue of provisions, forage, fuel, lights, etc., and all matters in connection with supply; while the Military Train- a successor of the Land Transport Corps raised during the Crimean war—was charged with transport duties. The duties both of supply and transport are now performed by the Army Service Corps. The transport companies have a uniform peace establishment of 50 men, with the necessary horses and wagons. A supply branch of clerks, butchers, bakers, etc., has its depôt at Aldershot, and its members are attached to different military stations in numbers proportionate to the work to be done. The administration of the corps is vested in the quartermaster-general, and an assistant quartermaster-general exercises the function of commanding officer of the corps at the War Office. A staff officer in each district is in charge of the officers and men belonging to it, and is the medium through which orders for supply and transport are sent. Owing to the exigencies of the S. African campaign, the numbers of the corps have been raised to 7,000 men and 2,500 horses. In time of war the transport company is the unit for expansion, and to each unit of an army is attached a supply column or company. A supply park to carry three days' provisions consists of three transport sections, and numbers 7 officers, 531 men, and 747 horses—the carriages all being hired. A field bakery column carries some 80 iron ovens, conveyed in hired vehicles.

Arnaboldi, ALESSANDRO (1827), Italian poet, born in Milan; was secretary to the town council at Milan until 1873. In 1872 he published a volume of *Versi*, which put him in the front rank of the modern poets of his country. In 1888 he published a new collection, *Nuovi Versi*.

Arnaud, HENRI (1641-1721), Waldensian clergyman and patriot, pastor of La Tour in Piedmont, was forced, in the persecution of the Vaudois by Victor Amadeus of Savoy, to retire to Switzerland in 1686. In 1689 he led the 'glorious return of the Vaudois to their valleys,' in spite of the attacks of the French and Savoyards. The Duke of Savoy granted religious liberty to the Vaudois; but on his reconciliation with France the concession was withdrawn, and the Vaudois had to find a retreat in Würtemberg. Arnaud's expedition is described in his *Histoire de la Glorieuse Rentrée des Vaudois dans leurs Vallées*, printed in 1710, with a dedication to Queen Anne. See also Muret's *Histoire de Henri Arnaud* (1853).

Arnauld, ANGÉLIQUE (1624-84), distinguished religieuse, born in Paris, and educated by her aunt, Marie Angélique Arnauld. She became prioress (1653) and abbess (1678) of Port-Royal, and was persecuted by the Jesuits. She was principal author of *Mémoires..... de Port-Royal* (1742). See Sainte-Beuve's *Port-Royal* (1878), and Beard's *Port-Royal* (1861).

Arnauld, ANTOINE (1560-1619), French advocate, born in Paris. He became *procureur-général* in 1585. He is remembered for his defence of the University of Paris against the Jesuits, which resulted in their temporary banishment. He was the father of 'le grand Arnauld,' and had six daughters who took the veil at Port-Royal.

Arnauld, ANTOINE (1612-94), Jansenist theologian, was born in Paris, and educated at the Sorbonne. Retiring to Port-Royal monastery, he became the strenuous adversary of the Jesuits. He was expelled from the society of the Sorbonne for his support of the Jansenists. To avoid the persecutions of the Jesuits, he became an exile in 1679, thereafter residing in Flanders and Holland. He gave assistance to Pascal with his *Lettres Ecrites à un Provincial de ses Amis*, and to Lancelot with his *Grammaire*. He was a devout Catholic, believing in 'the corruption of human nature and the depravity of the will,' and one of the profoundest metaphysicians of his century. His great work, the *Logique de Port-Royal*, was written in conjunction with Nicole (1st ed. 1662; Eng. ed. 1881). See Larrière's *Vie* (1783); Sainte-Beuve's *Port-Royal* (1878); Varin's *Vérité sur les Arnaulds* (1847).

Arnauld, Marie Angélique (1591-1661), Jansenist abbess, became abbess of Port-Royal when fourteen years old, and reformed her abbey at seventeen, reviving the discipline of St. Bernard. Later she introduced Jansenism into her convent. See *Life* by Frances Martin (1873), and *Mémoires* by Angélique Arnauld.

Arnault, Antoine Vincent (1766-1834), French poet and *littérateur*, born in Paris. He went with Napoleon to Italy, became secretary to the University of Paris on his return, and was elected to the Academy in 1799. He was exiled by the Bourbons (1816-19), but afterwards returned to France; was appointed (1833) secretary to the Academy, and died at Goderville. His dramas, of which the best are *Blanche et Montcassin, ou les Vénitiens* (1798), and *Germanicus* (1817), show the worst faults of the classicists. He is better known by his short moral poems, *Fables et Poésies* (1812; better ed. 1825), containing the famous '*La Feuille*,' and his *Souvenirs d'un Sexagénaire* (1833).

Arnaut of Mareuil (in the diocese of Périgueux), Provençal troubadour (fl. *c.* 1150-1200). He frequented the court of Alazais (Adelaide), the wife of Roger II. (Taillefer), Count of Béziers, and there he devoted himself to the service of the countess, whom he celebrated in many songs, though always, as was usual, under some disguised name, such as *Gent conquis*. His poems are instinct with passion—real, not feigned, like the ordinary expressions of love generally to be found in the poetry of the troubadours. The audacity shown in his poems at length gave offence to the countess, who dismissed him from her service. Arnaut withdrew, heartbroken, to the court of his friend and patron, Guilhem of Montpellier, where he bewailed his lot in several touching songs. As Alazais died in 1199 or 1200, and as Arnaut never refers to her death, he is supposed to have died before that date. Petrarch calls him the less famous Arnaut as compared with Daniel Arnaut; but this is not the verdict of modern criticism. About thirty of his poems have come down to us. The three epistles in verse, *Saluts d'Amour*, which he addressed to his lady, are among the best of their kind. See J. H. Smith's *Troubadours at Home* (1900).

Arnaut, Daniel (end of 12th century), troubadour, born at Ribérac (Dordogne), France; lived a long time at the court of Richard I. of England. He was the inventor of the *sestina*, which was imitated by Dante. His works were published by Canello (1883).

Arndt, Ernst Moritz (1769-1860), German poet and patriot, born in the island of Rügen. After travels in France and Germany he became (1805) professor of history at Greifswald. The son of a serf, he was instrumental in the abolition (1806) of serfdom by his work, *Geschichte der Leibeigenschaft in Pommern* (1803). In 1818 he exchanged his professorship of history at Greifswald for that at Bonn, from which, two years later, he was suspended for twenty years on account of his radical political opinions. Arndt is chiefly known by his patriotic poems and songs, which include *Was ist des Deutschen Vaterland? Was blasen die Trompeten?* and *Der Gott, der Eisen wachsen liess.* He is familiarly called 'Father Arndt' by the German people. He was a German chauvinist, detesting everybody and everything French. The best edition of his works, by H. Meisner, in 6 vols., was published in 1892-5. See Meisner and Geerds's *E. M. Arndt* (1898).

Arndt, Johann (1555-1621), a German theologian and mystic, is remembered chiefly for his (1605) *Wahres Christenthum* (True Christianity) and *Paradiesgärtlein aller christlichen Tugenden* (1612). See F. Arndt's *Biographischer Versuch* (1838).

Arne, Thomas Augustine (1710-78), musical composer, was born in London. He gave his sister—celebrated as Mrs. Cibber, the tragic actress lessons in singing, enabling her to appear in Lampe's opera *Amelia* (1732), and to play heroine in Arne's first opera, *Rosamond*, produced in 1733. In 1738 he wrote the music for Dr. Dalton's adaptation of Milton's *Comus*. He was the first to introduce—in his *Judith* (1773)—female voices into oratorio choruses. Besides oratorios and operas, Dr. Arne composed a large number of glees, catches, and canons; but he is best known by his musical settings of such songs as *Rule Britannia*—the finale of *The Masque of Alfred* (1840)—*Where the Bee Sucks, Under the Greenwood Tree*, and other Shakespearean songs.

Arneth, Alfred, Count of (1819-97), Austrian historian and statesman, born at Vienna; was a member of the German Assembly of 1848-9 at Frankfort-on-the-Main, and from 1869 a member of the Austrian Upper House. In 1868 he was appointed director of the national archives, and in 1879 president of the Austrian Academy of Sciences. His principal work is *Die Geschichte der Maria Theresa* (10 vols. 1863-79). Among other works are *Prinz Eugen von Savoyen* (3 vols. 1858-9), and the Letters of Maria Theresa and Joseph II., in 12 vols. (1866-91).

Arngrim ('The Learned'), otherwise Arngrimur Jonsson (1568-1648), a student of the ancient literature of Iceland. As the priest of Mel, he wrote *Brevis Commentarius de Islandia* (1593); the *Supplementum*—never printed (1596)—on the lives of the kings; the *Crymogæa* (1610), a Constitutional History of Iceland; and *Specimen Islandiæ*, chiefly from the *Landnamabok* (1643). See Vigfusson and Powell's *Corpus Poeticum Boreale* (1883).

Arnhem (anc. *Arenacum*), tn., cap. of prov. Gelderland, Netherlands; stands on the Lower Rhine, 35 m. by rail E. of Utrecht; is one of the most pleasant towns in the country. The 'large church' contains a monument to Charles, the last Duke of Gelderland (d. 1538). Paper, furniture, glass, printers' type, etc., are manufactured. Pop. (1899) 56,812.

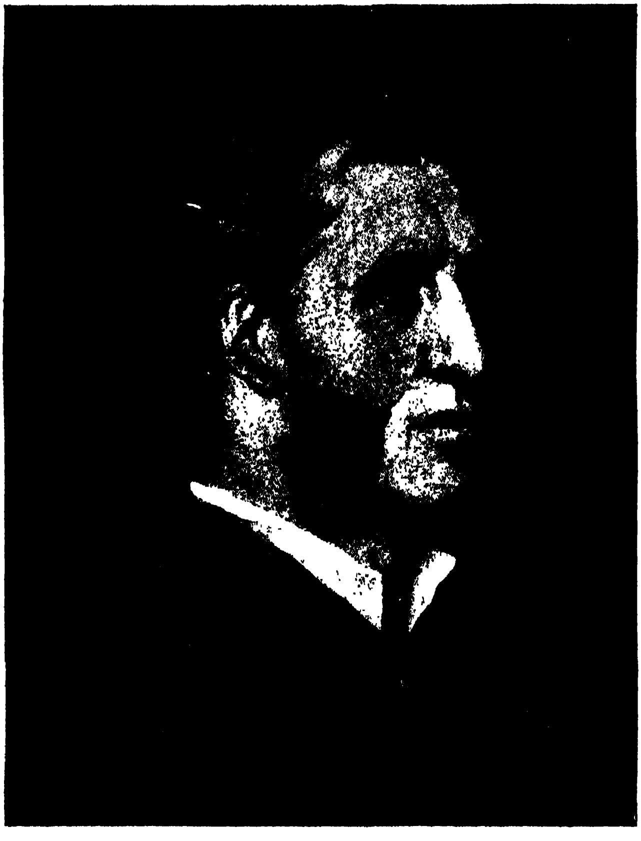
Arnhem Land, the most northerly part of the N. Territory of S. Australia, between the Gulf of Carpentaria and Anson Bay.

Arnica, the dried acrid and aromatic rootlets and rhizome of *Arnica montana*, found on the mountains of middle and southern Europe. The officinal preparation is a tincture which, diluted with water, serves as a remedy for bruises. Internally it has a stimulating effect on the alimentary canal. Its efficacy seems due to the alcohol in the tincture. Applied too freely to the skin, it may produce erysipelas.

Arnim, Bettina von (1788-1859), whose real name was Elisabeth; sister of Clemens Brentano and wife of Ludwig von Arnim, the German novelist and poet; born at Frankfort; is noted for her alleged correspondence with Goethe, published in 1835, under the title of *Goethe's Briefwechsel mit einem Kinde*. See L. Geiger, *Dichter und Frauen* (1896).

Arnim, Harry Karl Eduard, Count von (1824-81), Prussian diplomatist, was born in Pomerania. In 1870 he was ambassador at Rome, and supported the anti-infallibilists at the Vatican Council. In 1871 he took part in the negotiations which resulted in the peace of Frankfort. In 1872 he became ambassador at Paris. Recalled, owing to his hostility to Bismarck, in 1874, he was sent to Constantinople. Charged with having stolen state documents in Paris, he was imprisoned, and on appeal his sentence was increased. In 1876 he published a violent pamphlet against Bismarck and others, and was prosecuted for high treason and libel, and sentenced in 1876 to five years' penal servitude. By living in exile he escaped the penalty. He died at Nice. See Lowe's *Prince Bismarck* (new ed. 1898).

Arnim, Johann Georg von (1581-1641), general of the Thirty Years' war, was successively in the service of the Swedes, the Poles, the emperor, and the Saxons. Besieged Stralsund under Wallenstein (1628); co-operated with Gustavus Adolphus at Breitenfeld (1631); occupied Prague (1631); carried on negotiations with Wallenstein (1633-4); defeated the imperialist general Colloredo at Liegnitz (1634), and captured Zittau and Glogau; and in 1637 was arrested by the Swedes and carried to Stockholm, but contrived to escape in 1638. See Irmer's *Hans Georg von Arnim* (1894), and works cited *s.v.* Wallenstein.



Matthew Arnold. By G. F. Watts, R.A.
(Photo by Hollyer.)

Arnim, Ludwig Achim von (1781-1831), German poet, born in Berlin. In 1806 he met his lifelong friend, Clemens Brentano, in Heidelberg. Together they edited (1806-8) many old German songs (*Des Knaben Wunderhorn*—see Brentano). Arnim married Brentano's sister, Bettina, in 1811. His first novel (*Hollins Liebeleben*, 1802) was an imitation of Goethe's *Werther;* the second (*Ariel's Offenbarungen*, 1804) was a poor specimen of the romantic school. His best work is *Die Kronenwächter* (1817), based on extensive historical research, and representing German life in the renaissance period. Arnim also wrote some unsuccessful plays. An edition of his works in 22 vols. was published by his wife in 1853-6. See *Goethe und die Romantik* II., in *Schriften der Goethe Gesellschaft*, vol. xiv. (1899).

Arno, unnavigable riv. (total length, 140 m.) of Italy, rises at an altitude of 4,445 ft. in the Central Apennines, 23 m. E. by N. of Florence. As a mountain torrent it flows at first nearly due S. almost to Arezzo, then sweeps round to the N.W., and flows back nearly parallel to its former course as far as Pontassieve, where it turns to the W., and flowing through Florence enters the Mediterranean 7 m. below Pisa. This city stood originally on the seashore, but the Arno and Serchio together have brought down so much alluvium that the sea has been thrust back four and a half miles since the beginning of the Christian era.

Arnobius, also called Afer, rhetorician of Sicca in Numidia, wrote, about 295 A.D., an apology for Christianity (*Adversus Nationes*, lib. vii.). There is a good edition of his work by Reifferscheid (Vienna, 1875). English trans., vol. xix. of the *Ante-Nicene Christian Library* (1871).

Arnold, tn. and par., Nottinghamshire, 4 m. N.E. of Nottingham and ¾ m. from Daybrook, on railway from Derby to Grantham, in Sherwood Forest. Lace and hosiery manufactured. Pop. 8,757.

Arnold of Brescia (*c.* 1100-55), an Italian monk, studied under Abélard at Paris. For an attack on the worldliness of the higher clergy he was cited by the bishop of Brescia before the second Lateran Council (1139) as a heretic, and banished. He took refuge with Abélard, but his preaching brought upon him the hostility of St. Bernard, who denounced him. He found refuge (1142) in Switzerland; but in 1145 he proceeded to Rome, and endeavoured (1147) to establish a republic. In 1155, being expelled by the senate of Rome at the instigation of Pope Adrian IV., he fled to Campania, but was brought to Rome, crucified, his body burnt, and the ashes cast into the Tiber. See *Lives* by Giesebrecht (1873), Bonghi (1885), and Hausrath (1892).

Arnold, Sir Arthur (1833-1902), assistant-commissioner of public works in Lancashire (1863-66), resided in Lancashire during the cotton famine. First editor of the *Echo* till 1875; M.P. for Salford (1880-3); chairman of London County Council (1895-7); president of Free Land League, which he established in 1885; created a knight in 1895. Published *Hist. of the Cotton Famine* (1865); *Through Persia by Caravan* (1876); *Social Politics* (1881); *Free Land* (1880).

Arnold, Benedict (1741-1801), American general, born at Norwich, Connecticut. During the war of independence he assisted at the capture of Fort Ticonderoga; and after the siege of Quebec he commanded the flotilla at the battle of Valcour I., in Lake Champlain (1776). Embittered by the promotion over his head of five inferiors, he agreed with General Clinton to betray into his hands West Point and other important posts. On the capture of the British officer André, his fellow-conspirator, he went over to the British. He died in London. See *Lives* by Jared Sparks (1838) and Isaac N. Arnold (1880).

Arnold, Sir Edwin (1832-1904), English poet, born at Gravesend. For a poem on *The Feast of Belshazzar* he gained the Newdigate prize (1853). He was principal of the Government Sanskrit College at Poona (1856-61).

After his return to England he was employed on the editorial staff of the *Daily Telegraph.* His works include *Poems* (1853); *Hero and Leander* (1874); *The Indian Song of Songs* (1875); *Light of Asia* (1879), an epic on the life and work of Buddha, which has gone through numerous editions; *Indian Poetry* (1881); *Pearls of the Faith* (1883); *With Sa'di in the Garden* (1888); *The Light of the World* (1891); *Seas and Lands* (1891); and *Adzuma, a Japanese Tragedy* (1893).

Arnold, HANS (pseudonym of BABETTE VON BÜLOW), was born in Warmbrunn in 1850. Her tales, mostly published under the title of *Novellen* (1881-1903), treat mainly of the small vexations and worries of life. Among her best works are *Geburtstagsfreuden* (1884) and *Aprilwetter* (1893).

Arnold, MATTHEW (1822-88), poet, critic, and educationist, was the eldest son of Thomas Arnold, headmaster of Rugby. He was born at Laleham, Middlesex. In 1847 he became private secretary to Lord Lansdowne, by whom he was appointed in 1851 to a lay inspectorship of schools. On three occasions he drew up valuable reports of continental systems of education. Two of them have been reprinted as *The Popular Education of France* (1861) and *Schools and Universities on the Continent* (1868). Meanwhile Arnold steadily devoted his leisure to literature, and achieved a twofold reputation as poet and critic. From 1857 to 1867 he was regius professor of poetry at Oxford. His home was for a time in London, then at Harrow, and finally, from 1873, at Cobham, Surrey. In 1883, and again in 1886, he undertook lecturing tours in America. In 1885 he resigned his inspectorship. He died suddenly at Liverpool.

Matthew Arnold's literary work presents three phases. The ten or twelve years following his Oxford career were mainly devoted to poetry. Two early volumes—*The Strayed Reveller* (1849) and *Empedocles upon Etna* (1852)—were anonymously issued under the initial 'A.' The best of their contents were reprinted in the *Poems* of 1853, on the title-page of which the author's name appeared, and to which he added such masterpieces as *Sohrab and Rustum* (a narrative poem in the Homeric vein) and *The Scholar Gipsy*. A second series of *Poems* appeared in 1855, *Merope* (a tragedy in the Greek manner) in 1858, and *New Poems* in 1867.

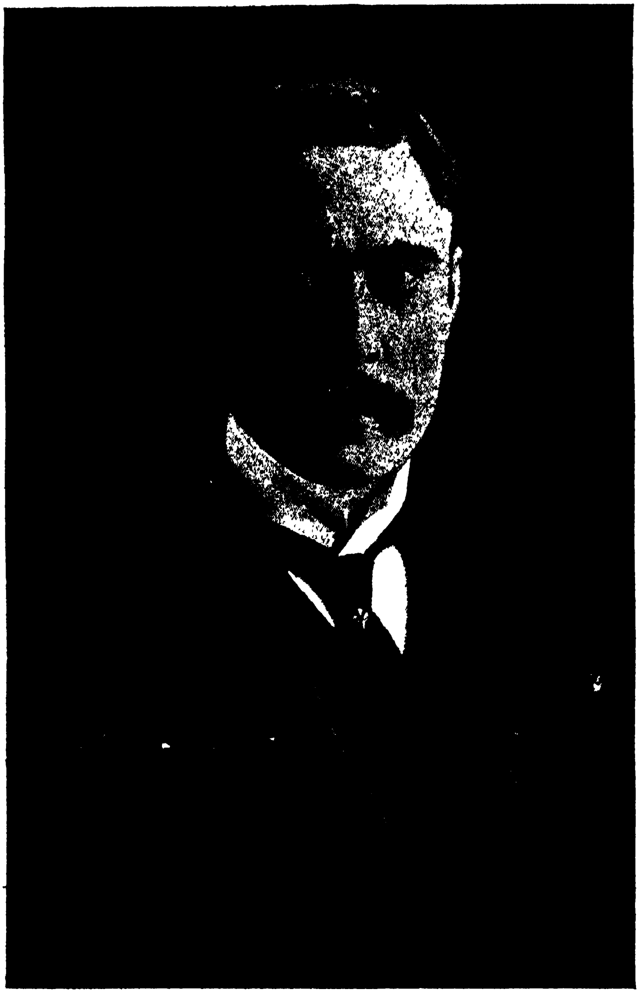
Hardly less remarkable than the *Poems* of 1853 was the preface—dwelling on the importance of structure and unity in poetry—that accompanied them. Although the monody on his friend Arthur Hugh Clough, printed as *Thyrsis* in the 1867 volume, is one of his finest single pieces, and he continued to write poetry at intervals until the end of his life, for a decade from 1857 it was in literary criticism that his strongest work was done. The Oxford lectures, *On Translating Homer* (1861, 1862) and *On the Study of Celtic Literature* (1867), are models of sympathetic, lucid, and graceful discussion of literary problems; and some scattered studies of no less interest were collected as *Essays in Criticism* in 1865. Arnold took Sainte-Beuve as his model, and aimed at establishing a scientific system of criticism.

Thomas Arnold of Rugby.

Literary criticism, like poetry, Arnold never wholly dropped. But his educational experience, and a constant study of the workings of the English mind when brought into contact with ideas, had led him into a profound dissatisfaction with the current ideals of the day. Towards the end of the 'sixties it became evident that the goal of his criticism was shifting from letters to life. There followed a period of active battle, during which, with a serious purpose beneath a mist of raillery, he attacked the social and educational prejudices of his countrymen in *Culture and Anarchy* (1869), their political prejudices in *Friendship's Garland* (1871), their religious prejudices in a series of works of which *Literature and Dogma* (1873) was the most startling and the most disputed. Arnold had the gift of crystallizing his views in memorable phrases. His plea for 'sweetness and light,' his division of English society into 'Barbarians,' 'Philistines,' and 'Populace,' have become household words. His message proved no inconsiderable factor in forming the ideals and habits of thought of a younger generation. Stimulating as his critical works are, it is probably by his poems that Arnold will live in English literature. Other works: *Higher Schools and Universities in Germany* (1874); *God and the Bible* (1875); *Last Essays on Church and Religion* (1877); *Mixed Essays* (1879); *Irish Essays* (1882); *Essays in Criticism*, 2nd series (1888). Editions: *Burke's Letters, Speeches, etc.* (1881), etc. Collected Works: Edition for America only (1884). Collected Poems, in 2 vols. (1869, 1877); 3 vols. (1885); 1 vol. (1890). Selections: *Passages from the Prose Writings* (1880); *Selected Poems* (1878); and recent editions since the partial expiration of copyright by W. Sharp, R. Garnett, H. B. Forman, and others. Biography: *Letters of Matthew Arnold*, ed. G. W. E. Russell (1901). Monographs, by A. Galton (1897); G. White (1898); G. Saintsbury (1899); H. W. Paul (1902). Bibliography, by T. B. Smart (1892).

Arnold, SAMUEL (1740-1802), born in London; composed oratorios, operas, and miscellaneous music. From 1783 to 1793 he was organist and composer to the Chapel Royal, till he became organist of Westminster Abbey. He is best known as the compiler of an excellent collection of music by English composers, entitled *Cathedral Music* (1790).

Arnold, THOMAS (1795-1842), historian, divine, and greatest of English schoolmasters, was born at East Cowes, Isle of Wight. In 1828 he was chosen headmaster of Rugby School, which he raised to a level second to that of none in England. He widened the conventional public school curriculum, and developed the 'prefect' and 'fagging' system. But his secret lay less in any system than in the profound religious and moral force of his own character, together with a sense of justice which inspired respect. He had an acute insight into character, and influenced his pupils by stimulus moral and intellectual, without subjecting them to needless rules. The 'Rugby' type of men obtained the reputation of holding an unusually serious and ethical view of life—perhaps also of not being wholly free from priggishness. The chief difficulty in Arnold's way was the prejudice excited in the Tory and High Church classes of society by his liberal views on politics and religion. Although a contemporary of Keble, he was a strong opposer of Tractarianism, which he attacked with an intolerance and a controversial vigour equal to its own. An article in the *Edinburgh Review*, championing the claims of the 'heretical' Dr. Hampden, nearly lost him his headmastership. For some time he was the chief representative of active 'Broad' churchmanship in the Anglican communion. By 1841 Arnold had conquered public opinion, at least as to the merits of his methods at Rugby. In that year he was appointed regius professor of history at Oxford. His contributions, under the influence of Niebuhr and other German writers, to a more scientific treatment of ancient history were not inconsiderable. While at Laleham he had written articles on Roman history for the *Encyc. Metropolitana*, and at Rugby he undertook an edition of *Thucydides*. In 1832 he had bought Fox How, Ambleside, as a vacation home, and here he died suddenly. His eldest son was Matthew Arnold the poet. Works: Edition of *Thucydides* (1830-41); *Hist. of Rome*, to Punic wars (1838-43); 'History of the Later Roman Commonwealth,' from *Encyc. Metropolitana* (1845); *Miscellaneous Works* (ed. A. P. Stanley, 1845), with various volumes of *Sermons*, many of which were collected in 1878. There is an excellent biography by Dean Stanley in *Arnold's Life and Correspondence* (1844; new ed. 1890). See also Sir J. Fitch's *Thomas and Matthew Arnold: their Influence on English Education* (1897); *cf.* M. Arnold's *Rugby Chapel* and T. Hughes's *Tom Brown's School Days* (1856).



Right Hon. H. O. Arnold-Forster.

(*Photo by Elliot & Fry.*)

Arnold, Thomas (1823-1900), second son of Dr. Arnold of Rugby, and younger brother of Matthew Arnold, was born at Laleham, Staines. He went to New Zealand in 1847, and in 1850 became inspector of schools in Tasmania. Becoming a convert to Roman Catholicism and an associate of Cardinal Newman, he was appointed professor of English literature in the Catholic University, Dublin (1856-62); from 1862 until 1865 was classical master in Birmingham Oratory School; in 1882 was appointed professor of English literature at University College, Dublin. His eldest daughter is Mrs. Humphry Ward the novelist. Besides his well-known *Manual of Eng. Lit., Hist. and Crit.* (1862; 7th ed. 1897), he was the author of *Chaucer to Wordsworth* (1868; 2nd ed. 1875); editions of English classics including *Select Eng. Works of John Wycliffe* (3 vols. 1869-71); *Beowulf, with a Trans.* (1876); *Eng. Poetry and Prose* (1879; new ed. 1882); and *Dryden: an Essay of Dramatic Poesy* (1889). He published an autobiographical volume, *Passages in a Wandering Life*, in 1900.

Arnold, Thomas Kerchever (1800-53), educational writer, rector of Lyndon in Rutlandshire, devoted himself (after 1838) to the writing of books of classical extracts, antiquities, and grammars. His work was of unequal merit, and was subjected to severe criticism; but his *Greek Prose Composition* (1838) and *Latin Prose Composition* (1839) are still in extensive use as text-books. See *Athenæum*, 1853, i. 353; Arnold's *Few Words in Answer to the Attack on my Classical School Books* (1853).

Arnold-Forster, Right Hon. Hugh Oakeley (1855), adopted son of the Right Hon. W. E. Forster, entered Parliament as member for West Belfast in 1892, and became parliamentary secretary to the Admiralty (1900), and Secretary for War (1903). He is the author of several works, including *The Citizen Reader; The Laws of Everyday Life; This World of Ours; In a Conning Tower; Things New and Old; A Hist. of Eng.* (1897); *Army Letters* (1898); *Our Great City* (1900); and *Our Home Army*.

Arnoldi, Wilhelm (1798-1864), bishop of Trèves, born at Bitburg in the Eifel; elected bishop (1839). In 1844 he drew vast crowds of pilgrims to Trèves by the exhibition of the 'holy coat,' which led Ronge to establish German Neo-Catholicism.

Arnolfo di Cambio (? 1232-1310), Florentine architect and sculptor, a pupil of Niccolo Pisano; examples of his work are the Duomo, Palazzo Vecchio, and the churches of Santa Croce and San Michele in Florence.

Arnot, Hugo (1749-86), historian, was an Edinburgh advocate, unsuccessful owing to his intolerable temper. He was interested in municipal politics, and was author of a *Hist. of Edin.* (1779; 2nd ed. 1817), and of a *Coll. of Celebrated Criminal Trials in Scot.* (1785). See Kay's *Edinburgh Portraits*, Nos. 5, 8, 66, 132.

Arnott, Neil (1788-1874), physicist and hygienist, native of Arbroath. After making physical and meteorological experiments while a ship's doctor, he settled in London in 1811, where he acquired a large practice, especially among foreigners. Arnott is remembered for his work on *Physics* (1827; 7th ed. 1876), for his inventions of scientific and sanitary appliances (*e.g.* Arnott's stove, Arnott's ventilator, and Arnott's water-bed), and for his benefactions to the London and Scottish universities. See *Proceedings of the Royal Society*, vol. xxv., 1877.

Arnould, Sophie (1744-1802), French operatic singer, created the principal parts in Rameau's operas, and in Gluck's *Iphigénie* and *Eurydice*. After a brilliant career she retired at the age of thirty-five. She was renowned for her sarcastic humour, and many of her *bons mots* were published in 1813, under the title *Arnouldiana*. She was a friend of D'Alembert, Diderot, Mably, Duclos, and J. J. Rousseau. See Goncourt's *Sophie Arnould* (1857).

Arnsberg, tn., prov. Westphalia, Prussia, 50 m. by rail N.E. of Barmen; railway workshops and paper and cellulose factories; a centre of the Vehmgerichte, and for long the capital of Westphalia. Pop. (1900) 8,490.

Arnstadt, tn., cap. of prin. Schwarzburg-Sondershausen, Germany, 14 m. by rail S. of Erfurt; corn and timber markets; brewing and gardening; saline springs and baths. Pop. (1900) 14,411.

Arnswalde, tn., dist. Frankfort, prov. Brandenburg, Prussia, 44 m. by rail S.E. of Stettin, with iron foundries, sawmills, match factories. Pop. (1900) 8,665.

Aroa, tn., Venezuela, prov. Lara, with copper mines; 47 m. by rail W. of Tucacas.

Aroideæ. See ARACEÆ and ARUM.

Arokszallas, or JÁSZÁROKSZÁLLÁS, mrkt. tn., co. Jász-Nagykun-Szolnok, Hungary, 44 m. E. of Budapest. Pop. (1900) 12,067.

Arolla, some chalets near the foot of the glacier of the same name (the local term for the *Pinus cembra*), at the head of the S.W. fork of the Val d'Hérens, Valais, Switzerland. They are three hours by mule path from Evolena, which is 16 m. by carriage road from Sion. It is now one of the most frequented of all Swiss summer resorts, especially for climbers,

Arolsen, cap., prin. Waldeck, Germany, 20 m. N.W. of Kassel. The prince's residence contains a collection of antiquities from Herculaneum and Pompeii, and a good library. Birthplace of W. von Kaulbach (1805-74) the painter, and of C. Rauch (1777-1857) the sculptor. Pop. (1900) 2,734.

Aromatics (Gr. 'spice'), substances which possess a spicy, fragrant smell, and a warm, pungent taste. Several orders of plants yield aromatics, such as rosemary, mint, cinnamon, eucalyptus, and camphor. Among aromatics yielded by animals are musk, from the glands of the musk deer; and civet, from the glands of the civet cat. The aromatics, generally speaking, are insecticides and antiseptics, and may be used internally on account of their flavour or carminative action. Some, such as orange, are used to cover the nauseous flavour of drugs; others, such as asafœtida, are used in nervous disorders to act through the strong impression produced by their intensely disagreeable taste and odour.

The name AROMATIC SERIES is given to those hydrocarbons and their derivatives which contain a benzene nucleus or other closed chain of carbon atoms. They often have an aromatic odour, and are distinguished from other carbon compounds by many characteristic reactions—*e.g.* by yielding nitro derivatives when acted on by nitric acid.

Aroostook, riv. rising in Maine, U.S.A., and flowing through Aroostook co. into the St. John R., New Brunswick, Canada; 140 m. in length; formed the subject of a boundary dispute between the States and Canada, settled by the Ashburton treaty, 1842.

Aros, African tribe inhabiting the Cross River region, N. of Old Calabar. A British punitive expedition suppressed their turbulent and slaving proclivities in 1901-2.

Arosa, at the head of the Schanfigg valley, E. of Coire, in the Swiss canton of the Grisons, and between Coire and Davos. It is 19 miles by road from Coire; a very rising resort for consumptives (alt. 5,600-6,000 ft.). Pop. (1900) 1,071.

Arouet. See VOLTAIRE.

Arpad (? 860-907), the national hero of the Magyars, and the founder of the Arpad dynasty (1000-1301) of Hungary. His history still lives in the national songs and legends.

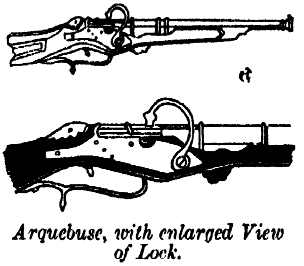
Arpad, or ARPHAD, city of Biblical times, N.W. of Aleppo, Syria; destroyed after a three years' siege by Tiglath-pileser III. in 741 B.C. (2 Kings 18:34); now a ruin called Tell Erfad.

Arpeggio, in musical score a chord of which the constituent notes are sounded consecutively from below upwards, instead of simultaneously. The sign is usually an upright wavy line placed before a chord.

Arpent, or ARPINE, an old French measure of area still in use in Louisiana and Quebec. It varied in extent from 54,900 sq. ft. (royal arpent) to 45,425 sq. ft. (common arpent) and 36,800 (arpent of Paris), and thus measured from about 1¼ to ⅚ acre.

Arpino, tn., prov. Caserta, Italy, 88 m. by rail (*viâ* Roccasecca) S.E. of Rome; represents the ancient Volscian town of Arpinum, still in part enclosed within cyclopean walls, with ancient gates and other relics. Vipsanius Agrippa (63 B.C.), Marius (157 B.C.), and Cicero (106 B.C.) were born in the vicinity, and the town is the birthplace of the painter Giuseppe Cesari (*c.* 1568). Pop. (1901) 11,013.

Arqua Petrarca, vil., prov. Padua, Italy, among the Euganean Hills, 12 m. S.W. of Padua. Here Petrarch spent the last four years of his life (1370-4); his house is still shown. Pop. (1901) 1,590.



Arquebuse, with enlarged View of Lock.

Arquebuse (more properly HARQUEBUS), an early form of hand firearm; an improvement on the first simple tube, with its touch-hole and hand-applied match. The arquebuse had a match-holder, which fell on the priming pan when the trigger was pulled; and, later, other devices were added. Larger weapons, mounted on swivels and throwing heavy balls, were used for defence of fortified places.

Arracan. See ARAKAN.

Arrack, or RAKI, the name given in the East (India, Siam, Malay Peninsula and Archipelago) to any ardent spirit distilled from the sweet sap of certain palms, rice, and molasses. The fermented sap is toddy, which when distilled yields arrack. The method of preparation varies.

Arragon. See ARAGON.

Arrah, munic. tn., Shahabad dist., Bengal, India, 33 m. W. of Patna. During the mutiny it was gallantly held for eight days by fifty sepoys and a dozen Englishmen. Pop. (1901) 46,170.

Arraignment consists in calling a prisoner to the bar of a court of criminal jurisdiction to answer the matter charged against him in the indictment. It is derived from *ad rationem*—*i.e.* calling the prisoner to reason. See INDICTMENT, JURY, PLEAS, and TRIAL.

Arran, the largest island of the Firth of Clyde, Scotland; part of the county of Bute and Arran; length, N. to S., 20 m.; breadth, E. to W., 10 m.; area, 165 sq. m. The N. parts are mountainous, intersected by narrow glens, the scenery magnificent. Goatfell ('hill of wind'), 2,866 ft., is the highest peak. To the S. the land is lower, undulating, and cultivated. The principal villages are Brodick, the castle a seat of the dukes of Hamilton; Lamlash, with a sheltered bay formed by Holy I., 2 m. off; Whiting Bay; Corrie; Lochranza, with fishing industry; Pirnmill; and Blackwaterfoot all favourite summer resorts. Temperature is mild and equable; rainfall heavy in the N. There are numerous stone circles and standing stones, and the antiquities include Lochranza Castle, dating before 1380, and Kildonan Castle, a royal stronghold in the 15th century. The Norse held the island till the 13th century; later (1306) it sheltered Robert the Bruce. Pop. (1901) 5,343.

Arran Islands, Ireland. See ARAN.

Arrangement, in music the transcription or adaptation of compositions to suit other instruments (or voices) than those for which they were composed. A common kind of arrangement is that of adapting orchestral compositions for the piano, in which branch Franz Liszt was notably successful. Many of the great composers—among them Bach, Beethoven, and Mendelssohn—have made arrangements of their own compositions.

Arras (*Nemetacum*), tn., former cap. of Artois, now of dep. Pas-de-Calais, France, 40 m. by rail N.E. of Amiens. It is the seat of a bishop; one of the principal grain markets of France, with soap, oil, cast iron, salt, sugar refining, lace, and agricultural implement industries. The Hôtel de Ville, of the 16th century, with a belfry (240 ft.), and the cathedral, of the 18th century, are the chief architectural features. Before the Roman invasion Arras was the cap. of the Atrebates. The town has had many troubles, having been destroyed by the Vandals in 407 and by the Normans in 880; besieged in 1414 and 1479; taken in 1578 by the Prince of Orange; besieged again in 1640 and 1654 by Condé, and rescued by Turenne. Robespierre was born here. Pop. (1901) 25,813.

Arras, a name given to large tapestries used as wall-hangings. See TAPESTRY.

Arrebo, ANDERS CHRISTENSEN (1587-1637), Danish poet, born in Ærö; was (1618) appointed bishop of Trondhjem, but was deposed in 1622, and afterwards reinstated as preacher of Vordingborg. He was styled 'the father of Danish poetry' for his innovations of the renaissance. He published *Hexaemeron* (1641-61), a description of the six days of creation, and a metrical translation of the Psalms of David. See *Life* by Rördam (1857).

Arrest, in criminal cases seizing a man's person to bring him to justice. Every one is liable to arrest. It may be on warrant or without warrant. Any justice may issue a warrant for the arrest of any person for any offence upon a sworn information being laid before him. Without warrant a private person may, by common law, arrest any one committing a felony in his presence, or any one whom he reasonably suspects of committing a felony, if a felony has in fact been committed. He may not arrest for a misdemeanour except under special statutory authority. Thus, in England, under the Prevention of Offences Act, 1851, any person may arrest any person found committing an indictable offence during the night (9 p.m. to 6 a.m.); and powers of arrest without warrant are given by the Coinage Offences Act, the Larceny Act, the Vagrancy Acts, and many other statutes. A constable may arrest without warrant upon reasonable suspicion that a felony has been committed, and that the person he arrests is guilty of it, even though no felony has been committed, and whether the grounds of his suspicion are facts within his own knowledge or stated to him by another. He is not generally justified in arresting without warrant for a misdemeanour, but he may do so if a breach of the peace is committed in his presence, or in the presence of some one who gives the prisoner in charge, and there is danger of immediate renewal. Constables have also statutory powers of arresting without warrant in a number of special cases. The law of Scotland with regard to arrest (or apprehension) with and without warrant is much the same as in England, but the powers of private persons to arrest without warrant appear to be rather more extensive. The English division into felonies and misdemeanours corresponds generally to the Scottish division into high crimes and offences, and offences. In civil cases arrest is practically obsolete. Debtors are only arrested for what are really criminal offences, or contempt of court. But see NE EXEAT REGNO.

Arrestment, in Scots law, a legal diligence by which payment of a debt is prohibited until the creditor in that debt shall make payment of another debt to his own creditor. The debt must be movable, and the arrestment can be made only by order of the court. Certain movables are excluded from the operation of arrestment—*viz.* debts due by bills, debts which will not be due till a future date, alimentary debts, and wages which do not exceed 20s. a week. The arrestment is made effectual to the arrester by an action of furthcoming, by which the subject arrested is converted into money and paid to him.

Arrest of Ships. Ships, except King's ships and those of foreign governments, may be arrested in Admiralty proceedings either on the ground of a maritime lien or for a claim against the ship—*e.g.* for damage done by collision. The ship is arrested by a marshal of the Admiralty Court upon a warrant, and remains in his custody. The arrest extends to the sails, rigging, etc., and in some cases to the cargo and freight. Arrested ships may be released on bail which is security for the value of the property arrested to the extent of the claim and costs. See Williams and Bruce's *Admiralty Practice* (3rd ed. 1902).

Arretium, Italy. See AREZZO.

Arrhenius, SVANTE, was born in 1859 near Upsala. He became teacher of physics at Stockholm in 1891, and professor in 1895. His most fruitful work has been in putting the dissociation theory of electrolysis on a sound experimental basis. He received the Davy medal in 1902, and was elected a foreign member of the Chemical Society in 1898. See Arrhenius's *Text-book of Electrochemistry*, trans. M'Crae.

Arrianus, or ARRIAN (*c.* 90-170 A.D.), Greek historian, born at Nicomedia, in Bithynia; pupil and friend of Epictetus. In 137, as prefect of Cappadocia, he defeated an invading horde of Alani. In 147 he was archon in Athens. He was best known for his *Expedition of Alexander*, but he also wrote *Discourses of Epictetus*, and *Enchiridion Epicteti*, containing the fullest account of the Stoic doctrine. Another work is the *Cynegetica*, a treatise on hunting. In all these writings he took Xenophon as his model, and his style is marked by an equal ease and simplicity. As a critical historian he deserves still greater credit; he makes the best use of authorities which are now lost, and his practical experience as a soldier makes his account of Alexander's campaigns and his work on *Tactics* of considerable value. He also wrote *Histories* of the successors of Alexander, of the Parthian empire, and of Bithynia, which are lost. There is an edition of his works in the Teubner series; also in Didot's series, by Dübner and Müller (1846); the fifth book of the *History* has been edited by Moberly (1875); and there is an English translation of the *History* by Chinnock (1893).

Arriaza y Superviela, JUAN BAUTISTA DE (1770-1837), Spanish poet. His early poems are erotic; but, like Quintana and Nicasio Gallego, he found his opportunity in the enthusiasm aroused by the invasion of Spain by Napoleon. His *Poesias Patrioticos*, published in London during his exile in 1810, are full of fire and eloquence. On the return of King Ferdinand after the war, Arriaza sank to the position of a court poet.

Arris, the sharp edge formed where two surfaces meet: usually applied to the edges of dressed stone or brick, and specially the sharp ridges between the channels of a Doric column.

Arroba, AROBA, or AROBE, a measure for liquids, varying, according to locality and liquid, from $2\frac{3}{4}$ to $6\frac{7}{16}$ imperial gallons. Used in Spain, Portugal, Mexico, Chile, etc. Also a weight used in Central and S. America, equivalent to 25·35 lbs. avoirdupois (in Brazil, 32·38 lbs.).

Arrol, SIR WILLIAM (1839), head of the firm of Wm. Arrol and Co., began business in 1868, and rapidly rose to a foremost place as an engineer. His firm were contractors for the second Tay Bridge, the Forth Bridge, the London Tower Bridge, and the Manchester Ship Canal. He was knighted on the opening of the last in 1890. Elected M.P. for S. Ayrshire (1895).

Arrondissement, the principal civil division of the department of France. It is divided into cantons, and each canton into communes. Every arrondissement is governed by a sub-prefect and council.

Arrow, a wooden shaft tipped with stone, metal, or bone, and notched and feathered at the butt, discharged by hand from a bow. Prehistoric flint arrow-heads display numerous forms, and range in length from half an inch to three inches. The Egyptians favoured a chisel-like arrow-head, while those of early Greece were made of bronze. Obsidian and slate arrow-heads also occur. Certain tribes of Guiana and Africa (*e.g.* the Akka) used to dip the tips of their arrows in poison to make them more deadly. For curious superstitions regarding the origin of arrow-heads as elf bolts, fairy darts, etc., see *Folklore of the Northern Countries*. See also Evans's *Stone Implements of Great Britain* (2nd ed. 1897), and J. Anderson's *Scotland in Pagan Times* (1886).

Arrow, a British coast-defence third-class gunboat, launched in 1871. The ship-name dates from 1796, and is associated with the capture of the *Draak* and *Gier* (1799), the capture of the *Freya* (1800), the bombardment of Copenhagen (1801), a most gallant defensive action with two French frigates (1805), San Sebastian (1813), and Kinburn (1855).

Arrowgrass, two small, erect, grass-like plants of the genus Triglochin; one is found in wet meadows, and the other in marshes overflowed by the tide.

Arrowhead, a British plant (*Sagittaria*) of the order Alismaceæ, found in streams and ponds; it has arrow-shaped leaves.

Arrowroot, the prepared starch obtained from various plants. The finest is the W. Indian, which is got from the rhizomes of *Maranta arundinacea*, of the order Marantaceæ. The starch is extracted by macerating and washing the rhizomes, the fibrous portion being then removed, and the milky liquor allowed to settle. It is then dried and packed for use. E. Indian arrowroot, or 'Curcuma starch,' is less pure than Maranta, and is obtained from various species of *Curcuma*, belonging to the ginger order. Florida starch, or arrowroot, is obtained from species of Zamia, belonging to the order Cycadaceæ. English arrowroot is the starch obtained from potatoes. Portland arrowroot, or sago, is the starch of the corms of *Arum maculatum*. See STARCH.

Arrowsmith, AARON (1750-1823), an English geographer and maker of maps, all of great merit. His chief maps are those of the World (1790), of North America (materials chiefly the MSS. of the Hudson's Bay Co.), of Scotland in 1807 (materials chiefly large MS. *Military Survey of Scotland*, 1745-55, made at instance of Duke of Cumberland), and of S. India. See *Ocean Highways* (1873-4), p. 124, and *Indian Surveys* (2nd ed. 1878), both ed. by C. Markham.

Arrowsmith, JOHN (1790-1873), one of the founders of the Royal Geographical Society (1830); succeeded to the map-publishing business founded by his uncle Aaron. He published (1) large maps and charts—*e.g.* his *London Atlas*, for the third edition of which (1858) 10,000 sheets were examined; (2) smaller maps (illustrative of expeditions) in books of travel, and in the Royal Geographical Society's journals; (3) after 1861, improvements of older maps, and illustrations of other geographical works. See *Ocean Highways* and *Indian Surveys*, ed. by Markham.

Arrow-worms, small, transparent creatures, often found in enormous numbers at the surface of the sea. The common genera are Sagitta and Spadella.

Arroyo Molinos, vil., Estremadura, Spain, 40 m. N.E. of Badajos; scene of defeat of French by Lord Hill on Oct. 28, 1811.

Arru. See ARU.

A.R.S.A., Associate of the Royal Scottish Academy.

Arsaces, the founder of the Parthian empire. He raised a revolt among the Parthians against Antiochus II. of Syria, and was the first king of Parthia, about 250 B.C., reigning two years. His name was borne by all his successors, of whom the last was Arsaces XXXI. (Artabanus IV.), whose power was overthrown by the Persians in 226 A.D. A branch of the dynasty ruled over Armenia from 147 B.C. to 430 A.D. See Rawlinson's *Parthia* (1873).

Ars an der Mosel, tn., Alsace-Lorraine, Germany, 5 m. by rail S.W. of Metz; manufactures champagne, and has ruins of a Roman aqueduct built by Drusus. Pop. (1900) 4,081.

Arsenal, a government establishment for the receipt, storage, and issue of ordnance and warlike stores. Large arsenals are usually provided with factories and workshops for purposes of manufacture and repair. In England the term is almost exclusively applied to the factories and magazine at Woolwich, from which the army and navy obtain the bulk of their guns and ammunition. The policy of having only one great arsenal in the vicinity of an unfortified capital has often been questioned, and schemes have frequently been mooted for forming another in an inland district. But the tendency of modern times is to restrict the output of government factories and encourage great private firms, such as those of Armstrong, Vickers Maxim, etc. Arsenals in the Indian dependency and in our colonial possessions are usually stores with sufficient workshops attached to deal with minor repairs. The manufacturing establishments for the navy, and the storehouses at places like Plymouth, Portsmouth, Pembroke Dock, and Chatham, are arsenals as much as Toulon and Cherbourg, but it has long been the custom to speak of them as dockyards. The principal naval arsenals on the Continent are Brest, Cherbourg, Toulon, in France; Spezia and Venice, in Italy; Cartagena, in Spain; Ludwigshafen and Kiel, in Germany; Kronstadt, with naval yards at St. Petersburg, Libau, Revel, Sebastopol, and Nicolaieff, in Russia; Horten, in Norway; Karlskrona, in Sweden; and Antwerp, in Belgium: in the United States, Portsmouth (N.H.), Boston (Mass.), Brooklyn (N.Y.), League I. (Pa.), Washington (D.C.), Norfolk (Va.), Pensacola (Fla.), Mare I. (Cal.), and Puget Sound (Wash.).

Arsenic (As, 75·0) is a semi-metallic element very widely distributed in nature. It rarely occurs native, but usually combined with sulphur, iron, and other elements, as in realgar, As_2S_2, arsenical iron, and particularly as mispickel or arsenical pyrites, FeSAs. The element is prepared by heating mispickel, upon which the arsenic sublimes, and ferrous sulphide is left. Arsenic is a steel-gray, very brittle crystalline solid that sublimes when heated, being deposited partly in crystals and partly as a black, amorphous solid. It tarnishes in air, and is rapidly oxidized if heated with it, giving off a garlic smell, and forming arsenious anhydride, As_4O_6. It is hardly poisonous, and is chiefly used to harden and improve the sphericity of sporting shot, for bronzing, and in pyrotechny. Arsenic forms two oxides, As_4O_6 and As_2O_5, both of which are acid anhydrides. Arsenious anhydride, or white arsenic, As_4O_6, is by far the most important compound of arsenic, and is obtained by roasting arsenical pyrites in air and condensing the fumes in large chambers. As many metallic ores are contaminated with arsenical pyrites and similar compounds, white arsenic is commonly obtained as a by-product in their preliminary preparation by roasting. This is notably the case with tin ores. Arsenious anhydride is a white solid, which crystallizes, as a rule, in brilliant octahedra, but if sublimed under pressure it is glassy and amorphous. It is very volatile, and only slightly soluble in water. It is extremely poisonous; though, if taken habitually, a considerable tolerance may be acquired. Acute cases of poisoning are caused by doses of two or more grains, and are marked by violent vomiting and diarrhœa, followed by collapse. The best antidote, following the emptying of the stomach, is freshly-prepared ferric hydroxide. Chronic poisoning of a milder nature is apt to follow the inhalation of dust and fumes, and the use of arsenic in medicine; while long-continued use, even in minute quantities, may set up peripheral neuritis. The use of Scheele's green and Schweinfurth green in the printing of wall papers has led to cases of arsenical poisoning. Arsenic anhydride, As_2O_5, is more acid and less poisonous than the arsenious oxide, from which it is obtained by oxidation. It and its salts are used in dyeing calico printing. The sulphides of arsenic, orpiment, As_2S_3, and realgar, As_2S_2, are used as paints and in pyrotechny. Arsine, or arseniuretted hydrogen, AsH_3, is evolved as an intensely poisonous gas whenever hydrogen is set free in presence of arsenic or its compounds, being decomposed again on heating. Its formation and decomposition are the basis of Marsh's test for arsenic, which is carried out as follows:—Hydrogen is evolved in a small flask fitted with a thistle funnel, by the action of arsenic-free diluted sulphuric acid on arsenic-free zinc—the gas, after filtration through cotton-wool, being passed through a fine, hard glass tube slightly turned up at the end. As soon as the hydrogen burns quietly after collection the tube is heated; and if, after the lapse of a sufficient time, no mirror forms on it, the materials may be considered pure. A suitable solution of the substance suspected to contain arsenic is then added through the funnel, whereupon the formation of a mirror shows the presence of arsenic. This can be confirmed by heating the mirror with air in the tube, when, if of arsenic, microscopic octahedra of As_4O_6 will be formed. Another test for arsenic is that of Reinsch. It consists in heating the suspected liquid with pure copper foil and hydrochloric acid, when the copper receives a gray deposit, which on sublimation yields octahedra if arsenic is present.

Medicinally, arsenic forms the basis of various escharotic pastes which are applied externally to destroy cancerous growths, warts, and exposed nerves of carious teeth. When administered internally in very minute doses, before food, it promotes appetite and digestion. In rather larger doses, such as three to five minims of liquor arsenicalis (a one per cent. solution), given after meals, the drug is absorbed with the food, and its effects depend on its action on the tissues. By lessening combustion it promotes the accumulation of fat without destroying the albuminous tissues. Arsenic is therefore a general tonic, and by increasing the deposit of fat under the skin it greatly improves the complexion. Given in excess, however, it causes fatty degeneration of the tissues. Medicinal doses are useful in many skin diseases, and in rheumatic, gouty, and malarial affections. Arsenic is also a good nerve tonic, and combined with iron it is used as a specific in anæmia.

Arsenical Poisoning. An outbreak of arsenical poisoning in November 1900 led to the appointment of a Royal Commission to inquire into the circumstances which had produced an extensive contamination of beer in certain towns of the north of England, leading to some seventy deaths and some 6,000 cases of severe illness. The commission issued an interim report in the following June, and a final report in December 1904. It reported that the epidemic was due to the arsenical contamination of beer by the use of brewing sugars—glucose or 'invert' sugar manufactured by means of a highly arsenical sulphuric acid. The investigation led to several interesting discoveries. Alcoholic neuritis was shown to be mainly arsenical poisoning. The report dealt with the ways in which foods (including drinks) were liable to become contaminated by arsenic, and enumerated the principal ingredients of food or food preparations which are likely to contain the poison—*viz.* sulphuric acid, hydrochloric acid, glucose 'invert' sugar, glycerin, mineral and coal-tar colouring matters, caramel, phosphoric acid and phosphates, boric acid and borates, malt and hops—and recommended precautions to be taken by manufacturers, as well as improved methods of public prevention. Foods which on analysis contained more than one-hundredth of a grain of arsenic per pound, or, in the case of fluids, more than one-hundredth of a grain per gallon, were to be held unfit for consumption.

Arsenius. (**1.**) Surnamed THE SAINT (*c.* 354-450), an Egyptian monk; was tutor to Arcadius and Honorius, sons of Theodosius the Great. He is honoured in the Greek Church on May 8, and in the Latin on July 19. (**2.**) Surnamed ANTORIANUS, appointed (1255) patriarch of Constantinople by Theodorus Laskaris II., who also made him, with George Muzalon, guardian of his son, John IV. When Michael VIII. (Palæologus), who had deposed and blinded John IV., demanded absolution, Arsenius refused it, and excommunicated him. Michael VIII. deprived him of his rank, and banished him (1267). He died in 1273.

Arsinoë. (**1.**) Daughter of Ptolemy I. of Egypt, and wife successively of Lysimachus, king of Thrace, Ptolemy Ceraunos, and Ptolemy II. (Philadelphus). Several ancient cities were named after her. (**2.**) Daughter of Ptolemy XIII.; carried captive to Rome by Julius Cæsar, and murdered by Antony to please Cleopatra.

Arsis and Thesis (Gr. 'elevation' and 'depression'). In prosody, *arsis* signifies the strong or primary accent in a word, *thesis* the weak or secondary accent. In music, they denote respectively the strong and the weak beat in a bar; the reverse of the Greek usage, as, in the choric dances, the *arsis*, or upward movement of the foot, was the weaker.

Arson, in English law, consists in unlawfully and maliciously setting fire to property. The property must be actually fired; and, except where there is an intention to injure or defraud some person (*e.g.* an insurer), it must not be the property of the offender. Arson of ships of war and military or naval stores or works is a capital offence. Arson of places of worship, public buildings, or dwelling-houses, if any one is in them; of private buildings, with intent to injure or defraud some person; of stations, etc., belonging to railways, ports, docks, harbours, or canals; of stacks of grain, peat, wood, etc.; of ships, and of coal mines, is felony, punishable with penal servitude for life. Arson of other buildings, and of growing or cut crops, is felony, punishable with fourteen years' penal servitude. Attempts to commit arson in the case of buildings, mines, and ships are punishable with fourteen years' penal servitude, and in the case of crops or stacks with seven years. Threats to commit arson are punishable with ten years' penal servitude. In Scotland the offence is called fire-raising. See Malicious Injuries to Property Act, 1861; Russell, *On Crimes* (6th ed. 1896).

Ars Poetica (also called EPISTLE TO THE PISOS), a poetic epistle by the Roman poet *Horace* (1st century B.C.), in which he tried to determine the laws of poetic composition. Subsequent works, written with a similar view, include Vida's *Ars Poetica* (1527); Sir Philip Sidney's *Apology for Poetry* (1595); Boileau's *Art Poétique* (1674); Pope's *Essay on Criticism* (1711); Louis Racine's *Réflexions sur la Poésie* (1752).

Art has been defined as 'the manifestation of emotion obtaining external interpretation, now by expressive arrangements of line, form, or colour, now by a series of gestures, sounds, or words governed by particular rhythmical cadence' (Véron). Each of these different ways of expression is described as an art, and in virtue of the organs through which they severally appeal to the mind, they are usually grouped as (1) 'arts of the eye,' and (2) 'arts of the ear.' Architecture, sculpture, and painting, with the minor arts of taste associated with them, are the former; literature and music are the latter. The drama and the music drama, with the ancient and symbolic dance, appealing to both sight and hearing, are composite. Excluding the minor arts, the function of which is to give pleasure by adorning articles of use, all the arts have a common origin in the desire to reproduce the feeling awakened in the artist by the contemplation of life and nature. But each art is better suited to the presentation of certain emotions than the others, and the range of the expressive power of each is determined by the limitations of its medium.

The Fine and the Decorative Arts.—Popular usage, however, usually limits the term 'art' to architecture, sculpture, and painting, and such handicrafts as goldsmith's work, enamelling, pottery, and wood-carving, related to them by skill of workmanship and display of taste. In this sense art may be said to be the materialized expression of man's delight in beauty. It is not until something has been added to adorn an article already adapted for its purpose that art can be said to begin. But the instinct for adornment is practically a primal passion. There are traces of it in the earliest known works of man, and among races the least developed. In the bone and ivory remains found in prehistoric cave dwellings in France, the representation of animal and other forms points to a desire to record observation, or simply to make objects of daily use more beautiful; while the same is true of the curious and even beautiful forms and decoration of the wooden cups and vessels which the *Challenger* expedition found in use amongst the Admiralty Islanders, at that time in the Stone Age state of civilization. Thus the two tendencies—one decorative, the other expressive—which mark all developed art are found even in its beginnings. The decorative element appeals to the senses alone, and it is the essential, if not the sole, characteristic of the applied arts. On the other hand, the expressive arts—architecture, sculpture, and painting—appeal vividly to the senses, and through the senses to the intellect and the imagination. At the same time, certain of the decorative arts approach closely to the expressive; and in some cases, as in fine decorative sculptures and mural decoration, including tapestry, they possess many of the qualities of the latter. As a rule, decoration has to forego something of expressiveness to conform to the conditions of its own highest beauty. But the expressive arts are freer, for their aim is the embodiment of the mental and emotional impressions received from reality.

Art as an Expression of Social Conditions.—Architecture has been called the 'mother of the arts;' but the earliest known efforts in art partake, as we have seen, of the nature of sculpture. But as soon as men commenced to erect huts and temples, the art of architecture, thus originated, provided a great and suggestive field for the exercise of the arts of sculpture and painting. At first, and for centuries, the three arts were closely related. In Egypt and Babylonia, in which they earliest developed, and in Greece, among the northern peoples, who evolved Gothic art, and during the renaissance, the three arts worked together, while in some cases one artist is known to have practised all. The complete separation of the arts which exists to-day is comparatively modern. The art of every epoch and of every great school is, in a wide sense, the outcome of social conditions, and the expression of national or racial aspirations. Thus, religion had much to do with shaping the course of the arts—in Egypt and in Greece originating temple and tomb architecture, sculpture, and painting, and even supplying decorative motives for the lesser arts; in France and England, during the middle ages, producing the Gothic cathedral and wonderfully beautiful ecclesiastical furniture in metal and enamel, ivory and textiles. But if the most important works were inspired by the religious instinct, desire for beauty expressed itself in domestic and warlike furnishings also. With the renaissance and the reformation other elements came into play. Both of these movements, although they took such different directions north and south of the Alps, originated in a revival of learning and a renewed interest in life: the Italians found in the arts and mythologies of the classic peoples a new source of artistic impulse, leading on to the grafting of an almost pagan delight in sensuous beauty upon the art of the earlier Christian artists; the northern peoples, cut off from their religious past by a renewed religious life, left the old traditional subjects and turned to contemplate the world around them. So realism, in its modern sense, rises in the pictures of the 17th century Dutchmen. But as if to reveal how independent of environment and tradition artistic genius may be, Velasquez in Catholic Spain is simultaneously producing those marvels of atmosphere painting and impressionistic concentration which, two centuries later, were to influence painting profoundly.

Art as a Personal Expression.—All works of art are more or less coloured by the individuality of the artist. Even among the Greeks, the scope of whose sculpture was largely controlled by religious considerations, and had as a general ideal the perfect beauty of the human form, the masters are distinguished from one another by individual treatment of common motives, and Phidias and Praxiteles have given their names to epochs of sculpture. During the earlier renaissance, also, although the principal works of art were wrought for the church, and deal with a clearly-marked range of subjects in a technique common to all, the individuality of the artist displays itself in the way in which any particular subject—be it a Crucifixion, a Holy Family, or a saintly legend—is conceived, and is marked by preferences in types or accessories, form or colour. It is, however, in the painting of the matured schools of the 16th and 17th centuries that personality, combined with a great but flexible technical tradition, first asserts itself fully. And it is towards greater individual freedom that art has since tended to move. But art is not constantly progressive: there are periods in which it flourishes, and periods in which it declines and almost dies, neither convention nor freedom being a guarantee of excellence.

As painting and sculpture deal with facts or ideas more or less familiar to all, the personal element in them is easily recognized. Architecture, however, is necessarily more a collective than a personal expression. In a great building it is the religious, social, or governing instincts and aspirations of a community, rather than the personal preferences and imagination of the architect, that are expressed; for architectural form is clearly determined by the utilitarian destination of the work. At the same time, considerable play is permitted to the fancy of the designer, particularly in variety of proportion, combination of material, and decoration.

Convention and Tradition.—Convention exercises a great influence in the arts. Indeed, to practise an art at all, it is necessary to conform to its conventions. Thus, in painting, the artist must express his impression of the visible world, or his dreams and imaginings, in colour and form (or in black and white, as in etching) upon a flat surface, in terms conformable to the laws and habit of vision, at the same time giving due consideration to the decorative or merely pleasing aspect of the result. In sculpture, again, in which real form is imitated in its three dimensions, or suggested as in relief, the nature of the imitation is controlled and determined by the material characteristics of the medium—stone or marble, bronze or silver—which, in its turn, ought to be used so as to bring out its inherent beauty as that is affected by mass and the play of light upon the modelled surfaces. Finally, architecture is largely conditioned by the utilitarian destination of buildings, by the structural possibilities of the building materials available, and by the necessity of providing against the prevailing weather.

Tradition also influences artistic form. It serves to preserve sound technical methods, and transmits from one generation to another the experience gained in experiment with new subjects or new processes. More often, however under the form of academicism, it sets up an arbitrary ideal of subject and style, founded upon past achievements, and tends to stereotype and conventionalize art. Thus tradition is the enemy of self-expression and of experiment. Tradition and belief in personal impressions divide the world of art into two hostile camps. But while academic influence still controls much modern art, painting and (in lesser degree) sculpture have largely freed themselves from the shackles of tradition. To-day, in every capital in Europe, there is a strong body of 'seceding' artists; and one of the most notable features in art during the past century has been an ever-increasing disposition to regard every kind of subject as possible of treatment in one or other of the arts. In architecture, however, tradition remains exceedingly powerful, and no style has yet been evolved adequately expressive of contemporary life.

The Function of Technique in Art.—Some would draw a distinction between the manner and the matter of art, and restrict the use of the word 'art' to the former. In reality, however, these two elements are so closely knit that to separate them, except in theory, is impossible. In all fully-developed art the technique, or manner of expression, is the direct outcome of the spirit in which the subject is conceived. Hence it is only in academic art that a definitely formulated method is possible. Of course, certain methods of using, let us say, oil-paint, or of carving marble, are more productive of beauty than others; and if it is possible to combine this sensuous element with the effects aimed at, it should be done. Art cannot exist without technique, but technique does not exist for itself; and if a man, by breaking through the tradition of the past, can express himself more fully, he is justified by the result. This is at once the explanation and justification of the methods of impressionist painters, and of such sculptors as Rodin and Meunier. Technique has, however, a fascination and legitimate charm of its own quite apart from its expressive power. But these appeal to the artist as craftsman, and to the connoisseur rather than to the general public. Art consists of a combination of fine emotion and skilful expressive technique. The greatest art is that which appeals with the greatest force to both the intellectual and the æsthetic emotions.

Of the many books treating of the origin and theory of the arts, most deal with them either as a branch of philosophy or metaphysics, or as so much archæology or history. Among those written from a more purely artistic standpoint, the following may be named:—Lessing's *Laocoön* (trans. by Sir R. Phillimore, 1874); Victor Cousin's *Du Vrai, du Beau, et du Bien* (1818; 7th ed. 1858); Véron's *Æsthetics* (trans. 1879); Chesneau's *Education of the Artist* (trans. by Clara Bell, 1886); Sir J. Reynolds's *Discourses* (new ed. 1884); Hunt's *Talks about Art* (1875 and 1883); Whistler's *Ten o'Clock* (1888); Ruskin's, Fergusson's, and Hamilton's writings; Baldwin Brown's *The Fine Arts* (2nd ed. 1902); R. A. M. Stevenson's *Velasquez* (1899); D. S. MacColl's *Nineteenth Century Art* (1902); Worsfold's *Judgment in Literature* (1900).

Art Schools. See SCHOOLS OF ART.

Arta. (1.) Province or nomarchy of Greece and a div. of Thessaly; 395 sq. m. in area; pop. (1896) 39,144. (2.) Capital of above, on l. bk. of Arta R., near its mouth in the Gulf of Arta, at entrance to which the battle of Actium was fought (B.C. 29). Manufactures cotton and woollen goods, and has considerable trade. Near it the Turks defeated the Greeks in 1822. Pop. (1900) 7,582.

Artaxerxes, a name borne by four ancient Persian kings. (1.) Surnamed LONGIMANUS, a son of Xerxes, who reigned from 464 to 425 B.C., and is mentioned in the Book of Nehemiah. (2.) Surnamed MNEMON, reigned from 405 to 358 B.C. The chief events of his reign were the defeat of Cyrus and his 10,000 Greeks at Cunaxa (401 B.C.); the war with Archelaus, king of Sparta (401–394); the conclusion of the peace of Antalcidas (387); and struggles against his rebellious satraps—Evagoras of Cyprus, Ariobarzanes of Phrygia, and Datames of Cappadocia—and wars with Egypt. (3.) Surnamed OCHUS; reigned from 358 to 338 B.C., and revived for a time the decaying power of his dynasty; by Greek aid he reconquered Cyprus, Egypt, and Phœnicia. (4.) The founder of the dynasty of the Sassanidæ, after the overthrow of the Parthian empire; he reigned from 226 to 240 A.D., and waged war with Alexander Severus, the Roman emperor. See Rawlinson's *Persia* (1873), and Duncker's *Hist. of Antiq.* (1877–82).

Artel, the Russian co-operative organization of artisans or skilled workmen. The organization of the different associations varies, but the fundamental principle of all is equal remuneration and equal shares of work. See Stähr's *Ursprung, etc., der Russischen Artelle* (1890).

Artemidorus. (**1.**) Of Ephesus (*c.* 100 B.C.), a Greek geographer, who made voyages in the Mediterranean and Red Seas, to Iberia and Gaul, and as far as the Southern Ocean. His work, called *Periplus*, is not extant. Some fragments are collected in Hudson's *Geographi Græci Minores* (1826), vol. i. (**2.**) Also of Ephesus, but surnamed DALDIANUS, from Daldis, a town in Lydia, his mother's birthplace. He lived in Rome from about 140-180 A.D., and wrote a work on dreams, which is extant. Ed. by Hercher (1864).

Artemis, called DIANA by the Romans, one of the chief divinities of the Greeks, and twin sister of Apollo, was the daughter of Zeus (Jupiter) and Leto (Latona). She was born in the island of Delos, and was worshipped under a variety of aspects. (1.) The earliest Greek conceptions of Artemis regard her as a goddess of the fields and wild country, unmarried certainly, but not a virgin goddess; indeed, she is closely connected with childbirth, and is worshipped particularly by women. (2.) The Artemis or Diana of Ephesus, whose worship was widely extended by colonists on the coasts of the Black Sea, in Sicily, in Massilia (Marseilles), and other Greek-speaking lands, was probably a nature-goddess of the Phrygians or other inhabitants of Asia Minor, whose worship was adopted by the Greek settlers. A goddess of fertility and wild life, her image represented her with many breasts, and attended by wild animals. (3.) The general conception of Artemis in Greek literature, beginning with Homer, is that of the virgin huntress, in close association with her brother Apollo. (4.) She is sometimes confounded with Hecate, and (5) with Selene, or the Moon; also (6) with Britomartis (or Dictynna) and Eileithyia. See also DIANA.

Artemisia. (**1.**) Daughter of Lygdamis and queen of Halicarnassus, the birthplace of Herodotus, who tells her story. As a vassal of Xerxes, she accompanied his expedition against Greece, and fought at the battle of Salamis. (**2.**) Daughter of Hecatomnus, and sister, wife, and successor of the Carian prince Mausolus, who reigned from 352–350 B.C. Famous from the erection of the mausoleum at Halicarnassus to her husband's memory. Died 348 B.C.

Artemisia. See WORMWOOD.

Artemus Ward. See BROWNE, CHARLES FARRAR.

Arteriotomy, the operation of the division of an artery; often performed when the vessel has been punctured by accident. The artery is cut down upon, divided, and ligatured above and below.

Artery, a blood-vessel which conveys blood from the heart to every part of the body. (See HEART.) Arteries are generally placed in situations protected from pressure and other dangers, are almost always straight in their course, and often anastomose with other arteries. The branches are usually given off at an acute angle, and the sum of the sectional areas of the branches of an artery generally exceeds that of the parent trunk. In the brain there are end arteries not anastomosing. Hence the occlusion of one of these by an embolus or plug is usually followed by death of that portion of the brain.

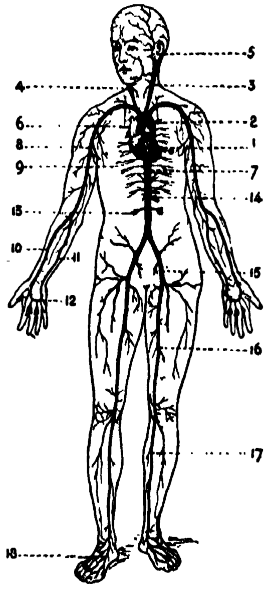


Diagram showing the Principal Arteries.

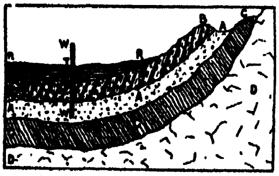
1. Heart. 2. Aorta. 3. Left carotid. 4. Right carotid. 5. Temporal [6. Vena cava]. 7. Thoracic. 8. Brachial. 9. Intercostal. 10. Radial. 11. Ulnar. 12. Palmar arch. 13. Renal. 14. Cœlic axis and mesenteric. 15. Iliac. 16. Femoral. 17. Tibial. 18. Dorsalis pedis.

Structure.—The walls of arteries are composed of three coats—(1) the external coat, or *tunica adventitia*, an outer fibrous tunic; (2) the middle, or *tunica media*, of muscular, elastic tissue; and (3) the internal, or *tunica intima*, lined with endothelial cells. The muscular fibres are unstriped, predominating in *large* arteries; while the elastic fibres, predominating in *small* arteries, form a network intertwined with the layers of muscular fibre. The arteries are capable of extension and distention—a power of great service in securing the maintenance of the necessary circulation. When there is rigidity, as in the case of old people, the result is dangerous, as it also is when there is excessive elasticity, as in fevers, when general as well as arterial relaxation is present. (See ARTERIOTOMY, PHLEBOTOMY, BLEEDING, HÆMORRHAGE.) In *arterial* wounds the means of cure are: (1) immediate pressure; (2) cautery or hot iron; (3) ligature, after elevation of the limb. In *venous* wounds, simple pressure is generally sufficient to stop the flow of blood.

Diseases of Arteries. (1.) Thrombosis. If a portion of blood inside an artery be cut off from the circulation, or if the vessel wall is injured, it will produce clotting. Thus thrombosis occurs as a secondary result of disease of the walls of arteries chiefly in cases of atheroma and aneurism. In the former case it often causes the closure of the vessel. Acute inflammation causes thrombosis. (2.) Embolism. If a piece of a thrombus is broken off, and carried in the blood stream till it becomes impacted in a small artery, it forms an embolus or plug, which may become organized, or may be invaded by septic organisms, and set up inflammation. (3.) Obliteration of arteries. This may happen by ligature. When an artery is ligatured, the middle and internal coats are torn through; the blood stagnates, and a thrombus is formed. It is followed by inflammatory changes, affecting first the internal coat; granulation ensues; and the result is that the portion of the artery concerned is resolved into a piece of cicatricial connective tissue. When an artery has been wounded a somewhat similar process occurs. (4.) Acute inflammation of arteries. Arteries often become infected by inflammation in their neighbourhood. (5.) Atheroma. (6.) Calcareous infiltration. (7.) Endarteritis obliterans is not an independent disease, but accompanies other morbid conditions: it consists in a thickening of the internal coat, leading to obliteration; seen especially in interstitial inflammation of organs, and frequent in chronic interstitial nephritis. (8.) Fatty degeneration and calcification. When great destruction of bone occurs, the lime salts may be deposited in distant parts, the lungs and the mucous membrane of the alimentary canal being the chief seats. Incrustation has occurred in an artery. The deposition increased in amount the farther removed the artery was from the heart, and it was especially manifest where the blood current was permanently impeded. (9.) Amyloid disease is the waxy degeneration of the tissues; it is found in the walls of arteries, and is due to poisons in the blood. (10.) Aneurism. (11.) Syphilis and tuberculosis of arteries. These arise usually by extension of the infective process to the artery, and are generally part of a more or less pronounced lesion. Syphilitic effects occur in the neighbourhood of gummata, more especially of the brain and its membranes. There is an extension of the specific inflammation to the walls of the artery, so that the coats are infiltrated with round cells, and the artery is thickened, with a resultant cartilaginous consistence. Tuberculosis of organs frequently extends to the artery. See Todd and Bowman's *Physiological Anatomy*, and Quain's *Anatomy of the Arteries*.

Artesian Wells derive their name from the French province of Artois (formerly *Artesium*), where the oldest one known in Europe was sunk in 1126. The wells are obtained by perpendicular borings into the ground, through which water that has percolated from a higher level rises in the boring tube from various depths to that level. The illustration shows the vertical cutting of half a valley or basin, where three layers of strata are seen, one (A) sandwiched between the other two (B and C). If A is a porous layer, such as gravel, and the other layers which enclose it are non-porous, such as clay or impermeable rock, the intermediate layer A will accumulate water and form a subterranean reservoir, the water-surface of which is higher than the point at which the shaft is sunk. As soon as the upper impervious layer has been pierced, a continuous stream of water will therefore issue from the well (W).

A singular instance of this kind occurred at Paris, at the boring (1833-41) of the Grenelle artesian well. After many unsuccessful efforts, the authorities resolved to abandon the attempt; when Arago, trusting to the geology of the valley, recommended that the boring should be continued through the mass of chalk (1,000 ft. thick), and through other strata beneath, till the 'lower greensand' was reached. The work of sinking such a shaft (1,792 ft. deep) took seven years; but at last a column of water sprang up, rising 122 ft. above the surface of the ground, yielding 700,000 gallons a day. Owing to the sinking of another well at Passy, the height of the column is now only 32 feet, and the supply 70,000 gallons.



Artesian Well (*section of Strata*).

In Germany there are several artesian wells—one on the railway between Leipzig and Corbetha more than a mile deep. Another, at Pittsburg, U.S.A., is 4,625 ft. deep. Over twenty successful borings have been made in Queensland; one well at Winton is 4,010 ft. deep.

In London many artesian wells have been sunk—*e.g.* for the chief breweries (300 ft. and upwards), the Bank, the Mint, Trafalgar Square fountains (393 ft.). See Prestwich's *Waterbearing Strata of London* (1851); Arago's *Annuaire du Bureau des Longitudes* (1835 and 1834); *Engineering*, ii., iii., viii.; Burnell's *Hydr. Engineering* (1881).

Artevelde, JACOB VAN (1285-1345), Flemish patriot, was a wealthy brewer of Ghent, who assisted the people in their struggle against Louis, Count of Flanders. He was chosen commander of the forces, and in 1335, with the assistance of the English, expelled Louis from Flanders. After having been ruler of Flanders for nine years, he was killed in a street disturbance at Ghent.

His son PHILIP (c. 1340-82) was placed at the head of the citizens

Arthropoda.

INSECTA—1. Common Butterfly. PROTOTRACHEATA—2. P. Novæ Britanniæ. PALÆOSTRACA—3. King Crab; 4. Eurypterus, fossil; 5. Trilobite, fossil. MYRIAPODA—6. Centipede. ARACHNOIDEA—7. Scorpion. CRUSTACEA—8. Masked Crab. (King Crab one-twelfth natural size; all others two-thirds nature.)

of Ghent in 1381, and after defeating the Count of Flanders he became regent. He was slain at the battle of Roosebeke in 1382, fighting against the forces of Charles VI. of France. See Kervyn de Lettenhove, *Jacques d'Artevelde* (1863); Hutton, *James and Philip van Artevelde* (1882); Ashley, *James and Philip van Artevelde* (1883); also Sir Henry Taylor's drama, *Philip van Artevelde* (1834); and Conscience's historical novel, *J. van Artevelde* (1849).

Arth, vil., canton of Schwyz, Switzerland, at the s. end of the Lake of Zug, the starting-point of the Rigi Railway. Pop. (1900) 4,739.

Arthrectomy, the cutting away of diseased synovial membrane lining a joint. See JOINTS.

Arthritis. See JOINTS.

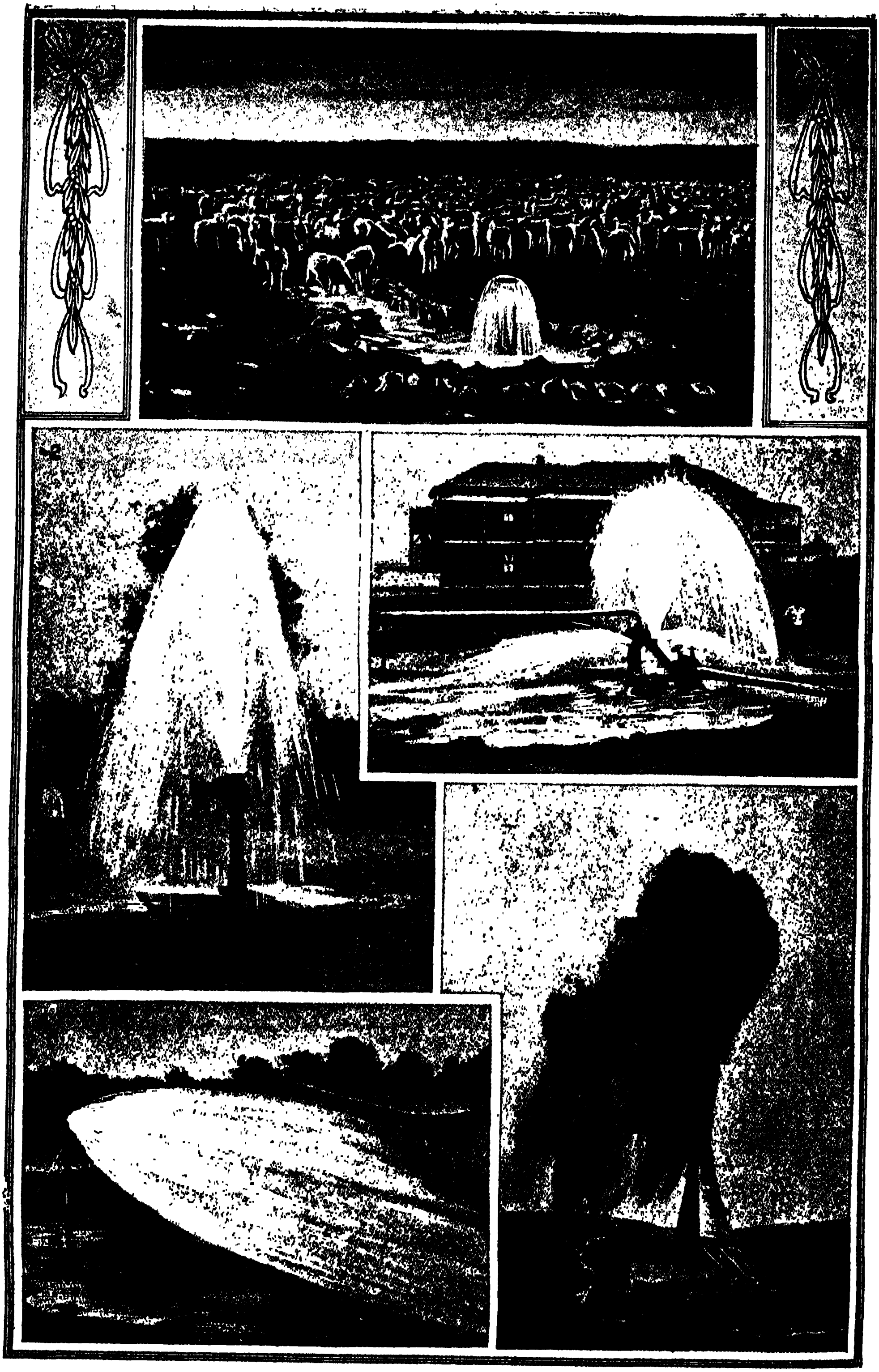
Arthropoda (jointed feet), the name of a series of invertebrate land and water animals, including such diverse forms as crustaceans, insects, and arachnids. Arthropods, considered by many zoologists to be only an artificial assemblage of animals, have bilaterally symmetrical, segmented bodies, some of the segments bearing jointed appendages; the body is covered by a tough cuticle made of chitin; the heart lies above the food canal, and the nervous system below it, except for the dorsal brain; there is no distinct body cavity between the food canal and the body wall. These are characteristic of the series; but in regard to the other organs there is much variation. The chief classes of Arthropoda are as follows:—(1.) Crustacea, including crabs, lobsters, and their allies. (2.) Prototracheata, including only a primitive form known as Peripatus. (3.) Myriapoda: the millipedes and centipedes. (4.) Insecta: the insects. (5.) Arachnoidea: spiders, scorpions, and mites. (6.) Palæostraca: the living king crab and the extinct trilobites and eurypterids.

Arthur, a famous British chieftain who distinguished himself in the wars with the Saxons during the latter part of the 5th and commencement of the 6th centuries. Some writers suppose that there were two historic chiefs of that name—one mainly active in the north, the other in the south-west part of the island. We may accept as historical the fact that Arthur fought a series of successful engagements with the invaders, ending in the crushing defeat inflicted upon the Saxons at Mount Badon (according to Zimmer, between 495 and 501); probably he was betrayed by his wife, and met his death in conflict with a near kinsman.

About 1135 Geoffrey of Monmouth wrote his *Historia Regum Britanniæ*, based upon the earlier history of Nennius, amplified by popular tradition. Here the historic Arthur, *dux bellorum*, becomes Arthur, the king of Britain and world-conqueror. Geoffrey's work was translated into French verse, about 1155, by Robert Wace, who himself found a translator in the Anglo-Saxon monk Layamon, each of them adding, from their own knowledge of popular tradition, to the picture drawn by Geoffrey. It is more especially on the version of Wace that the popular conception of Arthur is founded. Here he is the son of Uther Pendragon; king of Britain; conqueror of Scandinavia, Gaul, and Rome; the founder of the Round Table, and the centre of a brilliant circle of heroes. Victim of the joint treachery of his wife and his nephew Modred, he is wounded in battle with the latter, and retires to Avalon to be healed of his wounds.

Mythical Elements.—Many threads meet and mingle in this perplexing legend. Mr. Alfred Nutt has pointed out the resemblance between the popular tales of Arthur and a very widespread heroic and pre-historic tradition, the forms of which were classified by Von der Hagen under the title of *The Aryan Expulsion and Return Formula*. Professor Rhys detects in our hero a certain *Mercurius Artaius*, worshipped by the Gauls as a culture-god, and has dwelt at length on the persistence in the story of certain elements of early Celtic myth. It is probably in his character of culture-hero that Arthur is represented as the slayer of monsters—*e.g.* the demon cat of Lausanne, the giant of Mont St. Michel, and the boar *Twrch Trwyth* while the prevalence of certain features of early Irish tradition in tales alike of Arthur and his knights cannot be denied. To later mediæval writers the Arthurian story was largely compounded of fairy elements. After his last fight his body was magically transported to the Isle of Avalon, and its wounds healed. Avalon was a land of fairy, of which Arthur was king (*Bataille de Loquifer*); he was heir to the kingdom of Oberon (*Huon de Bordeaux*), and all places haunted by fairies, in whatever land they were situated, belonged to him, and were under his rule (*Brun de la Montaigne*).

Arthurian Romance.—It is now generally recognized that, great as was the influence of Geoffrey of Monmouth and his translator Wace, Arthur as a romantic (rather than historic or mythic) hero was known before the publication of the *Historia*, and that stories connected with him and his knights were already widely diffused. Professor Rajna has shown that the names of Arthur and Gawain were known in Italy by the end of the 11th century. Modern scholars are divided in opinion as to the source of this romantic tradition, some holding that it was of purely continental growth, the work of the Armorican Britons—their insular compatriots knowing only the historic *dux bellorum;* while others maintain that the romantic tradition was common to both sides of the Channel, and that Anglo-Norman writers played an important part in the transmission of the legend to the Continent. It is certain that during the latter half of the 12th and the first quarter of the 13th century the legends connected with Arthur were the most popular subject for literary treatment. Round the figure of the British king, as represented by the pseudo-chronicles, gathered a group of heroes, many of whom had already an independent and popular story attached to their names. Many of these old stories were retold with a view to bringing them into harmony with Arthurian tradition; new combinations and developments followed; and the resultant body of literature, prose and verse, the work of approximately some seventy years of literary activity, is what was known as the Arthurian cycle. Many of the stories are only superficially connected with Arthur, and all have been remodelled at least six centuries later than that in which the events are supposed to occur. The ignoring of this elementary fact has been the main cause of the mistaken popular conceptions concerning Arthur. A British chieftain of the 5th and 6th centuries could not have been the centre of a court such as the French romances describe, nor could his heroes have been 'knights' in any other sense save that in which the Roman soldiers were such. The main body of Arthurian romance is in French, the principal writers being Chrétien de Troyes, Robert de Borron, Walter Map, Raoul de Houdene—the names of Hélie de Borron and Luces de Gast, the ostensible compilers of the prose *Tristan*, being fictitious. In Germany the leading writers were Hartmann von der Aue, Wolfram von Eschenbach, and Gottfried von Strassburg; but in every case their work is wholly or in part derived from a French source. This was also most probably the case in England, where, previous to Sir Thomas Malory's 15th century compilation, based upon the later prose romances, Arthurian tradition was represented by a few scattered metrical romances, some of which had certainly French or Anglo-Norman originals, while the source of others is unknown.



Artesian Wells.

1. Cambridge Downs Bore, North Queensland. 2. Artesian Bore, Dolgelly, New South Wales (daily flow, 745,200 gallons). 3. Moree Bore, New South Wales (depth, 2,792 feet; daily flow, 1,108,080 gallons; temperature, 115° Fahr.). 4. Charlotte Plains Bore, Queensland. 5. Oil well at Grosnev, Northern Caucasus.

The original of the Welsh tales is more doubtful; French influence is undoubtedly present, but it seems highly probable that the groundwork of the stories represents genuine insular tradition. See, for history, Nennius's *Historia Brittonum* (1838); Zimmer's *Nennius Vindicatus* (1893); Geoffrey of Monmouth's *Historia Regum Britanniæ* (ed. Schulz, 1854)—translations of Nennius and Geoffrey are included in Bohn's Library; Wace's *Li Romans de Brut* (ed. Leroux de Lincy, 1836-8); Layamon's *Brut* (ed. Sir F. Madden, 1847). For mythical elements, Nutt's *Folklore Record* (vol. iv.), *Aryan Expulsion and Return Formula*, and (vol. v.) *Mabinogion Studies;* Rhys's *Arthurian Studies* (1891), and his *Celtic Heathendom*, 1886 (Hibbert Lectures). For romance, J. L. Weston's *King Arthur and his Knights* ('Popular Studies in Mythology, Romance, and Folklore,' No. 4, Nutt, 1899), a summary of the various branches of Arthurian romance, with full bibliography; Ward's *Catalogue of MS. Romances in the British Museum* (1883, vol. i.). For the sources of Arthurian romance, *cf.*, for the arguments in favour of Continental origin, Professor Zimmer, *Göttinger Gelehrten Anzeigen* (1890, Nos. 12 and 20), and *Zeitschrift für Französische Sprache* (vol. xiv.); E. Bruegger, *Zeitschrift für Französische Sprache* (vol. xx.); Professor Foerster, Introduction to vol. iv. of his edition of Chrétien de Troyes (1884, etc.). On the other side, Gaston Paris, Introduction to *Histoire Littéraire de la France* (1888, vol. xxx.); Ferd. Lot, *Nouvelles Etudes sur la Provenance du Cycle Arthurien* (in *Romania*, vols. xxiv. *seq.*); J. Loth, *Les Nouvelles Théories sur l'Origines des Romans Arthurien* (in *Revue Celtique*, vol. xiii.); J. L. Weston, *The Legend of Sir Lancelot du Lac* (Grimm Library, vol. xii. ch. v., 1901), where Professor Foerster's theories are examined.

Arthur, DUKE OF CONNAUGHT. See CONNAUGHT.

Arthur, PRINCE OF BRITTANY (1187-1203), grandson of Henry II. On the death of his uncle, Richard I., Arthur's claim as son of Geoffrey, elder brother of John, king of England, was upheld by several French provinces, and, at first, by Philip Augustus of France. John captured Arthur in 1202, and imprisoned him at Falaise and at Rouen, where he disappeared in 1203, murdered, it is said, by the hands of his uncle. See Shakespeare's *King John* and Norgate's *John Lackland* (1902).

Arthur, PRINCE (1486-1502), eldest son of Henry VII. of England, was married to Catherine of Aragon at the age of fifteen; died in the following year.

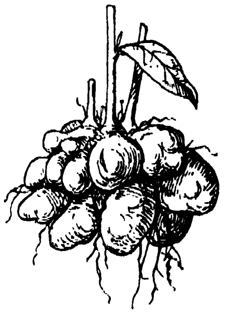
Arthur, CHESTER ALAN (1830-86), vice-president, U.S.A., in 1880; became president on the assassination of General Garfield in 1881, and held office till 1885. The son of a Baptist minister of Vermont, Arthur was admitted to the bar in 1853; took part in the civil war, holding the post of quartermaster-general of the New York forces; and after the war became a prominent lawyer and politician on the republican side. He was collector of the port of New York from 1871 to 1878, but was removed by President Hayes on account of his hostility to the latter's policy of civil service reform.

Arthuret, par., Cumberland, England, 8 m. N. of Carlisle; in early times a strategic point commanding the fords on the Esk and the road to Scotland. A battle was fought here (A.D. 573) between the Britons and the Romans.

Arthur's Seat, hill (822 ft.), in the King's Park, Edinburgh. Geologically interesting, the upper part consists of volcanic rocks, which overlie Lower Carboniferous sandstones and shales, traversed by intrusive sheets of dolerite and basalt, whose formation may be seen in Samson's Ribs and Salisbury Crags. Over the Holyrood end of the Radical Road the remains of the overlying sedimentary rocks can be seen, and elsewhere the Carboniferous sandstones below the basalt. The eastern part of the hill (the Whinny Hill) consists of alternating sheets of lava and beds of volcanic ash. The summit, or 'lion's head,' is an old crater plugged with basalt and agglomerate. The internal structure of the hill and its detailed history have given rise to much discussion. The hill figures in Scott's *Heart of Midlothian.*

Globe Artichoke—Bracts.

Artichoke, two different plants of the order Compositæ—the globe artichoke, or *Cynara scolymus*, and the Jerusalem artichoke, or *Helianthus tuberosus*. The globe artichoke, a native of N. Africa, is grown in British gardens for the sake of its large flower-heads, the edible parts being the large fleshy bracts and the fleshy axis from which they grow. In the second plant, the name Jerusalem is a misnomer for the Italian *girasole* (turning to the sun), from the habit of the plant, which belongs to the same genus as the sunflower. Its underground stem-tubers resemble potato tubers, their value as a food depending upon the starch they contain. The plant, introduced into Europe from N. America in 1616, was supposed to be a native of Brazil, but is indigenous to the upper Mississippi and parts of Canada.



Jerusalem Artichoke—Tubers.

Articles, THE SIX, STATUTE OF, 1539, was, in Henry VIII.'s intention, a corrective to the reforming zeal of Protestants in England after the breach with Rome (1529-36, 1539). It reasserted fundamental doctrines and positions in the church—*viz.* (1) transubstantiation; (2) communion unnecessary; (3) celibacy of priests; (4) vows of chastity to be observed; (5) private masses to be permitted; (6) auricular confession necessary. Those denying the truth of transubstantiation were to be burnt. The penalties for non-compliance with the other articles were forfeiture of property for the first offence, death for the second. The statute was repealed in 1547, after Edward VI.'s accession.

Articles, THIRTY-NINE. See THIRTY-NINE ARTICLES.

Articles of War. Before the establishment of a standing army in 1660, when war broke out, 'Articles of War' were issued by the crown to govern the troops when actually engaged in hostilities. The earliest articles of which record remains were those issued by Richard II. and Henry V., on the occasion of wars with France. The punishments awarded for crimes were very severe, death and loss of limb being inflicted for trivial offences. The prerogative power of the crown to issue articles was gradually encroached upon by Parliament, and finally superseded by a corresponding statutory power in 1803. Owing to the completeness of the present military code, Articles of War are no longer necessary; but section 69 of the Army Act reserves the right to make Articles in case of need. See MUTINY ACT.

Articulata (Lat. *articulus*, 'a joint'), a term formerly used instead of Arthropoda to include animals, such as crustaceans and insects, which bear jointed appendages; now obsolete.

Artificer Engineers (British navy). In May 18, 1897, engine-room artificers, of at least ten years' confirmed service, and of not less than thirty-five years of age, became eligible for warrant rank as artificer engineers. They rank with carpenters, and wear the same uniform, with the addition of a narrow stripe of purple cloth on the cuff.

Artificers, Engine-room, a class of rated men and petty officers in the British navy. The age for entering this branch of the service is between twenty-one and twenty-eight, and the candidates must be engine-fitters, boiler-makers, smiths, or coppersmiths. They are divided into four classes, entering in the fourth class, and rising, after twelve years' service, to the first. After ten years' service, an engine-room artificer is eligible for advancement to chief engine-room artificer, provided he re-engages to complete twenty-two years' service from the date of entry. Under the general head of artificers in the navy are classed carpenters, shipwrights, armourers, plumbers, painters, blacksmiths, and coopers. These ratings are filled by men who are entered from the shore with a knowledge of their trade, and who are advanced in their various branches by service, good conduct, and efficiency.

Artificial Eyes. See Eye.

Artificial Flowers. See Flowers, Artificial.

Artificial Limb, a mechanical contrivance taking the place of an absent limb in use and appearance. In the museum of the London College of Surgeons there is an artificial leg, made about 300 B.C., of bronze, wood, and iron. The artificial foot varies in construction, in material, and in price. After what is known as a Hey's or a Chopart's operation, which leaves the heel and part of the sole, the chief intention is to make a presentable appearance with a cork-filled boot. In cases of higher amputation, where an artificial ankle joint is needed it may be in the form of a transverse rod working in a socket, or of two 'rule joints,' one on either side of the stump. The lateral yielding of a foot is sometimes imitated by side springs which yield to lateral pressure. One of the best substitutes for the real foot is a curved sole (Beaufort), where the movement has a natural appearance, though the substitute itself is somewhat unsightly. The simplest artificial foot is a peg at the end of 'a bucket' which holds the stump. The centre of the artificial ankle is sometimes on the principle of the ball-and-socket joint. The artificial foot is sometimes extended by means of catgut strings, fastened at the back of the knee, with flexible bands passing down over the upper surface, or dorsum, of the foot. In amputations below the knee—such as Syme's operation—pressure can be borne upon the extremity of the stump, and the foot can be made to suit the purse and occupation of the patient. If the amputation be across the shafts of the bones, a laced leather sheath is needed—an awkward expedient, but a cheap one, the 'bucket leg' being secured by straps to the thigh. If the amputation is close below the knee, the resulting flap and breadth of bone give a stump that will bear the weight of the body. In amputation above the knee, the weight can be borne either on the extremity or by a leather sheath. The artificial hand made in Nuremberg, in 1504, for the German knight Götz von Berlichingen of the Iron Hand, is well known. The simplest form of artificial hand is a leather sheath, laced to the arm stump, and so fitted that a knife, fork, or spoon can be screwed to it; other hands open and close by hydraulic pressure—the Beaufort being of wood, with a movable thumb. The Beaufort arm and leg are the most natural and useful types of all substitutes, and not expensive. A 'box-leg,' with which the cripple rests on his knee and points the stump backwards, can be had for about 15s., while a jointed leg may cost as much as 30 guineas. See 'Artificial Limbs,' in the *Encyclopædia Medica;* Caird and Cathcart's *Surgical Handbook* (11th ed. 1902); Heather Bigg's *Orthopædy* (1892).

Artificial Stone. See Stone, Artificial.

Artillery, in a general sense, includes the theory and practice of the employment of cannon, the guns themselves and their entire equipment, as well as the organization, *personnel*, and transport of that branch of the service which has the handling of ordnance.

The early ordnance of the 14th century was rude in construction, weighty to move, and of little real efficiency. Guns were made of wrought-iron bars bound together like the staves of a cask by the shrinking over them of iron hoops. In the 15th century the 'bombards' were replaced by guns of cast iron or brass. Wheeled carriages of a rough type were framed, and iron projectiles began to supersede those of stone. The necessity of mobility was first realized in the 16th century, and culverins, sakers, and falcons of light make followed an army in the field. The culverin of the 17th century required fifteen horses to drag it, while the loading was slowly effected by putting in powder with a ladle. On the Continent an attempt at real mobility was originated by Gustavus Adolphus with his so-called 'leather' guns, while rapidity of fire was secured by the introduction of cartridges. It was not till 1716 that a permanent force of two companies of artillerymen was organized in England, and formed the nucleus from which was evolved the present Royal Regiment of Artillery. Meantime some progress was made in the casting of light guns in brass, from 3-pounders up to 12-pounders; while cast-iron guns reached a size that threw a 68 lb. shot. The wars of the French revolution led to the abolition of the civilian driver, and a more mobile equipment for field guns. Military drivers were mounted on the draught horses, and 'brigades' of guns formed a unit closely resembling the modern battery. Napoleon, an artilleryman by profession, may be said to have laid the basis of the modern system of artillery tactics. But little progress was made until the middle of the 19th century, when the introduction of rifled guns made of wrought iron forced the artillery arm prominently to the front, notably in the Franco-German war. The quality and power of *matériel* has since been enormously increased by the substitution of steel for iron.

Artillery may be considered under the heads of field, siege, and fortress guns, with their *personnel* and equipment. There is strong resemblance in the *field artillery* of all armies. The field battery consists of 6 guns and 6 ammunition wagons, with spare wagons for supplies, equipment, and, in some cases, ammunition. Each gun and wagon is drawn by 6 horses, the 3 drivers being mounted on the near horses. Pole draught is universal, and collar attachment is generally preferred to breast harness. The ordinary pace of manœuvres is the trot, and the equipment must be sufficiently light to traverse heavy and broken ground at this pace. Under ordinary circumstances, the gunners march alongside the guns; but when the trot is sounded, they mount on the seats provided for them on the gun and wagon carriages. The field ordnance of armies is at present in process of conversion to a quick-firing weapon. An English field battery consists of 171 men, 131 horses, and 10 carriages.

The gun of the future will possess the following general characteristics, the details varying somewhat in different armies:—A calibre of 3 inches; a shell of from

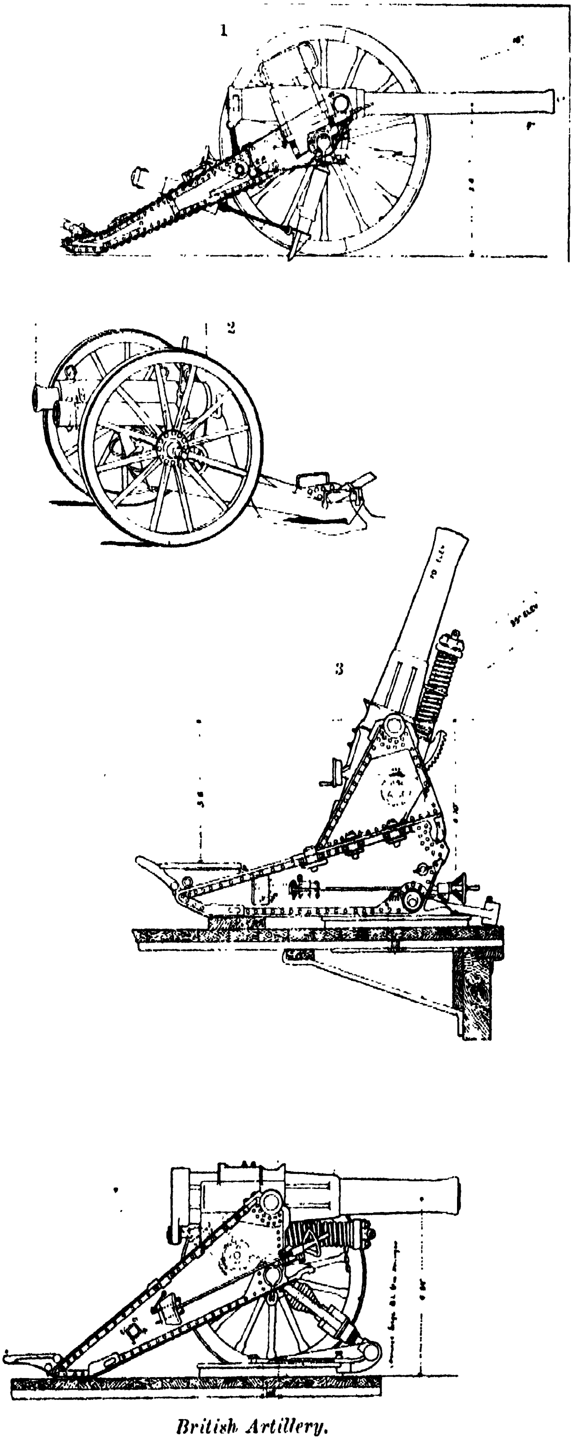
12 to 18 lbs. in weight, discharged with a velocity approximating to 1,600 ft. a second; a gun fitted with an automatic recoiling saddle, and with a further spade, or drag attachment, for destroying as far as possible the recoil on discharge, a quickly-acting breech action, and a metallic cartridge case.

Horse artillery differs from field artillery in that it must be able to keep pace with cavalry. This is effected mainly by mounting the gunners on horses, and in many cases by reducing the weight of gun and shell. A British horse-artillery battery is composed of 179 men, with 191 horses and 16 carriages. The gun at present in use is of the same calibre as the 15-pounder field gun, but is lighter, and throws a 12-pound shell. *Mountain batteries* have their equipment carried usually on the backs of mules, and this limits the weight to about 200 lbs. for each animal. In the British service the mountain guns are a 2·5-inch M.L. divided into two portions, which are screwed together for action, a 10-pounder B.L., and a 2·95 quick-firing gun. In India, a few *heavy batteries* are organized with elephant and bullock draught for 4-inch guns and 5·4-inch howitzers. As a result of the experiences of the S. African campaign, a few batteries have been armed with 5-inch howitzers.

A force of dismounted men, called *garrison artillery*, is trained for service with siege, fortress, and coast guns. A *siege train* is formed into divisions, each containing 14 to 16 pieces. The existing siege ordnance is gradually being replaced by weapons of the most modern type—4-inch and 5-inch guns, and howitzers of from 4-inch to 8-inch calibre.

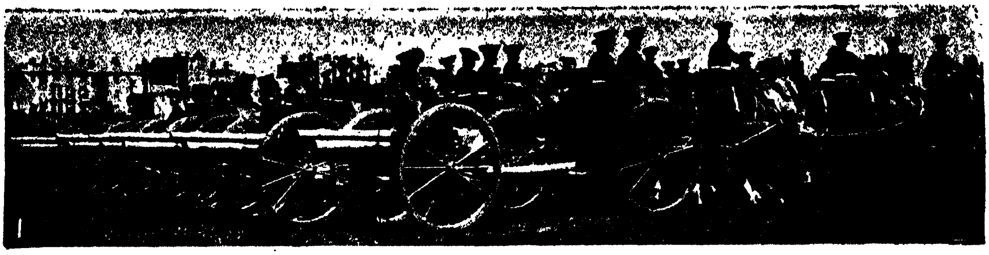
In the heavy, medium, and light armament of fortresses breech-loading guns are being substituted for muzzle-loaders. *Heavy ordnance* is usually mounted on the sea front of fortresses. The most modern weapons vary in size from the 6-inch of 7 tons to the 13·5-inch of 69 tons. Some 9·2-inch guns of wire construction, that discharge a shell 380 lbs. in weight with an initial velocity of 2,600 ft. a second, have recently been sent to Dover. *Medium* pieces are mounted on the land fronts of fortresses, and used as an auxiliary armament on sea fronts. Besides M.L. guns, the heavy 12-pounder and the 4·7-inch and 6-inch B.L. quick-firers are fixed in many positions. For the movable or light armament of fortresses, besides the smaller M.L. guns and howitzers, quick-firing weapons, throwing projectiles of from 1 to 12 pounds, as well as machine guns on travelling or parapet carriages, are employed.

The *personnel* of the garrison artillery has recently been separated from that of the field artillery. The batteries under the command of majors are organized into



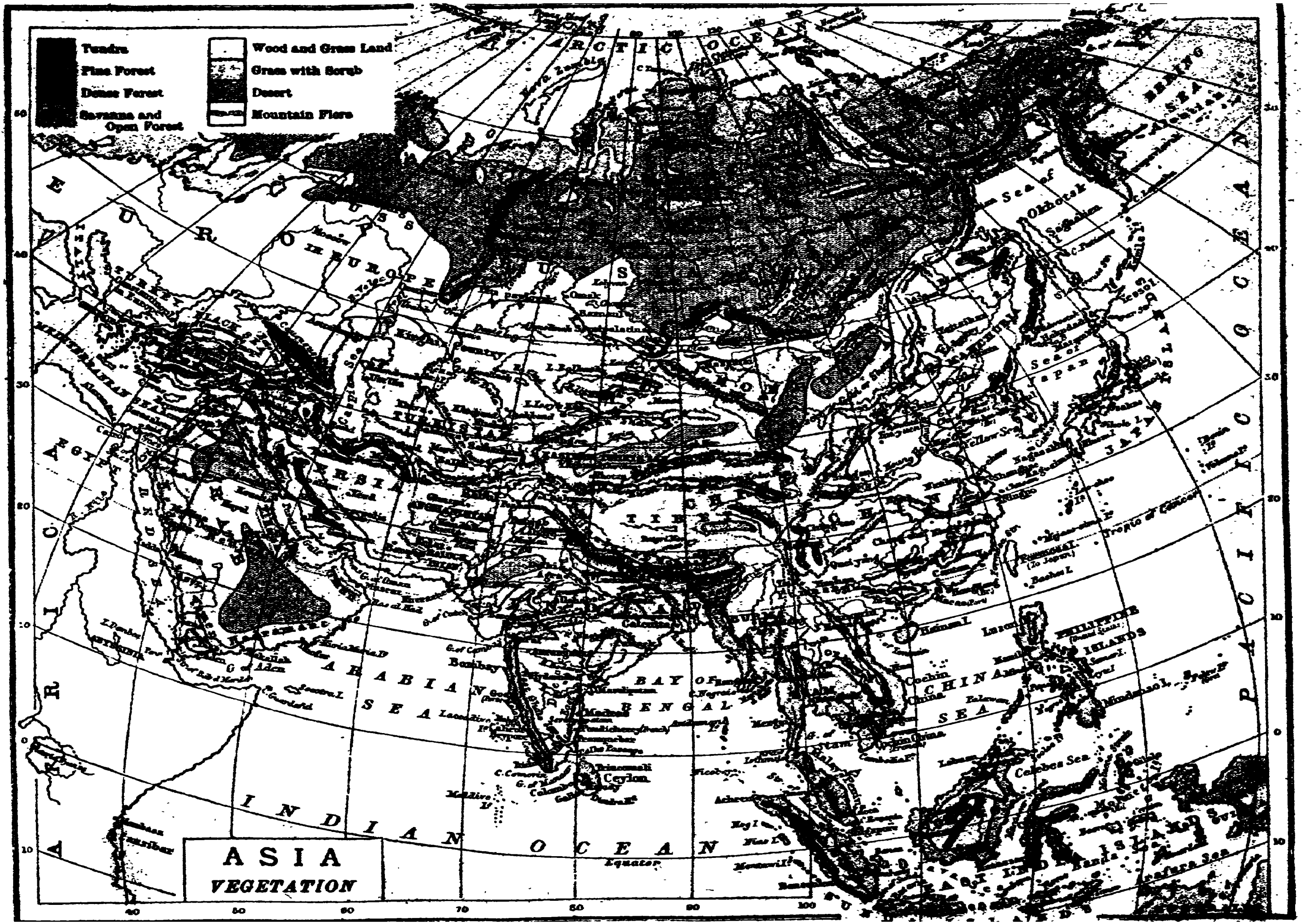
British Artillery.

1. 15-pounder Field Gun 2·95 Quick-firing Mountain Gun. 3. Top B.L. 6-in. Howitzer Siege Carriage. L. 6-in. Howitzer Siege Carriage.

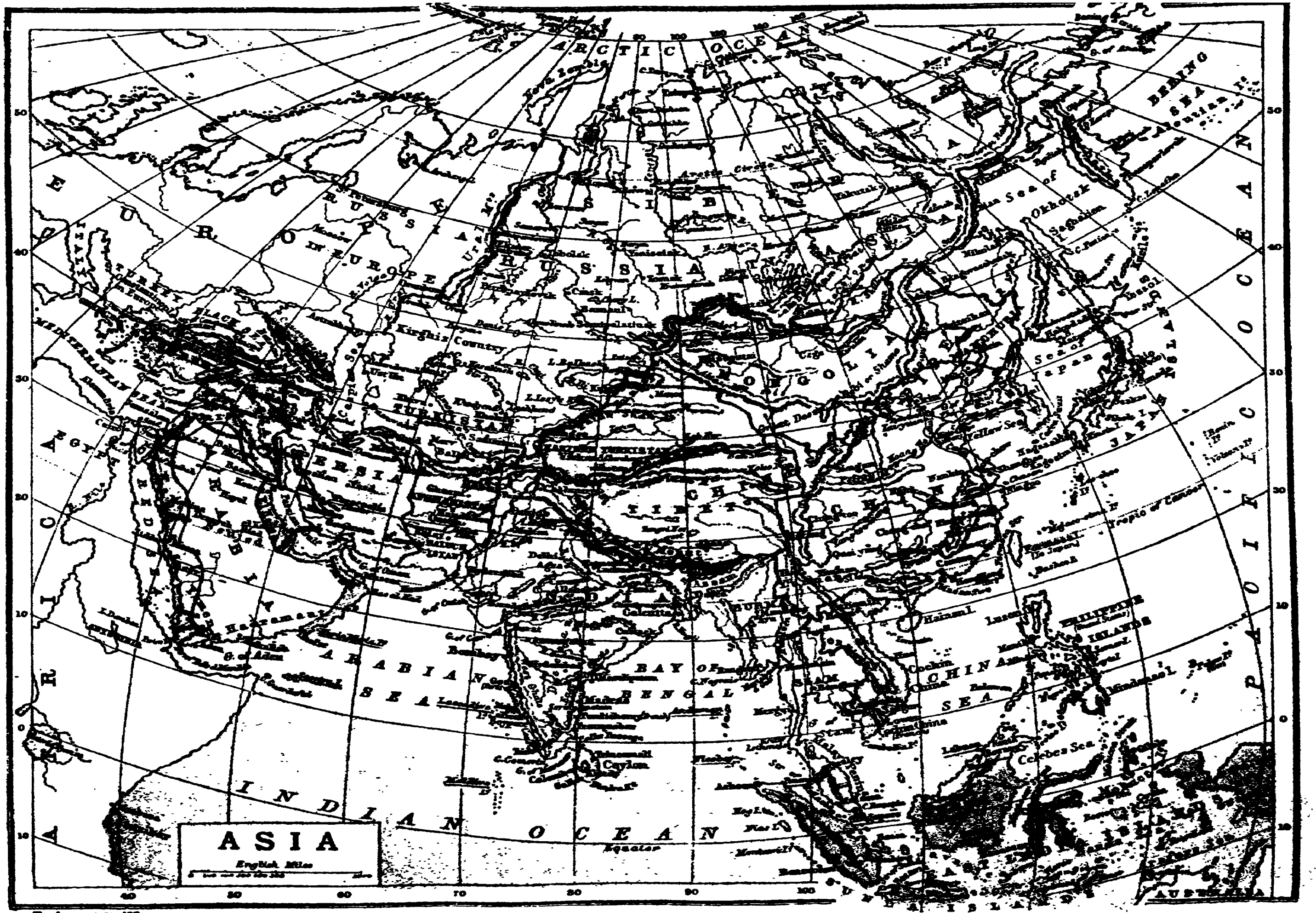


British Artillery.

1. A Battery of Field Artillery with 15-pr. Guns. (Photo by Cribb.) 2. Royal Horse Artillery—Gun Limbering up. (Photo by Gregory.) 3. Mountain Gun—Mule Equipment. (Photo by Gregory.) 4. 6-in. Howitzer in Firing Position. (Photo by Cribb.)



ASIA
VEGETATION

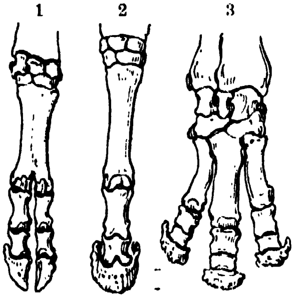


To face page 408.

six groups, to the depôts of which are affiliated the militia and volunteer artillery of their respective districts. To secure the efficient service of the guns a number of armament officers are attached to forts of importance, and superintend the training in range-finding, position-finding, and other technical duties. The Royal Garrison Artillery now numbers some 23,000 men, inclusive of the Indian establishment, and of these about one-half serve in the colonies. See Owen's *Modern Artillery* (1873); Jerram's *Armies of the World* (1889); Lloyd and Hadcock's *Artillery, its Progress and Present Position* (1893).

Artillery Association, NATIONAL, formed in 1865, chiefly for the encouragement of artillery shooting among volunteers.

Artillery Schools. See WOOLWICH and SHOEBURYNESS.



Comparison of Even-toed Ungulate with Odd-toed.
1. Pig. 2. Horse. 3. Rhinoceros.

Artiodactyla, the name given to even-toed ungulates, such as the sheep and the cow, as contrasted with odd-toed forms, such as the horse and the rhinoceros. The artiodactyles have the third and fourth toes of the foot almost equally developed, and so shaped that, while each is unsymmetrical in itself, the whole foot is symmetrical. The femur is without the third trochanter, conspicuous in the horse, and the stomach is generally complex. The sub-order Artiodactyla contains: (1) Suina, including hippopotamus, pigs, and peccaries; (2) Tylopoda, including camels and llamas and their allies; (3) Tragulina, the chevrotains; (4) Pecora, the ruminants, including deer, giraffes, cattle, and sheep.

Artisans' Dwellings. See HOUSING OF THE WORKING CLASSES.

Artlett, RICHARD AUSTIN (1807-73), an engraver of sculpture, whose chief works are: *The Day Dream*, a statue by P. MacDowell; *The Veiled Vestal*, a statue by R. Monti; *Perdita and Florizel*, and *The Siren and the Drowned Leander*, groups by J. Durham. See *Art Journal*, 1873, p. 377.

Artocarpaceæ, an order of plants confined to the tropics, allied to the Urticaceæ, and containing a milky juice. The best-known species are the upas tree of Java, the bread-fruit tree of the Pacific Islands, the cow tree of S. America, and others producing indiarubber and beautifully-marked woods.

Artois, former prov. of France, now forming the greater part of the dep. Pas-de-Calais. The name is derived from Arras, its capital. From the time of Charles the Bald, Artois belonged (863) to Flanders; was French from 1180 to the middle of the 13th century; became then a Burgundian and afterwards (1493) an Austrian possession, finally reverting to the French (1659-1713).

Arts, FACULTY OF, also DEGREES IN. See UNIVERSITIES.

Art Union, a voluntary association the object of which is (1) the purchase of works of art for distribution among the members by ballot, etc.; or (2) the collection, by subscriptions, etc., of money to be distributed among the members as prizes for the purchase of pictures. They originated in Germany (Munich) in 1823, and were instituted in England in 1834. Under the Art Unions Act, 1846, such associations, if founded by royal charter or approved by the Privy Council, are exempted from the acts which forbid lotteries.

Artvin, tn., cap. of prov. Kutais, Russian Armenia, 34 m. S.E. of Batum; exports honey, oil, and wax. Pop. 6,000.

Aru or ARRU ISLANDS, small Dutch archipelago, E. Indies; area of group, 2,460 sq. m.; pop. 15,000. Coralline in formation and well wooded, the group produces trepang, sago, cocoa-nuts, rice, maize, mother-of-pearl, edible swallows' nests, betel nuts, sugar, and tobacco. The birds and fauna are of great interest. Chief town, Dobbo.

Aruba, Dutch W. Indies. See CURAÇAO.

Arum is a genus of plants, belonging to the order Aroidaceæ, characterized by their thick rhizomes, beautiful pedate or hastate leaves, and flowers arranged on a club-shaped spadix, naked at the top, enclosed in a convolute sheath. The only species native to Britain is *A. maculatum*, the cuckoo-pint or lords-and-ladies. Numerous species are, however, cultivated in our gardens and greenhouses. Among the hardy arums are the narrow-leaved *A. tenuifolium*, with a white spathe; *A. dracunculus*, with pedate leaves and a brown spathe; *A. italicum*, with a yellow spadix; and *A. proboscideum*, with long proboscis to spathe. *A. Palæstinum* is the best of the greenhouse sorts.

Arundel, munic. bor., W. Sussex, England, 11 m. E. of Chichester. The castle, which stands on a steep hill, suffered in the civil war. It was restored in the 18th century, and again recently, and is now a magnificent pile surrounded by a park of 1,200 acres, the seat of the Duke of Norfolk. The most noticeable ecclesiastical edifices are an ancient cruciform church (Fitzalan Chapel) and a Roman Catholic church (1873). Pop. (1901) 2,738.

Arundel, EARLS OF, a peerage which has descended through several noble families from Roger de Montgomery, a follower of the Conqueror. In 1243 the estates passed to the Fitzalans through John, a descendant of the third earl. The chief members of the Fitzalan family are:—**(1.)** RICHARD FITZALAN, first Earl of Arundel (1267-1302), who was the first of the peerage actually summoned Earl of Arundel by writ (1291). **(2.)** RICHARD FITZALAN, third earl (1346-97), a famous admiral; was involved in Gloucester's fall, and beheaded in 1397. **(3.)** HENRY FITZALAN, twelfth earl (1511?-80), was one of the twelve councillors in the regency during the minority of Edward VI. He was a prominent councillor of Queen Elizabeth, and also a suitor for her hand. He was imprisoned for his connection with the Ridolfi conspiracy. Through failure of male heirs, the earldom passed to Philip, son of the fourth Duke of Norfolk, in right of his mother, Mary Fitzalan, and has since continued in the line of the Fitzalan Howards, dukes of Norfolk. (See HOWARD.)

Arundel, THOMAS (1353-1414), Archbishop of Canterbury, became bishop of Ely when twenty-one, and was chancellor five times under Richard II. and Henry IV. He became Archbishop of York in 1388, Archbishop of Canterbury in 1396; was banished for complicity in the conspiracy against Richard II. (1397); returned with Henry IV., on whose head he placed the crown, in 1399. He vigorously persecuted the Lollards. See Hook's *Lives of the Archbishops*, vol. iv.

Arundel Marbles, the collection of ancient sculptures formed by Thomas Howard, Earl of Arundel, in 1624-7, and preserved in the Ashmolean Museum at Oxford. They include the celebrated 'Parian Chronicle,' a slab recording the outlines of Greek history from 1582 to 263 B.C., though the portion containing the last ninety years is missing.

Arundel Society, a society founded in London in 1848, its object being the furtherance of art by the publication of photographs and facsimiles.

Arundo. See REED.

Aruns, a name borne by three of the Tarquins, ancient kings of Rome—(1) the younger brother of Tarquinius Priscus; (2) younger brother of Tarquinius Superbus, murdered by his wife; (3) younger son of Tarquinius Superbus, slain in battle by Brutus. The word is Etruscan, and perhaps means a younger son in general.

Aruwimi. (**1.**) River, r. bk. trib. of the Congo, Congo Free State; rises near the W. side of Albert Nyanza; drains the great forest region between the central lakes and the Congo. (See Stanley's *Darkest Africa*, 1890.) Navigation is possible from Basoko to Yambuya. (**2.**) Aruwimi, near the junction of the Aruwimi R. with the Congo, is a station and the administrative centre of the Congo Free State.

Arva, co. of Hungary, between the W. Beskiden and the Tatra Mts. The surface is mountainous, and not very fertile; and the climate is severe, though healthy. Cattle, sheep, flax, oats, timber. Area, 802 sq. m. Pop. (1900) 84,950 (mostly Slovaks).

Arvad, a famous Phœnician town (Gen. 10:18, etc.) on a small island N. of Gebal, called Arados in Greek (now Er-Ruâd); also known as Amrit and Marathos. It is mentioned on monuments about 1500 B.C., when the fleet of Arvad assisted the Amorites against Egypt, and attacked Tyre. Phœnician remains, including a temple, amphitheatre, and tombs, have been found on the island.

Arval, an Old English term for a funeral feast; now obsolete, except as a provincialism. It dates back to the days of the Norsemen, whose 'arvel ("heir-ale") feasts, when heirs drank themselves into their fathers' land and goods,' are referred to by Dasent; of these the classic instance in the Saga literature will be found in *Olaf Tryggvason's Saga*. The English arval was more an affair of eating than of drinking; and in later times the word was lengthened to arval dinner or supper. One distinctive feature was the arval-bread, specially baked for the occasion (spiced with nutmeg, cinnamon, sugar, and raisins), and distributed among the poor.

Arval Brethren (*Fratres Arvales*), a kind of priestly college in ancient Rome who in the end of May conducted the *ambarvalia*, or progressions round the ploughed land, chanting as they went hymns of invocation to Dea Dia, probably Ceres, or to the Lares of the fields, praying that they might grant them a rich harvest. This rite, which lasted three days, was accompanied by dancing and singing; the priests, of whom there were generally twelve, holding office for life, wore chaplets of oak leaves and ears of corn; honeycombs, on which wine and milk were poured, were offered to the goddess, and sacrifices of animals were also made. This priesthood was of great antiquity, and survived until at least the 4th century A.D. See *Acta Fratrum Arvalium*, ed. Henzen (1874).

Arverni, Gallic tribe in Aquitania. In early days they were the most powerful people in Gaul, and under Vercingetorix offered a stubborn resistance to Cæsar (52 B.C.), but were subdued in 121 B.C. by the Romans. See Holmes's *Cæsar's Conquest of Gaul* (1899).

Arveyron, outlet of the Mer de Glace, Mont Blanc chain, Haute Savoy, France; trib. of the Arve, which it joins in the valley of Chamouni; issues from the glacier through an ice-cave, 'Ice-gates of Arveyron.'

Arvicola. See VOLE.

Arya, ARYAN, ARYANISM. Arya is a Sanskrit word, the general connotation of which is nobility, historical and personal, 'belonging to good family' (*cf.* Lat. *gentilis*), in opposition to *anarya*, 'unworthy,' 'vile.' In the Rig-Veda, from the language of which classical Sanskrit was derived and formed, it was used as the national designation of the invading tribes from the north-west. Its original meaning was probably 'kinsman,' as one of the same race, and having the same religion. By it was evinced the proud consciousness of superiority and unity or community, in opposition to the aboriginal inhabitants, who were called Dasa or Dasyu, 'fiends.' When ultimately the Dasa were reduced, their name assumed the meaning of 'slave,' and they were incorporated into the Hindu social system as the fourth caste, the Sudra. (See CASTE.) The name Arya then assumed its meaning as in Sanskrit: instead of being tribal and national, it became social and ethical. This gives the keynote of Hindu civilization and culture, in the history of the dominance of the invading Arya.

In the Iranic field the use of this name was more emphatically ethnical and national. Its earliest ethnical use is found in the old Persian inscription on the tomb of Darius (485 B.C.), where he calls himself an Arya and of Aryan descent. In the Avesta it becomes Airya, where it means 'venerable,' and is the name of the people in opposition to the Anairya; and the land is named Airyana. Among the Greeks, Herodotus records that the Medes were formerly known as Arii; Hellenicus, that Persia was called Aria; and from Eudemus is cited the phrase, 'the Magi and all the Arian race.' Hence the Greek use of Aria and Ariana, and the modern national name of Persia, Iran.

But the more ordinary use of the term Aryan is for the whole family, which is also known as Indo-Germanic and Indo-European. This use of it was introduced chiefly by Max Müller and Pictet; and latterly, when language and race became more strictly discriminated, Max Müller advocated the sole use of the term for the Indo-European family of languages. Its application, however, to race as well as to language has been long established. When it was seen that the chief languages of Europe had affinities with the ancient languages of India and Persia, the problem arose of their historical connection, and their relation to the parent speech; and out of this problem, again, arose that of the original home of the parent race of the peoples. At first, on account of the antiquity of the ancient language of the Hindus, those of Europe were derived from India, as by Friedrich Schlegel (1808); and from a study of the Avesta, Rhode first indicated the highlands of Central Asia, about the upper basin of the Amu Daria, as the original home. By the comparative study of words and names common to all or several of the languages (linguistic palæontology), it was believed possible to locate the original home as indicated by the primitive civilization. And by the work of many scholars this came to be regarded as some part or other of Central Asia, from the Urals to the Hindu-Kush, and from the Pamirs to Armenia. Opposition to this view was first made by Omalius d'Halloy and Latham, who held that the original abode must be looked for in Europe, Latham calling attention to the archaic forms of Lithuanian. In support of Europe, further evidence was adduced by Benfey, who decided for the southern plains of Russia, and was followed by Schrader; by Geiger, who indicated Central and West Germany, and was followed by Hirt on behalf of the Baltic plains, and by Cuno, who claimed the whole of N. and E. Europe from the Urals to the Atlantic. Finally, anthropological evidence was adduced by Pösche on behalf of E. Europe, and by Penka on behalf of Scandinavia. Europe may be said to have gained the day; but Asia has been, nevertheless, upheld by several scholars, such as Max Müller, Van den Gheyn, Ujfalvy, Hehn, and Ihering. Huxley, summing up the Aryan question in 1890, wrote: 'There was and is an Aryan race—that is to say, the characteristic modes of speech termed Aryan were developed among the blond long-heads alone, however much some of them may have been modified by the importation of non-Aryan elements.'

Thus arose the problem of the Aryan race and its origin. Although the Indo-Iranic word *Arya* is probably represented in the Hellenic *Aristos*, in the Teutonic name *Ariovistus*, and in Old Irish *Aire* or *Airech* (*princeps*), there is insufficient evidence to show that Arya was in use as the name of the primordial race or people which used the parent Aryan speech. As the population of Europe consists of two fundamental races, one of which is dolichocephalic and the other brachycephalic, it is necessary to decide which is to be considered the Aryan. But the dolichocephalic race comprises two branches—a brunette in the south and another in the north. By one school it is held that the Aryans are the tall, blond dolichocephalic race which is best represented by the people of N. Germany and Scandinavia. It is held by another school, the Gallic, that the brachycephalic race is the original Aryan. According to Sergi, the dolichocephalic race, comprising the brunette and blond branches, constitutes a Eurafrican species, since it is found in Europe and N. Africa; and the brachycephalic race (or Alpine race, as it is called by some, after Linnæus), which is found from Auvergne and Savoy to the Hindu-Kush and the Pamirs, constitutes a Eurasian species, which invaded Europe and Aryanized it in speech. Such is the new phase of the Aryan problem. It is worthy of notice that Prichard (1845) noted the Mongoloid affinity of the Celtic skull, and that several scholars, such as Sweet and Taylor, have found many affinities between Aryan speech and the Ugric and Finnic branches of the Ural-Altaic family.

In the study of the Aryan problem it is necessary to discriminate between language, race, and civilization or culture. From the comparative study of the Indo-European languages, several accounts have been given of the primitive Aryan civilization, as by Kuhn, Pictet, Max Müller, Ihering (for law and custom), and most fully by Schrader in all its aspects. The fascinating idyll of the primitive Aryan of Pictet and Max Müller has been dissipated by more exact study. Its civilization was much inferior to that of the neolithic people of Europe. According to this view, the classical civilization of Europe is of Mediterranean origin, but Aryanized in speech. The advocacy of the opposite theory is termed Aryanism—that Europe owes its culture and civilization to the Aryan, a tall, blond dolichocephalic race represented by the modern Germans, Scandinavians, and English. See Schrader's *Prehistoric Antiquities of the Aryan Peoples* (trans. by Jevons 1890); Reinach's *L'Origine des Aryens* (1892); Sergi's *Mediterranean Races* (1901, with a bibliography); Brugmann's *Comparative Grammar of the Indo-Germanic Languages* (1891).

Arya Samaj. See BRAHMA SAMAJ.

Arzamas, tn., Nijni Novgorod gov., Russia, 70 m. S.S.W. of Nijni Novgorod. Commercially, it is, after Nijni Novgorod, the chief town of the government. Tanneries, oil works, foundries, etc. Pop. (1897) 10,591.

Arzeu, seapt. of Algeria, 30 m. by rail N.E. of Oran. Alfa (esparto) and salt are exported. In the neighbourhood are the Kléber quarries of Numidian marble, and the ruins of ancient *Arsenaria.* Pop. (1901) 5,555.

Roman As (*reduced*).

As, the Roman *libra,* or pound, so called because made of the compound metal *aes.* Eventually the name came to denote a coin, the *as,* which weighed half an ounce.

As, in northern mythology. See AESIR.

As (plural ÅSAR), ridges of gravel and sand in Sweden, formed during the Glacial epoch, and extending often for miles. They generally reach a height of 100 to 200 ft., and are often wooded.

Asa, king of Judah (*c.* 918-877 B.C.), son and successor of Abijah. He showed great energy in purging his kingdom of idolatry. He defeated Zerah, a Cushite invader, and, with the help of Syria, Baasha, king of Israel. See 1 Kings 15:9-24; 2 Chron. 14-16.

Asaba, tn., W. Africa, in the British protectorate of S. Nigeria, on the r. bk. of the Niger, about 12 m. N. of lat. 12° S.

Asafœtida (Lat. 'fetid gum'), a gum resin from the living root of various species of *Ferula,* in Tibet, Afghanistan, Persia, and the Punjab. The fresh oil has not an unpleasant smell, but when decomposed it gives off sulphuretted hydrogen. It is one of the aromatics, differing from most of them in its disagreeable characteristics. It is used as a cathartic to expel flatulence, and as a nerve stimulant.

Asakusa, popular Buddhist temple to the 'thousand-armed Kwan-non,' the goddess of mercy, in a suburb of Tokyo, Japan. See Bird's (Bishop's) *Unbeaten Tracks in Japan* (1880), vol. i. p. 62.

Asaky, GEORGE (1788-1869), Roumanian author, one of the leaders in the regeneration of his country. He established in Roumania (Moldavia) the first press for printing books in the Roumanian language; founded, and edited for thirty years, the first Roumanian paper (*Albina*); composed school books, translated classical plays from German and French, and wrote a volume of poetry, *Poesii* (2nd ed. 1854).

Asama-yama, active volcano (doleritic lava), prov. Shinshu, Japan, 80 m. N.W. of Tokyo; 8,280 ft.; usually ascended (5½ hrs.) from Oiwake or Kutsukake. The crater is ¾ m. in circumference. A serious eruption took place in 1783.

Asaph, chief musician in the time of David and Solomon (1 Chron. 16:5). His name is prefixed to 12 psalms (Nos. 50 and 73-83), and he seems to have been regarded as the founder or ancestral representative of a guild or family of singers in the second temple. *Cf.* 'sons of KORAH,' and see Driver, *Lit. of O.T.* (p. 348, 2nd ed.; 6th ed. 1897).

Asarum, a genus of plants of the order Aristolochiaceæ, or birthworts. An American species is the snakeroot or wild ginger. The leaves of the European species, called asarabacca, are emetic, cathartic, and diuretic.

Asben. See AIR.

Asbestos (Gr. 'inextinguishable'), finely fibrous minerals, varieties of amphibole, usually tremolite or actinolite. It occurs in delicate fibres, usually white, gray, or blue, which can be teased out like wool. Though rather brittle, it has been spun and woven into cloth, which was used by the Romans to envelop corpses on the funeral pyre, and served to retain their ashes. From this property its name is derived. It is both uninflammable and a poor conductor of heat, owing to the large amount of air enclosed between the fibres, and is employed in the manufacture of pipes, lamp-wicks, and cardboard. Chemists use it for filtering fluids which attack ordinary filter-paper, or, in place of platinum wire, for flame tests. But it is more largely used as a heat-retaining medium, as in packing steam pipes, and in the manufacture of fireproof safes and of gas stoves. Fireproof paints, papers, putty, clothes, gloves, felt, curtains, have all been made from it, and have been found of value in certain cases. The principal sources of supply are Canada, the Alpine countries, Russia, Corsica, and New South Wales. It is found chiefly in the older crystalline rocks, and has been obtained in Cornwall, at Portsoy, and in Shetland. See Jones's *Asbestos and Asbestic* (1890), and Röll's *Der A. und seine Verwendung* (1901).

Asbjörnsen, Peter Christian (1812-85), Norwegian author, and writer of folk-tales. In 1842 he and his friend and colleague, J. E. Möe, published the first part of the classic *Norske Folkeeventyr* (new ed. 1896-9), which can be placed by the side of Grimm's *Kinder- und Haus-märchen.* On the development of Norwegian literature the book exercised a far-reaching influence. A second collection of folk-tales, dealing chiefly with fairies, appeared from 1845 to 1848, under the title of *Norske Huldreeventyr og Folkesagn*, standing as literature even higher than the *Folkeeventyr.* A third collection of the tales appeared in 1870. Grants from the state enabled Asbjörnsen to travel on the north Norwegian coast—a journey which led to important geological discoveries. From 1860 to 1876 he was engaged as curator of forests, and in investigating the condition of the national peat-fields. Of his scientific works his account of his Mediterranean expedition (1849-50) in the corvette *Eagle* is the most important. Asbjörnsen is the Norwegian story-teller, *par excellence*, though he wrote in Danish. See *Popular Tales from the Norse*, by Dasent (1859; new ed. 1903); *Tales from the Fjeld* (1874); *Round the Yule Log* (1881); *Fairy Tales from the Far North* (1897). Biography: Sinding-Larsen and Asbjörnsen, *P. C. Asbjörnsen; Fra Asbjörnsens Turistliv* (1884).

Asbury, Francis (1745-1816), bishop, founder of Wesleyanism in the United States; born near Birmingham, England; was sent by Wesley to America in 1771, and was ordained first bishop of the Methodist Episcopal Church in the United States in 1784. The great development of Methodism there is largely due to his untiring labours. He died in Virginia. See *Asbury's Journal* (3 vols. 1852) and Strickland's *Pioneer Bishop* (1858).

Ascalon, or Ashkelon, one of the five chief Philistine cities, N. of Gaza, on the Mediterranean, 39 m. S.W. of Jerusalem (Josh. 13:3, etc.). It is noticed on monuments of 1600, 1500, and 1350 B.C. as subject to Egypt under Philistine princes. It is now represented by the ruined city Askalân, with walls built in the 13th century A.D., to which time it was an important city. Near the town, on Aug. 12, 1099, the Crusaders, under Godfrey of Bouillon, defeated a superior army sent by the sultan of Egypt to recapture Jerusalem. The Crusaders captured the place (1153); it was recaptured by Saladin in 1187, and destroyed in 1270. Ascalon gives its name to the eschalot or shallot, which is grown in the vicinity. See Smith's *Hist. Geog. of the Holy Land* and Thomson's *The Land and the Book.*

Ascania. This name is derived from the castle of Ascania near Aschersleben, the home of Albert the Bear, contemporary of Frederick Barbarossa. Albert, the Ascanian margrave of Brandenburg, and his successors, nearly doubled the margravate between 1170 and 1267. The dynasty was intimately connected with the house of Anhalt.

Ascanius, the son of Æneas and Creusa, who as a boy escaped with his father from the fall of Troy. He distinguished himself in the war against the Italians, and after the death of Æneas founded the town of Alba Longa. He is also called Iulus, and from him the Julian clan at Rome claimed descent. See Virgil's *Æneid.*

Ascapart, a legendary giant, 30 ft. high, who, in Drayton's *Polyolbion*, bk. ii. (1612), carries off Sir Bevis of Southampton, his wife, and steed, but is subdued and made into a footman by the knight.

Ascaris, the name of a genus of round worms or nematodes, including some important intestinal parasites—*e.g. A. lumbricoides*, of man; *A. mystax*, of cats, dogs, etc.; and *A. megalocephala*, of the horse and related animals. Other species have been found in birds, reptiles, and fishes. There is some obscurity as to the means of infection of man, but it is believed that millipedes—*e.g. Iulus*—may serve as the first host, and may be inadvertently eaten in fallen fruit or unwashed vegetables.

Ascendant. See Astrology.

Ascension, British isl. in S. Atlantic, 760 m. N.W. of St. Helena, lat. 7° 56′ S., long. 14° 24′ W. (so called because discovered by the Portuguese navigator, Juan de Nova, on Ascension Day, 1501), is composed of extinct volcanic cones, forming part of a submarine longitudinal ridge which divides the S. Atlantic into two basins. The island (38 sq. m. in area) is used as a coaling and victualling station for the African squadron. In the S.E. is Green I. (2,820 ft.), which is used as a sanatorium. The only good anchorage is at George Town, in the N.W. Land crabs are plentiful, and green turtles are caught in great numbers. Great Britain took possession of it in 1815. Pop. (1901) about 430. The island is rated at the Admiralty as a man of war. See Mrs. D. Gill's *Six Months in Ascension* (1878) and Darwin's *Voyage of H.M.S. Beagle.*

Ascension Day, or Holy Thursday, commemorates, in most of the Christian churches, the ascension of Christ into heaven, held to have taken place forty days after the resurrection, and thus placed in the calendar forty days after Easter. The old custom of 'beating the bounds' used to take place on this day.

Ascension, Right. See Right Ascension.

Asceticism, as used by ecclesiastical writers from the 3rd century onwards, means the continual mortification of bodily desires, even of such as are lawful in themselves, in order to attain purity of soul and more perfect union with God. But though the word thus understood is of Christian origin, the principle of asceticism is common in varying degrees to most religions. It is especially prominent when the idea prevails that earthly life is evil, or that the body is a hindrance to the soul in its quest of virtue. Hence in Brahminism we meet with an elaborate system of meditation and penance, by which the adept attains union with the divine, and acquires supernatural powers (see Fakir and Suttee); while Buddhism regards the life of the monk who lives in poverty and celibacy as the means of escape from transmigration into new forms of bodily existence. Even among the Greeks there are traces from early times of this ascetic view. In the 5th century B.C. there was a disposition, for example, to depreciate marriage; and tendencies of this kind were fostered by the Orphic mysteries and the teaching attributed to Empedocles and Pythagoras. After the Christian era, the Roman Stoics, and later still the Neo-Pythagoreans and Neo-Platonists, pursued ascetic modes of life. The Old Testament, with its solitary fast (*viz.* that on the Day of Atonement) and its exaltation of marriage, gives scant encouragement to asceticism. Still, among the later Jews, the Pharisees fasted twice a week; the Essenes, as a rule, abstained from marriage, and lived in community; and the praise of virginity finds frequent expression in the works of Philo Judæus. It was from the influence of later Greek philosophy that the ascetic life gained entrance into the Christian church. The New Testament requires complete self-surrender to the service of God and man, but prescribes no rules of ascetic discipline.

Early in the 2nd century A.D., Christians kept stated fast days and hours of prayer. It was thought meritorious to abstain from marriage; watching through the night, endurance of cold, going barefoot, wearing of sackcloth, and other kinds of mortification were in high repute. Gradually a special class of men and women arose, known as *ασκηταί* or ascetics. Such persons were at first bound by no vows, and continued to live in the family circle. But towards the close of the 3rd century, Hieracas of Leontopolis, a disciple of Origen, gathered round him a number of ascetics, whom he trained to study and mortification. He even regarded the ascetic life as the distinguishing novelty of the Christian revelation. It is said that some of these ascetics fled into the desert during the Decian persecution. In any case, the Egyptian Antony (251–356 A.D.) became the father of monasticism, which is the legitimate outcome of the ascetic life.

The ascetic principle is still maintained in the Roman and Eastern Churches, though from the earliest times the Catholic authorities have condemned as heretical the belief that wine, flesh-meat, marriage, etc., are intrinsically evil. The reformation was unfriendly to asceticism. Still, a moderate asceticism, represented, for example, in Jeremy Taylor's *Holy Living*, has found favour in the Anglican Church. Puritans, too, have often been strict ascetics, though not after the Catholic fashion.

Asch, tn. in N.W. corner of Bohemia, Austria, 17 m. by rail N.W. of Eger. Manufactures dress stuffs and lace. Pop. (1900) 18,675.

Aschaffenburg, tn., dist. Lower Franconia, Bavaria, on the r. bk. of the Main, 26 m. S.E. of Frankfort-on-Main. The castle contains a valuable library, a picture gallery, and a collection of engravings. Manufactures paper, papier-mâché, dyes, wax, tobacco, etc. Pop. (1900) 18,093.

Ascham, ANTONY (d. 1650), English Parliamentarian ambassador. In 1649 he was at Hamburg as agent for the Commonwealth, and in 1659 was dispatched to Madrid as resident minister. The day after his arrival there he and his interpreter were murdered by six English royalists. See *Harleian Miscellany* (iv. 280, ed. Park).

Ascham, ROGER (1515-68), educationist and scholar, one of the earliest masters of English prose, was born at Kirby Wiske, near Northallerton. He went in 1530 to Cambridge. In 1537 he became reader in Greek, and in 1546 was appointed public orator to his university. In 1545 he published *Toxophilus*, a treatise on archery, which gained him the favour of Henry VIII. and the appointment (1548) of tutor to Princess Elizabeth. Three years (1550-3) spent abroad in the suite of the English ambassador at the court of Charles V. led to the publication in 1553 of his *Report on the Affaires of Germany*. Meantime he had been appointed Latin secretary to Edward VI., and was continued in the same position under Mary. Under Elizabeth he was secretary and tutor until his death. In 1570 his widow published his principal work, *The Scholemaster*, in which Ascham advocates the teaching of classical languages by the analysis of choice passages rather than by an elaborate course of grammatical instruction; he also shows that gentleness is more effective than punishment with children. See *Toxophilus* (ed. Arber, 1868); *Scholemaster* (ed. Mayor, 1863, or Arber, 1870); *Works* (ed. Giles, 1865); also Katterfeld's *Roger Ascham* (1879).

Aschersleben, tn., prov. Saxony, Prussia, pleasantly situated, 36 m. N.W. of Halle. Woollens, hardware, sugar, etc., and a saline spring. Pop. (1900) 27,245.

Ascidians (Ascidiacea) constitute an order of tunicates or sea-squirts, including all the familiar members of that class. The term is also used in a more restricted sense for tunicates belonging to the genus Ascidia and the related genera. See TUNICATES.

Ascites, an accumulation of fluid, more or less serous, in the peritoneal cavity. The swelling is not inflammatory, but dropsical; and ascites is not, properly speaking, a disease, but a sign of one of several diseases. Fluid in excess in the peritoneal cavity may be due either to (1) lack of propelling power—heart weakness; (2) obstruction to circulation; (3) weakness of the tissues, and impairment of absorption; (4) changes in the fluid itself; or (5) mechanical obstruction to the portal circulation, caused by liver disease. Ascites is usually slow in its onset, and a gradual abdominal enlargement is very likely the first thing noticed by the sufferer. It is diagnosed chiefly by the appearance of the abdomen in different positions, by palpation and percussion, or by the discovery of disease likely to produce it. The treatment consists in dealing with the cause, medically or by surgical operation as may be necessary, and in promoting absorption of the ascitic fluid by free action of the bowels, skin, and kidneys.

Asclepiadaceæ, an order of plants closely related to Apocynaceæ, or Dogbanes. Many possess a milky juice (*latex*) which in certain cases forms an acrid caoutchouc of small value, the best-known species occurring in Penang. Most species occur in Africa, but many are found in India and tropical America—the cow plant of Ceylon and a pitcher plant (*Dischidia*) in the Malay Archipelago belonging to the order. In most of the genera the pollen forms pollinia, as in orchids. Many of the plants are of local repute for the cure of leprosy, elephantiasis, dysentery, etc. Several yield useful fibres—*e.g.* mudar.

Asclepiades. (**1.**) A Greek poet of Samos (fl. 280 B.C.), who is said to have taught Theocritus. Thirty-nine epigrams in the Greek anthology are ascribed to him. (**2.**) A native of Bithynia (fl. 1st century B.C.); attained great fame as a physician in Rome, where he founded the 'methodical' school. The salient features of his treatment were such as are approved by modern physicians—*viz.* a generous diet, the use of alteratives, open-air exercise, bathing, and in general the assistance of nature by freeing the patient from mental or nervous strain.

Asclepiadic, a metre supposed to be so called on account of its connection with the poet Asclepiades. The lesser asclepiad consisted of a spondee, two choriambi, and an iambus (– – | – ∪ ∪ – | – ∪ ∪ – | ∪ –); as, *Mæcenas atavis edite regibus.* The greater asclepiad contained three choriambi (– – | – ∪ ∪ – | – ∪ ∪ – | – ∪ ∪ – | ∪ –); as, *Quis post vina gravem militiam aut pauperiem crepat!*

Asclepios. See ÆSCULAPIUS.

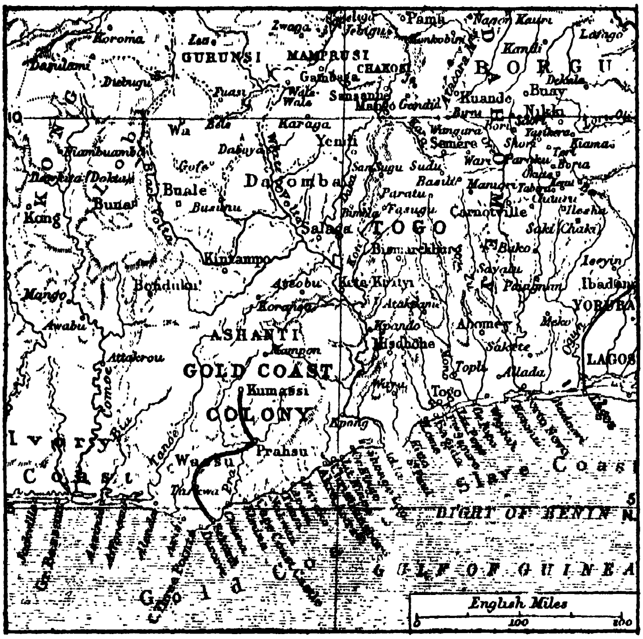
Ascoli, GRAZIADIO ISAIA (1829), Italian philologist, from 1861 to 1902 professor at the Academy of Milan, has done much to promote in Italy the study of comparative philology, Sanskrit, and the Romance languages, and is a leading authority on the science of phonetics. His chief publication is *Fonologia Comparata del Sanscrito, del Greco, e del Latino* (1870). His most noteworthy contributions on dialects are contained in the volumes of the Milan periodical *Archivio Glottologico* (1873, etc.). His *Studii Critici* (1861) and *Lettere Glottologiche* (1886) deal mostly with phonetics.

Ascoli Piceno. (**1.**) Province, Italy, in the Marches, sloping N.E. from the Central Apennines to the Adriatic, with the Sibylline Mts. (8,130 ft.) on its W. border. Area, 796 sq. m. Pop. (1901) 245,883. (**2.**) Town and episc. see, cap. of above, 20 m. from the Adriatic coast, and 73 m. by rail S. of Ancona. It represents the ancient *Asculum Picenum*, chief town of the Piceni, which played a leading part in the Social war, and in retaliation was burnt (89 B.C.) by the Roman consul Pompeius Strabo. Various remains of the ancient town—*e.g.* a bridge, portions of the walls, etc.—still survive. The very ancient cathedral is alleged to have been built by Constantine the Great, on the site of a former temple of Hercules. Majolica, glass, paper, etc., are manufactured. Pop. (1901) 28,608.

Ascoli Satriano, tn. and episc. see, prov. Foggia, Italy, 19 m. S. of Foggia. It is identified with the ancient *Asculum Apulum*, where Pyrrhus, in 279 B.C., defeated the Romans. It was destroyed in the 12th century by a son of the Norman Robert Guiscard. Pop. (1901) 7,932.

Asconius Pedianus (2 B.C.–83 A.D.), Roman grammarian, who wrote a commentary on the speeches of Cicero, of which valuable fragments are extant. The best edition is that of Baiter and Orelli, forming part of their edition of Cicero's works. See also Madvig's *De Asconii Pediani Commentaries* (1828).

Ascot and **Ascot Heath,** a famous race-course, nearly 2 m. long, in S.E. Berkshire, and 6 m. S.W. of Windsor. The races, instituted in 1711 by the Duke of Cumberland, third son of George II., are held annually in June, and are usually attended by royalty. The course was altered and improved under the personal supervision of the King in 1902. The centre of the race-course is laid out as golf links. See Cawthorne's *Royal Ascot* (1900).



Ashanti and Gold Coast Colony.

Ascot Vale, a suburb of Melbourne, Victoria, Australia, situated on the Saltwater R. Pop. (1901) 9,500.

Asculum. See ASCOLI.

Asellio, GASPARO (1581-1626), a celebrated Italian surgeon, native of Cremona. An early advocate of vivisection, and an accomplished anatomist (some time professor of anatomy at Padua), his greatest claim to distinction is his discovery (1623) of the lacteals. He died at Milan.

Asepsis is the neutral condition in which there are neither the germs of putrefaction nor any active antiseptic agents: *e.g.* water boiled for half an hour in a covered vessel is *aseptic*, having no live germs of putrefaction, but is not *antiseptic* until an antiseptic has been added to it. The term aseptic is now used to express a condition of freedom from all bacteria—not merely from those concerned in putrefaction. Asepsis is the surgeon's aim as the ideal condition in a wound, and the less antiseptic required to maintain that condition the better. See ANTISEPTICS.

Asexual. See SEX.

Asgard, home of the Aesir.

Asgill, JOHN (1659-1738), an English barrister and pamphleteer, expelled in 1703 from the Irish and in 1707 from the English House of Commons on account of the blasphemous nature of his book, *An Argument*, holding that men may be translated to heaven without dying. He attributed death to the power of custom, and to the fear of dying, rather than to necessity. From the Fleet prison, where he was imprisoned for debt (and where he died), he issued numerous pamphlets. Coleridge (*Table Talk*) declares there is no 'genuine Saxon English' finer than Asgill's. See Asgill's pamphlet *On Argument*, ed. by Gregg (1875), and Southey's *Doctor*.

Ash, THE (Lat. *Fraxinus excelsior*), of the order Oleaceæ, is a native of the British Isles. In winter the tree has a bold appearance with its gray, compact, grooved bark, and branches which often bend downwards and then upwards towards their extremities, while the twigs are thick and knotted, due to the large lateral and terminal buds, which are protected by black scales. The minute flowers, destitute of calyx and corolla, appear in dense clusters in April and May, before the leaves, and each consists of a pistil and two purple stamens. The leaves are compound, with long, drawn-out leaflets, and a grooved midrib and petiole which are said to absorb rain. The fruit is a two-celled and two-seeded samara. Varieties are the weeping ash; the flowering or manna ash, which exudes a sap in summer; and the mountain ash, or rowan tree. The wood is whitish, tough, and elastic, with a well-marked grain in the spring wood of the annual rings. It is chiefly used for making the handles of spades, hammers, and other tools. The tree figures prominently in ancient Scandinavian mythology; see YGGDRASIL.

Ashangos, a tribe of fetish-worshippers of the French Congo. They work iron into weapons. Unlike most neighbouring tribes, they are fully clothed.

Ashanti, down to 1896 a native kingdom of W. Africa, dating from the very beginning of the 18th century, lies inland behind the Prah R., on the Gold Coast. It is an undulating region, covered with dense forest, and traversed by wide, swampy streams. Its people (one of the most important tribes of the Tshi group) were warlike, predatory, and notorious blood-shedders, principally in orgiastic human sacrifices. Owing to their depredations on the Fanti subjects of Britain in the coast regions, they were punished by military expeditions in 1807-11; in 1873-4, when Sir Garnet Wolseley captured and burned Kumassi; in 1895-6, when their king, Prempeh, was exiled; and again in 1900, after which Ashanti was annexed by Great Britain. It now constitutes a district (Northern Territories) of the Gold Coast Colony. Chief town, Kumassi (Coomassie). In 1901 the entire population was estimated at about 1,805,000. The gold exports in 1903 (Ashanti Goldfields Corporation) was £254,791. A railway runs from Sekondi *viâ* Tarkwa and Obuassi to Kumassi (180 m.). See C. C. Reindorf's *Hist. of Gold Coast and Ashantee* (1895).

Ashbee, HENRY SPENCER (1834-1900), bibliographer and author. His library, which contained a splendid collection of Cervantic literature, first editions of Molière, Le Sage, etc., he bequeathed to the British Museum; and his water-colour drawings, by Turner, De Wint, etc., to the Kensington Museum. He published *Notes on Curious and Uncommon Books* (3 vols. 1877-85); *Iconography of Don Quixote, 1605-1895* (1895).

Ashbourne, or Ashborne, mrkt. tn., Derbyshire, England, is beautifully situated on the l. bk. of the Dove. The cruciform church, with central tower, dates from 1241, and its beautiful spire (212 ft.) is known as the 'Pride of the Peak.' In the north chancel is the remarkably fine sculpture of Banks to the memory of Penelope Boothby, which suggested Chantry's 'Sleeping Children' in Lichfield Cathedral. Two engagements took place here during the civil war, Charles I. being in the town on both occasions. Pop. (1901) 4,039.

Ashbourne, Lord, The Rt. Hon. Edward Gibson (1837), born in Dublin. He became M.P. for Dublin University (1875), attorney-general for Ireland (1877-80), and was raised to the peerage in 1885. He has been lord chancellor of Ireland (1885-92), and again since 1895. His name is associated with the Act of 1885 for facilitating the sale of Irish holdings to tenants.

Ashburnham, John (1603-71), confidential agent to Charles I. He sat in the Long Parliament; assisted, during the civil war, at the treaty of Uxbridge and other peace negotiations, accompanied Charles in his journey to the Scots army, and arranged his flight from Hampton Court to the Isle of Wight. During the Commonwealth he was imprisoned and banished, but regained his old office as groom of the bedchamber at the restoration. See *Narrative* edited by Lord Ashburnham (1830).

Ashburton, mrkt. tn., Devonshire, England, on the Yeo, 19 m. S.W. of Exeter. It received a charter in Edward III.'s time (1328) as a stannary town. It was occupied by the Royalists during the civil war, and was taken by Fairfax in 1646. On Holm Chace, a bold promontory 2 m. to the W., is a curious 'camp of concealment,' surrounded by a fosse, and enclosing an 'agger.' Pop. (1901) 2,628.

Ashburton, tn., New Zealand, on the l. bk. of Ashburton R., 53 m. S. of Christchurch. Pop. (1901) 6,000; of county, 13,664.

Ashburton River, W. Australia, N.W. of the colony, flows 400 m. N.W. to the Indian Ocean, N.E. of Exmouth.

Ashburton, Lord, Alexander Baring (1774-1848), was the head of the banking firm of Baring Brothers; M.P. for various constituencies (1806-35), and raised to the peerage (1835). As special commissioner to Washington (1842), he concluded the Ashburton Treaty, which dealt with the frontier line between the state of Maine and Canada, the extradition of criminals, and the suppression of the slave trade.

Ashburton, Lord, John Dunning (1731-83), English lawyer and politician; born at Ashburton. Called to the bar in 1756, he became recorder of Bristol (1766), and solicitor-general (1767-70); M.P. for Calne (1768-82); opposed the government's American policy; chancellor of the Duchy of Lancaster, a privy councillor, and a peer (1782). See Roscoe's *Lives of Eminent British Lawyers.*

Ashbury. See Ashdown.

Ashby-de-la-Zouch, mrkt. tn., Leicestershire, England, 18 m. N.W. by W. of Leicester. The town is pleasantly situated; the 'Ivanhoe' medicinal baths were erected in 1826. The church contains monuments of the Hastings family, and a curious finger-pillory for the punishment of persons who were disorderly in church. In the time of Edward IV. a strongly-fortified castle was erected here by Sir William, afterwards Lord Hastings. During the civil war it was garrisoned for the king under Lord Loughborough, but surrendered in 1646, and was demolished about 1649. The town and district figure in Scott's *Ivanhoe.* Bishop Joseph Hall (1574-1656) and Dr. John Bainbridge (1582-1643), the mathematician, were born here. Pop. (1901) 4,722.

Ashdod, a great city of the Philistines (Josh. 11:22, etc.), not far from the coast; called Azotus in the Apocrypha and New Testament, now Isdud or Esdûd, a small mud village. It was for long a thorn in the side of the Israelites. When the Philistines captured the ark, they conveyed it to Ashdod, where stood the temple of Dagon. The town underwent sieges at the hands of Sargon and Psammetichus, and was despoiled by Judas Maccabæus, as also by Jonathan, his brother.

Ashdown, W. Berkshire, England, 3½ m. N.W. of Lambourn; probably the scene of a sanguinary battle (Æscandune or Assandune) in which Ethelred and Alfred defeated the Danes (871). There are various ancient intrenchments—Alfred's Castle, Uffington Castle, and Hardwell Castle—in the vicinity of Ashbury, a little farther to the N.W. Wayland Smith's Cave or Forge is a cromlech 1½ m. E. of Ashbury. The associated legend plays a part in Scott's *Kenilworth.*

Ashe, Simeon (d. 1662), nonconformist divine. On the outbreak of the civil war he became chaplain to the Earl of Manchester, and afterwards rector of St. Austin. He wrote, with the object of vindicating the conduct of his patron, a pamphlet on *A True Relation of the most Chiefe Occurrences at and since the late Battell at Newbery.* He actively promoted the restoration of 1660. See Calamy's *Nonconformist Memorial,* ed. 1802, i. 94-96.

Ashehoh, Ajeho, or Alohuku, trading tn. in N. of prov. Kirin, Manchuria, 30 m. S. of Sungari R. Pop. 30,000.

Asher, Jacob's eighth son, whose mother was Zilpah, the handmaid of Leah. Asher was the ancestor of the tribe of the same name, the territory allotted to which extended from Dor north-eastward to Lebanon.

Asherah, a Hebrew word (pl. *asherim, asheroth*) translated 'grove' in the Authorized Version, which follows the Septuagint and the Vulgate, but simply transliterated by the revisers. Being sometimes associated with Baal (*cf.* Judg. 3:7), like Ashtoreth (Judg. 2:13), Asherah has been supposed to be a doublet of the latter name; but the word more probably signified a sacred post or stake, which, though often connected with alien cults, may originally have had a place in the worship of Jehovah. It is unlikely that the *asherah* was a phallic emblem, but it may have been a residuum of tree-worship. See W. R. Smith, *Religion of the Semites* (2nd ed. 1894).

Ashes, the mineral residue obtained by the combustion of animal and vegetable substances. Every organic tissue contains inorganic salts. The study of ashes is thus of great importance in the physiological chemistry of animals and plants, in dietetics, in the detection of certain poisons, in agricultural chemistry and the preparation of manures, in the estimation of the heating power of fuel, and in the discovery of adulteration.

Asheville, city, N. Carolina, U.S.A., the county seat of Buncombe co., in the W. part of the state; alt. 2,350 ft. Its mild climate (mean temp., summer, 72°; winter, 39°) makes it a popular resort for invalids. In the vicinity is Biltmore, the seat of Mr. G. W. Vanderbilt. Pop. (1900) 14,694.

Ashfield, tn., New South Wales, Australia, 5 m. S. of Sydney. Pop. (1901) 14,331.

Ashford, mrkt. tn. of Kent, England, near the Colne, 14 m. S.W. of Canterbury, with an ancient church, containing a monument to Thomas ('Customer') Smyth and his wife. The industries include brewing, brickmaking, tanning, flour-milling, and the manufacture of agricultural implements. At Ashford New Town are the engineering works of the S.E.R. Pop. (1901) 12,808.

Ashikaga, tn., 72 m. by rail N.W. of Tokyo, Hondo I., Japan, with a large trade in native cotton and silk. An image of Confucius is the only relic of an ancient academy of Chinese learning which once existed here. It has a large trade in cotton and silk goods. Pop. (1898) 21,348.

Ashingdon, par., Essex, England, 6 m. N. of Southend, the reputed scene of Edmund Ironside's defeat (Assandun) by Canute in 1016.

Ashira, a Bantu people living between the Congo and the equator, in the coast region to the west of the French Congo. They are skilful workers in iron and copper, and weave a kind of cloth from palm-leaf fibre. Complexion, coal-black; physique and features, good; religion, fetishism.

Ashkenaz, the name of a tribe descended from one of the sons of Gomer, the son of Japheth (Gen. 10:3), originally inhabiting the part of Asia Minor in the vicinity of Armenia, and associated with Ararat and Minni (a portion of Armenia) in Jer. 51:27; found later in the west and north of Asia Minor, and giving the name Ashkenaz to the Black Sea. They have been identified with the Scandinavians; also with the Polish and German Jews, who are, as a matter of fact, called Ashkenazim, to distinguish them from the Sephardim, or Spanish and Portuguese Jews.

Ashland. (1.) City, Wisconsin, U.S.A., co. seat of Ashland co.; on Chaquamegon Bay, an arm of Lake Superior; a busy lake port, it has large lumber and iron industries. Pop. (1900) 13,074. (2.) City, Boyd co., Kentucky, U.S.A., 144 m. E. by S. of Cincinnati; has large trade in coal, iron ore, lumber, etc. Pop. (1900) 6,800.

Ashlar, squared stone masonry truly dressed, in courses over 12 inches deep. ASHLAR PIECES, in carpentry, are short uprights from floor to roof in an attic room, cutting off the acute angle of meeting; also pieces in mediæval roofs between the wall blocks and the rafters.

Ashley, ANTHONY. See SHAFTESBURY, LORD.

Ashley, RT. HON. ANTHONY EVELYN MELBOURNE (b. 1836), 4th son of late Earl of Shaftesbury; secretary to Lord Palmerston, (1858-65), whose life he afterwards (1876) wrote; M.P. for Poole (1874-80), Isle of Wight (1880-5); parliamentary secretary to Board of Trade (1880-2); church estates commissioner (1880-5); Under-Secretary for the Colonies (1882-5).

Ashley, WILLIAM JAMES (1860), held the chair of political economy and constitutional history at Toronto (1888-92), and of economic history at Harvard (1892-1901); organizing professor of faculty of commerce in Birmingham University (1901); one of the chief academic champions of Mr. Chamberlain's fiscal policy (1903-4); has published *Introd. to Eng. Economic Hist. and Theory* (1888-93); *Surveys, Historic and Economic* (1900); *Adjustment of Wages* (1903); and *The Tariff Problem* (new ed. 1904).

Ashmole, ELIAS (1617-92), English antiquary and astrologer, born at Lichfield; became a Royalist soldier in 1642; appointed commissioner of excise at Lichfield, 1644. In 1660 he was made Windsor herald by Charles II., and from that time devoted himself to antiquarian researches. In 1677 he presented his collection of antiquities—including the collection of his friend Tradescant—to Oxford University. He wrote *Institution, Laws, and Ceremonies of the Order of the Garter* (1672), a capital work; *The Antiquities of Berkshire* (1719). Of his works on alchemy, for which he had a passion in the early part of his life, the most important is the *Theatrum Chemicum* (1652). See his *Diary* (1717), and Anthony à Wood's *Athenæ Oxon.*

Ashmolean Museum, Oxford, was founded in 1679 by Elias Ashmole; the building was designed and executed (1679-83) by Thomas Wood of Oxford. Its greatest treasures are the Arundel Marbles and the Selden Marbles, the latter presented by the executors of John Selden. It also contains the founder's collection of antiquarian curiosities. His library of heraldic, genealogical, and astrological works (2,136 volumes, including 850 MSS.) was transferred in 1858 to the Bodleian Library.

Ashmun, JEHUDI (1794-1828), prominent for his efforts in developing the negro republic of Liberia, was born at Champlain, New York; was professor in the Bangor Theological Seminary, Maine. He spent the period 1822-8 in Liberia, as agent of the American Colonization Society, being practically governor of the little settlement. He died at New Haven, Connecticut. See *Life* by Gurley (1839).

Ashraf, or ASHREF, tn. in Mazanderan prov., Persia, near the S.E. corner of the Caspian Sea, and about 50 m. W. of Astrabad; the residence of Shah Abbas the Great in the 16th century. Pop. about 6,000.

Ashta, tn. in Satara dist., Bombay, India, 80 m. N.W. of Bijapur. Pop. (1901) 12,409.

Ashtabula, city, Ashtabula co., Ohio, U.S.A., situated 3 m. from Lake Erie, 55 m. E. of Cleveland, with a fine harbour. It receives and ships great quantities of iron ore, and also ships coal. Pop. (1900) 12,949.

Ashtaroth. See ASTARTE.

Ashteroth-Karnaim (Gen. 14:5, etc.), a chief city of Bashan, noticed on monuments 1700-1500 B.C.; now the ruin Tell Ashterah in the Hauran.

Ashton, JOHN (1834), antiquarian, born in London; author of *Social Life in the Reign of Queen Anne* (1882), *History of 18th Century Chapbooks* (1882), *Old Times* (1885), *The Dawn of the 19th Century in Eng.* (1885), *Social Eng. under the Regency* (1890), *Hist. of Gambling in Eng.* (1898), etc.

Ashton, LORD, surname WILLIAMSON (1842), M.P. for Lancaster div. (1886-95), raised to the peerage (1895). He is a large landowner and manufacturer, and practically controls the linoleum industry.

Ashton-in-Makerfield, or ASHTON-LE-WILLOWS, tnship., Lancashire, England, 4½ m. S. of Wigan; manufactures locks, tools, etc.; extensive collieries. Pop. (1901) 18,695.

Ashton-under-Lyne, parl. and munic. bor., Lancashire, England, 6½ m. E. of Manchester. The ancient church of St. Michael was rebuilt in the 15th century. The public buildings include a technical school, school of art, and a free library. The public park was mainly the gift of Earl Stamford. Local industries are cotton spinning and weaving, silk spinning and dyeing, and the manufacture of hats, machinery, and beer. There are extensive collieries in the vicinity. Ashton returns one member to the House of Commons. From early times the place has belonged to the Asshetons. The local ceremony of 'riding the Black Lad,' still observed on Easter Monday, testifies to the obnoxious character of one of the former lords of the manor. Pop. (1901) 43,890.

Ashurada, isl. and Russian naval stn. at S.E. extremity of Caspian, at entrance of Bay of Astrabad. Acquired under Nicholas I., it had far greater importance and celebrity when it was the only Russian possession in the E. Caspian districts; now it is overshadowed by Krasnovodsk.

Ash-Wednesday (Ger. *Aschermittwoch*; Fr. *Le jour des cendres*), observed by most of the Christian churches, is the first day of Lent, and is said to derive its name from the custom of sprinkling ashes on the heads of penitents on that day—a custom that received papal sanction in 1191, but is believed to be six centuries older.

Ashwell, ARTHUR RAWSON (1824-79), born at Chelsea. He became principal of the Oxford Diocesan Training College at Culham (1853), of the Training College, Durham (1865), and of Theological College, Chichester (1870-9). He wrote *The Schoolmaster's Studies* (1860), *Lectures on the Holy Catholic Church* (1876), and the first volume of a *Life of Bishop Wilberforce* (1880).

Ashworth, HENRY (1794-1880), friend of Cobden, was born at Bolton, Lancashire. He was one of the founders and leaders of the Anti-Corn Law League, and wrote *Recollections of Richard Cobden* (1876; 2nd ed. 1881).

Asia.—*Confines and Dimensions.*—Asia was first distinguished from Europe by Mediterranean peoples. The name originally given to a small region of Asia Minor has been extended to the largest of the continents. So large is it that when the sun at the equinoxes is rising on its W. extremity, Cape Baba, in Asia Minor (26° E.), it is nearly setting on its farthest E. shores, Cape Dezhneff (170° W.), formerly known as East Cape, 6,000 m. away. For some weeks every year continual night reigns at the N. point, Cape Chelyuskin (77½° N.); while day and night are nearly equal at the S. point, Cape Burros (1° N.), 5,400 m. away, and within 90 m. of the equator.

The main feature lines are drawn out, on the whole, from W. to E., but converge towards the W. No physical barrier interrupts their passage westwards from Asia into Europe, and it is natural to expect a continuity of intercourse as well as of physical features between the two continents. Nevertheless, the Mediterranean and Black Seas form natural physical W. limits to the continent; so does the Red Sea, lying between Asia and Africa, which are connected by the isthmus of Suez, 72 m. wide. The modern Suez Canal may here be taken as the boundary. The Ural River and Mountains are the common conventional boundaries with Europe north of the Caspian. The Manych depression and the crest of the Caucasus are both used as the limits of Asia between the Black and Caspian Seas. The former is the better. The low N. coast, with great river estuaries in the W. and great river deltas in the E., borders the Arctic Ocean, into which the Taimyr peninsula projects, and out of which the New Siberian Islands rise. The Bering Strait, 36 m. wide, separates Asia from America; and St. Lawrence and the Aleutian Islands are reckoned with the latter, the Komandorski Islands with the former. The E. coast borders the Pacific. The mainland juts out in peninsulas and recurves in great gulfs, bordered on the outer side by a series of volcanic islands, which form a fringe to the continent; the Japan and Philippine Islands are the chief of these. Farther S. the Malay archipelago links Asia to Australia, and presents another boundary problem. The volcanic chain can be traced through the Moluccas and Sunda Islands, and it may be taken as the limit. Three great peninsulas, which have some analogies with those of S. Europe, project southwards.

Within these limits the continent has an area of over 17,000,000 sq. m.—roughly, one-third of the land of the globe. The coast-line bounding it is some 44,000 m. (three times the minimum possible periphery). The peninsular area amounts to 17 per cent. of the whole, a proportion surpassed only in Europe. Excluding this area, the continent is a compact quadrilateral, whose centre lies over 1,600 m. from any sea.

Physical Divisions.—Over one-fourth of the area lies below 650 ft. (1·3 per cent. being beneath the level of the sea), and one-seventh is over 6,600 ft. The bulk of the lowlands is found in the N., and the highest land lies in the centre. The continent may be divided into four great natural regions: (1) The Great Lowlands, in the N.; (2) the Great Central Mountain System; (3) the Eastern Margin of Fringing Basins and Volcanic Islands; (4) the South and South-west Table-lands of the Deccan and Arabia.

1. *The Great Lowlands* lie N. of a line drawn from the Sea of Okhotsk to the S. of the Caspian, whose surface lies 85 ft. below sea-level. There are three well-marked divisions: (1) The Turanian lowlands, separated by the Kirghiz steppe from (2) Western Siberia beyond the Yenisei, which rises to the more rugged region of (3) Eastern Siberia.

Turan (Western or Russian Turkestan) forms the Aralo-Caspian depression. It is a low, sand-covered plain, with few heights, except the Ust-Urt plateau to the E. of the Caspian, and the Kirghiz steppe to the N. Here all the rivers evaporate or enter lakes without an outlet, of which the chief are the Caspian, Aral, and Balkhash. The Ural flows to the first, the Amu and Syr (Oxus and Jaxartes) to the second, and the Ili to the third.

Western Siberia is a low, flat, marshy region, lying between the Urals and the main stream of the Yenisei. It is lowest in the W., where the Tobol and the Lower Ob flow northwards, and into the same depression the Irtish and the Ob flow from the S.E.

Eastern Siberia is a higher and more uneven land (composed largely of almost horizontally bedded Palæozoic and crystalline rocks, with some recent volcanic outcrops). The W. part is drained by the Upper, Middle, and Lower Tunguska Rivers to the Yenisei. The Lena flows through the central region. The E. is bounded by an arc of mountains which runs, under various names (Verkhoyansk, Stanovoi), from the Lena delta to Cape Dezhneff. The N. is drained by the Indigirka and the Kolyma.

2. *The Central Mountain System.*—The central mass of mountains and plateaus gradually widens from W. to E. At two points it is constricted, and the northern and southern lowlands come closely together—(*a*) in Armenia (separating the Caspian and Mesopotamia), and (*b*) in the Pamirs (separating Turan and the Indo-Gangetic plain). Between these mountain nodes are three series of chains—northern, central, and southern. A series of depressions lies between the northern and central sets of chains, and a series of plateaus between the central and southern ones.

West of Armenia the Caucasus and Yaila Mountains (continued westwards as the Balkans) sweep round the Black Sea depression. The plateau of Asia Minor to the S. is separated from this depression by the Pontic chain, and bounded on the S. by the Taurus chain. The E. and W. lines of heights which characterize the plateau project westwards as peninsulas, and the intervening hollows form bays in the Ægean Sea, and may be traced westwards through the archipelago to Europe. Much evidence of recent volcanic disturbances exists—*e.g.* the volcano Arjish, the ancient *Argæus* (14,000 ft.), surpassed by the twin-peaked Ararat in Armenia (17,000 ft.).

East of Armenia lie the Turan depression and the Iran plateau, separated by the Elburz, Khorassan, and Hindu-Kush Mountains. The N. ranges are not so definite here, but may be traced in the W. spurs of the Tian-Shan and their probable W. continuation in the Mangishlak. The Iranian plateau is largely composed of porous limestone, producing karst landscapes. On the whole it is a desert region, and only a few of the rivers run S.W. to the sea. On all sides it is bounded by narrow folded ridges and furrows, dominated by a massive chain of Cretaceous peaks. These 'retaining mountain walls' may be called the Zagros chain in S.W. Persia, the Makran chain S. of Baluchistan, and the Khirthar or Hala and Sulaiman ranges in the E., rising in terraces above the plains of the Indus.

The Pamir plateau is much loftier. It is bordered on the E. by the lofty Sarikol and Muztagh-ata ranges, and is drained to the W. by parallel streams which are forced to the N. by the Badakshan plateau, forming the Amu or Oxus.

The Tian-Shan forms the N. boundary of the Pamir plateau, from which its ranges strike both to W. and to E. The E. extension is by far the more important, and bounds the depression of Eastern or Chinese Turkestan, with the great Takla-makan desert, round whose margin flows the Tarim and its tributaries, fed by the melting snows of the mountains, and forming rich oases.

The Kwen-lun runs due E. from the Pamirs; has the E. Turkestan depression on the N., and the

Tibetan plateau on the s. It extends for 40° of lat. (nearly 2,300 m.), with a mean level higher than that of any other mountain chain.

The Tibetan plateau, like those of Iran and the Pamirs, consists of many bare west to east parallel ranges and troughs. Its average height is over 13,000 ft. It is bounded by lofty mountains, and most of the passes crossing them are over 15,000 ft. high. The Karakoram range, with the greatest glaciers in the world (Biafo, Baltoro, and Hispar), and some of the loftiest peaks (Godwin-Austen, 28,280 ft.), runs southeastwards from the Pamirs, and forms its western end. On the s. the Himalayas, with even loftier peaks (Mount Everest, 29,000 ft.) and almost as lofty passes, form the 'retaining wall.'

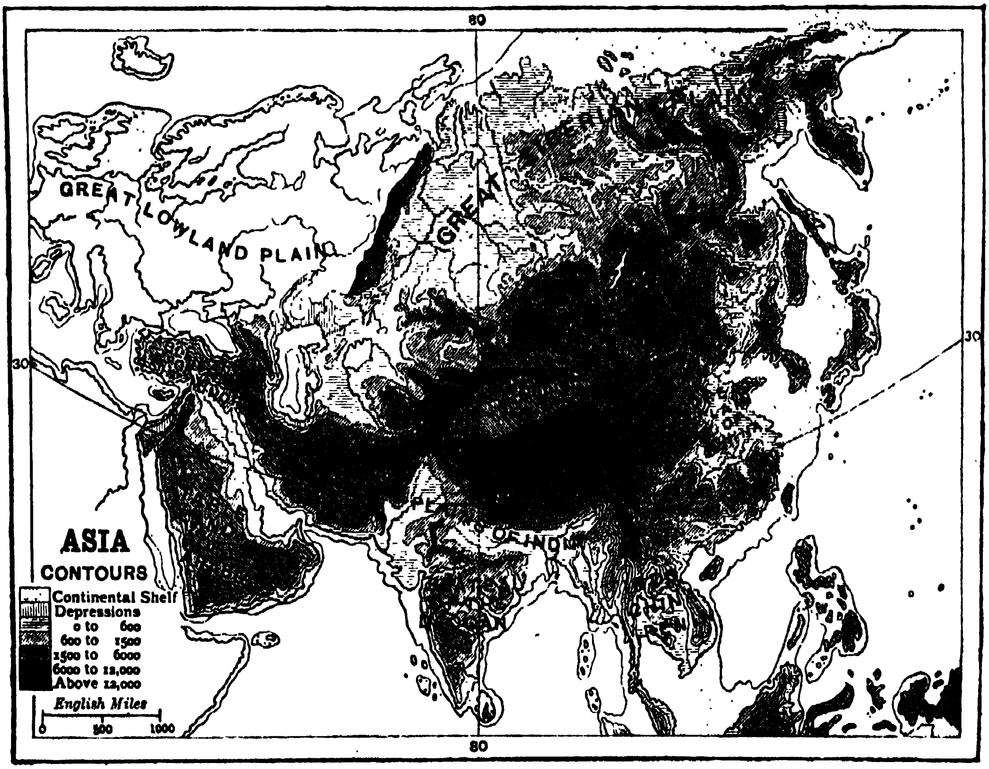
The Himalayas are pierced by the gorges of the Indus, Sutlej, Ganges, Gogra, Gandak, and Brahmaputra, which are said to have gradually eroded their beds as the mountains were upraised, and so to be antecedent to the ranges they pierce. The Himalayas therefore do not form the main divide between the rivers of Tibet, which flow into inland lakes, or the Irawadi, Mekong, or Yang-tse, and other rivers, which reach the sea through deep longitudinal valleys.

These continuations of the folded mountain system form the main lines of S.E. Asia. The w. chain passes by the Khasi and Arakan ranges and the volcanic Andaman and Nicobar Islands to the Malayan volcanic chain. The Irawadi basin and the Andaman sea lie between it and the central chain which forms the Malay peninsula. The plains, hills, and gulf of Siam lie farther to the E., and the E. Annam chain forms the coast of the S. China Sea.

All these mountains from Asia Minor to Malaysia were folded in the Tertiary period, and, like the Alps, are part of the younger mid-world mountain system, whose main feature lines are due to crustal movements, where active denudation has, as yet, affected only the superficial features.

The other mountains of Central Asia are of much older date, and resemble the highlands of Central Europe (drained by the Rhine and Elbe) rather than the Alps. The valleys have been hollowed out of plateaus characterized by foldings of the rock layers of ancient date. The land, however, is partly shaped by fractures, the most remarkable of which are the deep rifts in which the waters of Lake Baikal have accumulated to a depth of over 4,500 ft., so that the floor of the rift is some 3,000 feet below sea-level, while the land surrounding the lake rises to over 6,000 ft. above it. These rifts may be compared with those of similar origin in East Africa, or with Glen More in Scotland.

Round Lake Baikal the highlands can be grouped in four great masses—the Sayan and Altai in the s.w., and the W. Trans-Baikalian highlands to the S.E. and E. South of these lies the plateau of Mongolia. The highlands are much less lofty than the younger folded mountains. The Altai, which forms the loftiest highland (Byelukha, 14,800 ft.), rises N. of the plain of Dzungaria. This important gap in the Asiatic highlands connects the Siberian lowland with the plateau of Mongolia, and has as its southern rampart the Tian-Shan. The Altai Mountains have great glaciers in the upper valleys, and are clad with forests on the wetter northern slopes. They contain many minerals, including gold, whence their other name, the Kin-Shan or Gold Mountains. The Sayan Mountains are of similar character, but somewhat lower. The culminating line of the Trans-Baikal plateaus is commonly known as the Yablonoi (Apple), and more recently as the Malkhan Mountains. It does not, as was formerly supposed, form the main divide between the Arctic and the



Pacific river basins, although most of the W. plateau is drained to Lake Baikal, and the E. one to the Amur. The average elevation of these plateaus is between 4,000 and 5,000 ft., the highest point (Sokhondo) rising to 8,200 ft.

The Mongolian plateau averages between 3,000 and 4,000 ft. above the sea, and forms a stony steppe, here and there covered with sand, which gives it its native name of Shamo (Sand Sea), or Gobi, which, with the Takla-makan, comprises the Han-hai, or dried-up sea of the Chinese. The E. limit of this region is the escarpments of the so-called Khingan Mountains (6,000 ft.).

3. *The Eastern Margin of Asia.*—From Cape Dezhneff a series of escarpments can be traced along a great circle beyond the tropic of Cancer in the E. of Yünnan. In plan they are J shaped, a series of scarps, one of which is parallel to the meridian, the other parallel to the lines of latitude. The Stanovoi Mountains form the most N. pair, the Yablonoi the second, the Khingan the third, the Tai-hang-Shan, forming the E. and S. boundary of Shan-si, the fourth, the eastern to southern limits of Ho-nan the fifth, of Kwei-chou the sixth, and of Yünnan the seventh. This zigzag line is also of climatic and economic significance.

A somewhat similar succession of N. and S. alternating with E. and W. running feature lines can be traced in the coast-line and in the bordering islands and peninsulas of the extreme E.: (1) Along the coast there is the Stanovoi, or N. and W. coasts of the Sea of Okhotsk; (2) the Tungus coast, bordered by the Sikhota-Alin Mountains; (3) the Korea coast, which can be traced to the Saddle Islands in Hang-chou Bay; (4) the China coast, S. of Hang-chou to the Red River delta; and (5) the Annam coast, to the Mekong delta. In the peninsulas and islands there are: (1) the Aleutian Islands, continuing the Alaskan peninsula; (2) Kamchatka, the Kurile Islands, and W. Yezo (Hokkaido); (3) Sakhalin and the two parts of the main island of Japan, Honshiu; (4) Kiushiu and the Lu-chu Islands; (5) Formosa, the N. of Luzon, Palawan, and Borneo. In the S., beyond this series of islands, a second can be traced (1) through the Bonin and Marianne Islands, and (2) through the S. of Luzon, Mindanao, and the Moluccas.

Between these feature lines lie great depressions. In the W. there is land forming the Anadyr basin, Manchuria, the N. China plain, and the S. China and Tongking basins. In the E. they are covered with water, and form the Bering, Okhotsk, Japan, E. China, and S. China seas. In the extreme S. are the seas between the Marianne Islands and the Philippines, and the Sulu, Celebes, and Moluccas Seas. Only the Sea of Okhotsk extends from the western to the eastern feature line without a break, and the number of successive hollows, each eastern one deeper than its western neighbour, increases in the S. The S. of China contains a series of fracture mountains striking from S.W. to N.E.

Three great rivers and a number of smaller ones rise in the plateaus of Asia, and break across these eastern escarpments to the sea—the Amur, the Hwang-ho, and the Yang-tse-kiang.

The fringing islands are mainly volcanic, and form part of the 'girdle of fire' which encircles the Pacific and rises above the greatest depths of the ocean. The volcanic line is not continued through Palawan and Borneo, but forms a great arc through the Moluccas, and so joins the line already traced by the Andaman and Nicobar Islands, Sumatra, Java, and the Lesser Sunda Islands. Within this arc are the large islands of Borneo and Celebes.

4. *The S.W. Asiatic Table-lands.*—The Deccan and Arabia are geologically a continuation of Africa. The former resembles S. Africa, the latter N. Africa, in composition and structure. In the Deccan crystalline schists and old Palæozoic rocks, lying horizontally, form the framework. Above them the Gondwana rocks — 'sub-aerially formed river deposits,' probably dating from Carboniferous to Jurassic times—lie in the E., and resemble similar rocks in S. Africa. The W. contains a lava outflow of recent origin, the hygroscopic black soil of which is excellent for cotton-growing. This outflow may be associated with the fracturing which shaped the W. coast, which rises above the sea in a succession of terraces known as the W. Ghats or the Sahyadri Mountains. A series of shallows connects the Deccan with the islands of Ceylon, which consists of a low northern plain and lofty southern mountains.

The Arabian table-land is bounded on the W. by the great rift valley of the Red Sea, which is prolonged to the N. in the Jordan and the Orontes valley between Lebanon and Anti-Lebanon. The floor of the Dead Sea lies 2,600 ft. below the Mediterranean. The northern part of Arabia is composed of Cretaceous and Tertiary limestone; recent volcanic outpourings pierce the Archæan rocks of the west and centre; Tertiary limestone prevails in the south; while much of the surface of the south and east is covered with sand.

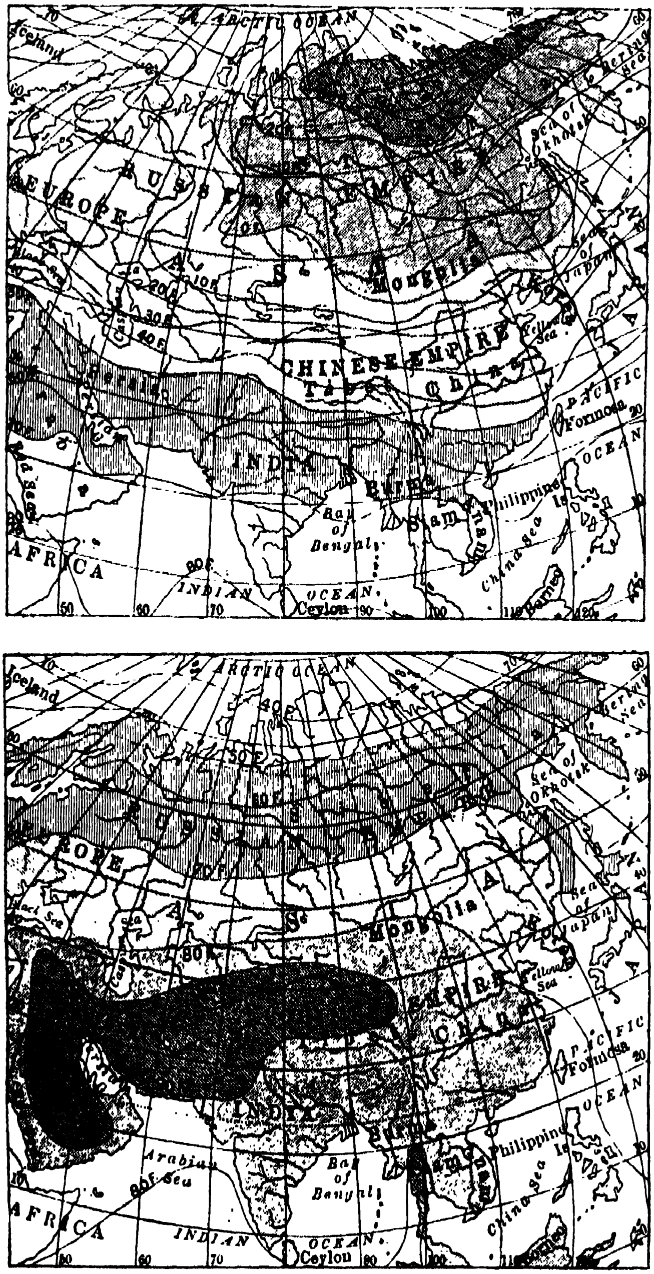
The Mesopotamian and Indo-Gangetic plains are formed of alluvium brought down by the rivers Euphrates and Tigris to the former, the Indus, Ganges, and Brahmaputra to the latter. These rivers all form great deltas.

Climate.—The southern chains of the Central Mountain system N. of the tropic form the climatic divide between the N. and S. of Asia, between the regions of cold and those of warm winters, between the regions of light summer rains and the monsoon lands, which, except in N. Arabia, receive heavy summer rains.

In winter a region of intense low temperature (under − 40° F.) exists in N.E. Siberia, with Verkhoyansk as its centre; and a high-pressure system extends over the continent, with a pressure of over 30·5 in. (reduced to sea-level) over Mongolia. The winds blow out from the cold continent to the warmer ocean, and deposit rain only on lands to the windward of mountains which deflect the air currents upwards—*e.g.* in W. Japan, in E. Annam and Ceylon, S.E. India, and in the western mountain regions, where winter storm winds penetrate from the western seas. The outflowing winds are cold, and cause cold winter seasons even in the extreme S. of China.

In summer a region with a mean temperature of over 90° F. (reduced to sea-level) exists in the S.W.; a low-pressure system extends over this region, with a pressure under 29·5 in. (reduced to sea-level). Towards the low-pressure axis, which is continued diagonally from S.W. to N.E., the winds blow inwards in the S. and E. from over warm seas, and are consequently laden with moisture, which is deposited on all the southern and eastern marginal lands, and is carried far into the interior. Rain also falls at this season most abundantly in the regions lying to the N. and W. of the low-pressure axis, so that the greater part of Asia receives most of its rain in summer. The lofty central regions, surrounded by mountains, are arid, for the winds blowing over these barriers have *föhn* characteristics.

Asia may be divided into ten climatic regions:—(1.) The region fringing the Arctic Circle, belonging to the cold, dry northern or Arctic climatic region, where the average temperature of the warmest month is not over 50° F. (2.) The Siberian continental region, N. of 50°, with a July temperature of 50° to 70° F., and a January temperature under 0° F. The rainfall is between 10 and 12 in. (3.) The Siberian coastal plain, with a similar summer and a slightly higher winter temperature, and a heavier rainfall. (4.) The Turanian region, with a July temperature between 75° and 90° F., a January temperature between 10° and 40° F., and a rainfall under 10 in. (5.) The Mediterranean region, with cool winters and warm summers, and rain during the winter half-year. (6.) The mountain region, from inner Asia Minor to the Khingan, and from the Altai to the crest of the Himalayas; dry everywhere, with very cold winters, especially on the lofty plateaus, and warm summers, especially in the depressions. Both annual and daily ranges of temperature are very great. The rainfall in this region is usually less than 10 in. (7.) The east monsoon region, including China and Japan, with a uniform July temperature of over 70° in Japan and over 80° F. in China, but with a January temperature that varies from 60° F. in the S. to below freezing-point in the N. The rain falls in summer, and also in winter on the W. coast of Japan, and is over 40 in. except in the N., and even 80 in. on some exposed mountain slopes. (8.) The south monsoon region, including India and Further India, where the temperature is never lower than 60° F., and the rain falls in the summer months, except in the S.E. of both peninsulas, where the maximum is in winter. (9.) The Indian desert region, which differs from the rest of India in having hardly any rain. (10.) The south-western desert region, including Arabia, with warm winters and very hot summers, and scarcely any rain, and that falling in winter, except in the southern mountains of Arabia.



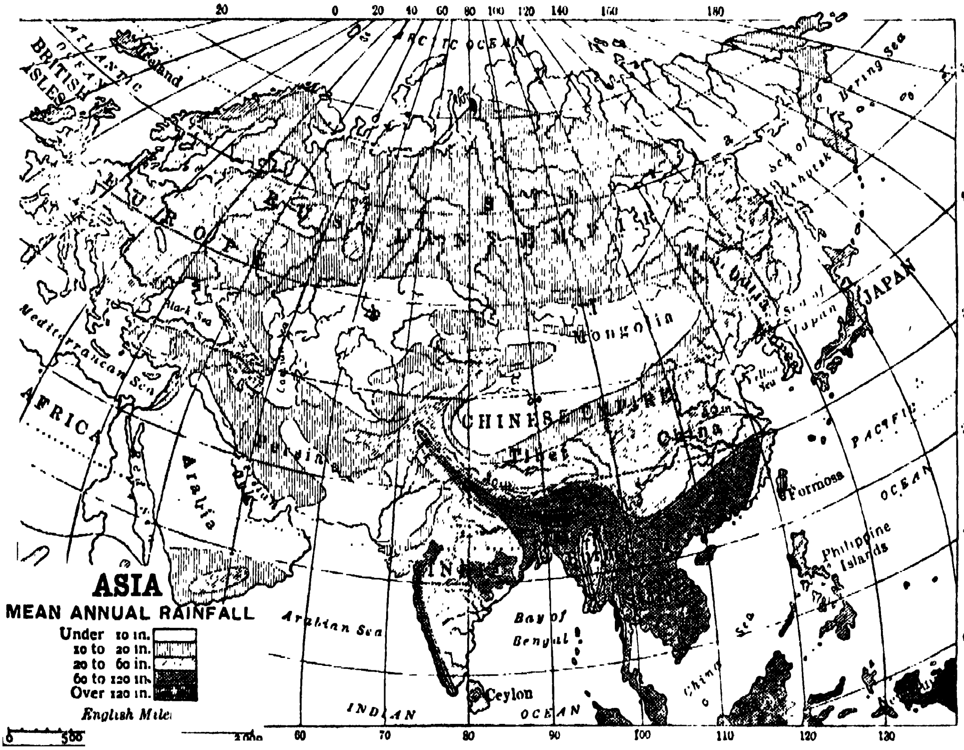
Asia—Isotherms, January and July.

Hydrography.—The rivers flowing to the Arctic Ocean are ice-bound in winter, and, as their upper waters thaw before the lower, great floods occur in the middle and lower basins every spring. The rivers rising in Tibet are fullest in summer, when the snow melts and the rainfall is abundant, causing heavy floods. The flood waters of the Yang-tse flow into the Tung-ting and Po-yang lakes, and those of the Mekong into the Tonle-sap, which act as regulators, and prevent disastrous floods. The rivers of the Deccan are low in winter, and raging torrents during the rains. The Mesopotamian rivers receive winter rains, and much melted snow in summer. Most of the lakes have no outlet, and are salt and brackish. Lake Baikal is drained by the Angara.

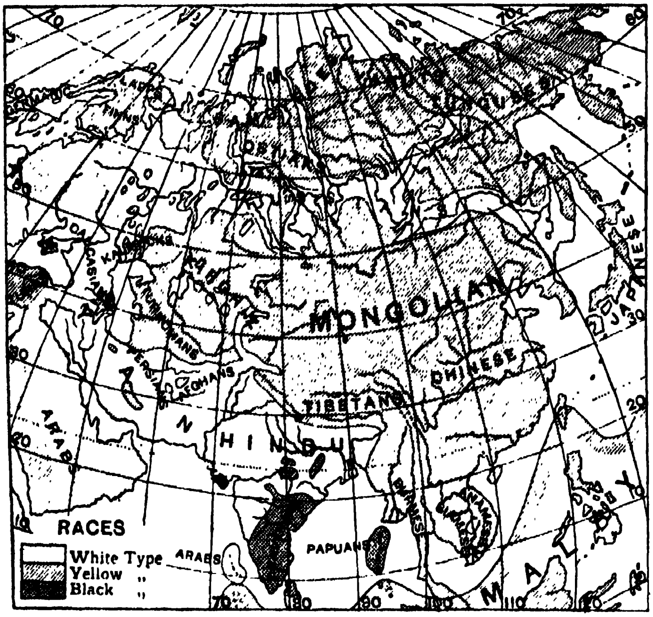
Minerals.—The mineral wealth of Asia is very great. The older mountains, like the Altai, the Khingan, and the Chinese mountains, are rich in many kinds of minerals. The gold-mining in the regions N. and S. of the Amur may one day rival that of the American mountains in similar latitudes on the other side of the Pacific. The precious stones of Ceylon, Burma, and the Yablonoi are famous. The coal and iron of China are among the richest known, and have scarcely yet been touched. Petroleum is abundant in Sumatra, Burma, and the Caucasus.

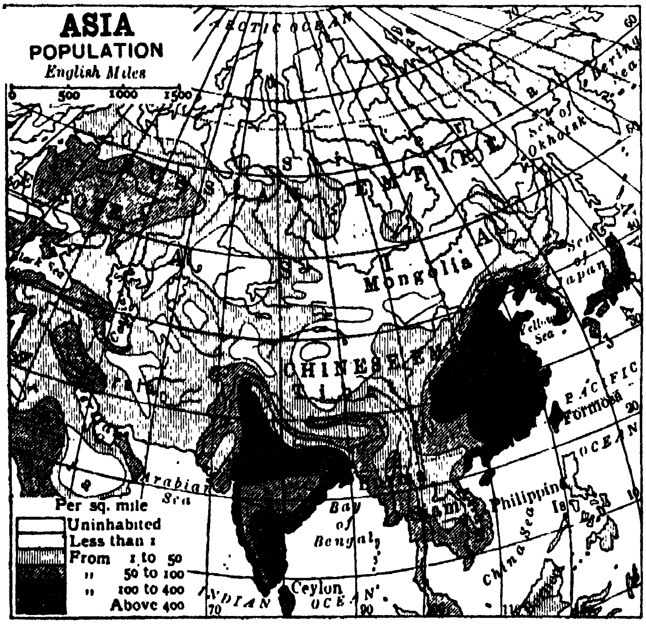
Vegetation.—The vegetation areas correspond to the climatic ones. The tundras are found N. of the Arctic Circle, and in patches as far S. as 60° N. (See TUNDRA.) The cold temperate forests of larch, spruce, fir, and birch lie between 50° and 60° N. The thin-stemmed trees are covered with lichens and dark-green mosses, and the forest is strewn with wreckage of storm and fire. The Mediterranean flora—plants with thickened leaves, bulbous roots, watery fruits, and other provisions for enduring a hot, dry summer—is found in Asia Minor and Syria.

The vine, fig, orange, citron, and pomegranate are among the fruits; the cedar, Aleppo pine, cork, and evergreen oak among the timber trees. The western steppes and deserts cover most of the plateaus of Iran, Arabia, and the heart of Asia Minor. Pistachio and junipers are characteristic bushes of the less arid parts, and date-palms are the trees of the oases. Salt steppes cover much of Iran, and sand-dunes Arabia, whose southern heights are a savanna region yielding important cultivated plants. Wherever water is found, vegetation flourishes. The central steppe and desert, the relatively low-lying Turan, Tarim, and Gobi region, have grasses and composites in the more favoured parts, willows and poplars along the stream courses, and tamarisks, artemisia, lilies, ranunculuses, crucifers, poppies, grasses, and other small-leafed plants in the higher areas. The saksaul is a characteristic shrub. Much of this region is covered with salt wastes or moving sand-dunes. The high mountain and plateau regions of Tibet, the Pamirs, and the great mountain chains are treeless. In N.E. Tibet meadows are found to about 13,000 ft. Above them are stony deserts, with a few saxifrages and pyrethrums; and still higher, from 14,500 ft. on an average, is perpetual snow. In the Pamirs the valleys have a scanty vegetation; stunted trees have been found at 23,000 ft. The S. slopes of the Himalayas have deciduous forests in the wet east, and evergreens in the drier west. The Amur region is a rich steppe land, with many umbellifers and spiræas transitional between the desert and the woodlands of the E. coast—*e.g.* in Sakhalin. In Japan two regions can be distinguished—the northern, with dense temperate forests of deciduous trees, thick undergrowth, and innumerable lianas, due to the heat and moisture of the vegetation period; and the southern, where evergreen trees abound, such as camphor, camellia, magnolia and other laurels, oaks, etc. Similar vegetation is characteristic of Korea. The savannas of Southern and Eastern Asia are found in the higher and drier regions, and produce the alang-alang grass, between three and five feet high. The wet jungles of heavy monsoon rains are characteristic of the lower flood plains of the S. and S.E. peninsulas and islands. Areca-nut, liquidambar, borassus and phœnix palms, pandanus, and tree-ferns are common, and, at higher levels, bamboos. In the E. of the S.E. islands the vegetation is more Australian in character, and eucalyptus trees predominate. The great central mountain system separates markedly different floras. A mixture of plants takes place and a region of mixed woods exists in Korea and Amuria, a transition between the Sino-Japanese region and the Siberian region, corresponding to the similar transition region in West Central Europe. The species in Arabia are closely related to those of N. Africa.



Animals.—The E. to W. trend of the mountains separates Asia into two great faunal realms, the palæarctic and the oriental, with a transition region in the E. The N. tundras and forests are the home of many fur-bearing animals. The seal, walrus, and other aquatic mammals are found in Arctic waters. The polar bear, reindeer, dog, arctic fox, wolf, ermine, lemming, arctic vole, musk ox, deer, and brown bear are among the characteristic mammals. Some tigers and Kamchatkan sheep are still found in the E. of this region. Ptarmigan, snow owl, and guillemot are among the birds. In the steppe lands S. of the forests a different fauna exists. The horse, ass, and camel are among the animals of this region; and the argali, a large, handsome sheep, lives in the mountains. The jerboa, marmots, some deer and gazelles, and a few tigers are found. The lofty plateau of Tibet, with its severe climate and scanty vegetation, deserves to be reckoned as a special region. The yak, wild ass (kulan), Hodgson's argali, and some rodents are peculiar to it. The Sino-Japanese region is a transition one for animals as well as for plants. Monkeys are found, and tigers exist on the mainland. Many deer, some of which exchange white-spotted coats for brown winter ones, are found. The sea-otter occurs round the coast. The giant salamander is peculiar to Japan. The pheasant and silkworm are of Chinese origin.





Human Geography.—The population is estimated at 850,000,000, or 50 inhabitants per sq. m. Vast areas are almost uninhabited. The densest population is found in the monsoon area, especially in the Ganges, Lower Hwang-ho, and Yang-tse basins, round the coasts of the Deccan and China, in S. Japan, and in Java, where more than 350 people live in each square mile.

Economic Conditions.—In the north the reindeer is domesticated, and hunting and fishing are the main occupations. Among the nomads of the grass lands flocks and herds form the chief wealth. Agriculture has long flourished in the mountain valleys. In the Asia Minor and Iranian plateaus agriculture is carried on along with pastoral occupations; but farther E., in the mountains, the people are mainly herdsmen. Mesopotamia, India, the Indo-Gangetic plain, and the Deccan are agricultural regions; and the W. slopes of the W. Ghats, and the flood plains of the great rivers, the Ganges, Brahmaputra, Irawadi, and Salwin, the coasts of Indo-China and the south-eastern islands, are regions where plantation cultivation has developed. In the interior of Indo-China and the south-eastern islands hunting, with a slight cultivation of the soil, is carried on. In most of China and Japan the cultivation is so careful that we may distinguish it as spade cultivation. In Korea and round the Yellow Sea, and up the valley of the Amur, agriculture is the chief occupation. The tribes of the forest north of Korea are mainly hunting tribes.

Races.—Asia is the home of the Mongolians. They are divided by Keane into the Northern Mongols, found throughout the lowlands, in parts of Iran, and Asia Minor; the Southern Mongols, in Tibet, Indo-China, Formosa, and some parts of Malaysia; and the Oceanic Mongols, found in Malaysia, the Philippines, Formosa, and the Nicobar Islands. In W. Asia the white man predominates, mainly the central or alpine type, with round heads, pale or swarthy complexion, and brown eyes and hair. In the S.E. are numerous oceanic negroes, mainly Negritos. The Northern Mongols, or Mongolo-Tartars, or, better, Mongolo-Turki, are related by their languages, known as the Finno-Tartar or Ural-Altaic group. They include such different races as the Japanese in the E., the Magyars and the Finns in Europe, the semi-nomadic Mongols and the Khirgiz and Turkomans of the steppes, the agricultural Turks of the Asia Minor and the Balkan (European) peninsulas in the W., and the Manchus and Koreans in the E., while the Northern tribes are nomadic fishers and hunters, with herds of reindeer. The Southern Mongols are darker than the Northern ones, and their speech differs mainly in being monosyllabic. They include such different peoples as the Tibetans, Gurkhas, Burmese, the different tribes of the mountains between

Tibet and Burma, the Lao and other tribes of N. Siam, the Annamese, the Cochin-Chinese, and the Chinese themselves. The Oceanic Mongols are less homologous, and are mixed with Negritos in many regions. They are similar in size and of the same colour as the Southern Mongols, but their cheek-bones are not so prominent. They speak languages of the group known as the Oceanic or Malay-Polynesian. They may be divided into Proto-Malays and Historic Malays. The former are found in Sumatra, Java, the Sunda Islands, and Celebes, in the Dyaks of Borneo, Tagals and Bisayans of the Philippines, the natives of Formosa, and those of the Nicobar Islands. The Historic Malays are found in the Malay Peninsula and the coast-lands of Borneo and the Moluccas, in the smaller islands to the S. of the peninsula, in Ternate and Amboyna, and in parts of the Sulu archipelago. Many of these are Mohammedans, but the peoples in the interior are fetish worshippers.

In the Asia Minor and Iranian plateaus, as well as in the plains of Hindustan, numerous peoples are found corresponding to the southern or Mediterranean-European type—*e.g.*, some Kurds, most Persians, Afghans, Dards, Kafirs, and Hindus. The Armenians and many inhabitants on the northern slopes of the Hindu-Kush are of the central or mountain type of white men. The Negritos are found in the Andaman Islands in the interior, in some of the south-eastern islands, and to them belong the Aetas of the Philippines.

Political Divisions.—In the W. the Turkish empire, Persia, and Afghanistan, in the E. the Chinese empire, Korea, Japan, and Siam, have not yet been absorbed by European powers. The northern lowlands are controlled by Russia; the Deccan and the land around it form British India. Ceylon, much of the Malay Peninsula, the N. of Borneo, and numerous smaller possessions, such as Cyprus, Aden, most of the islands in the N. Indian Ocean, Hong-kong, and Wei-hai-wei (N. China), are under British control. The French own the eastern part of the Indo-China peninsula, and have several small colonies in India, and one in China. Portugal possesses three settlements in India, Macao in China, and the eastern half of the island of Timor. The Philippines belong to the United States of America. The other islands of S.E. Asia belong to the Dutch. Germany has a footing in China at Kiao-chou.

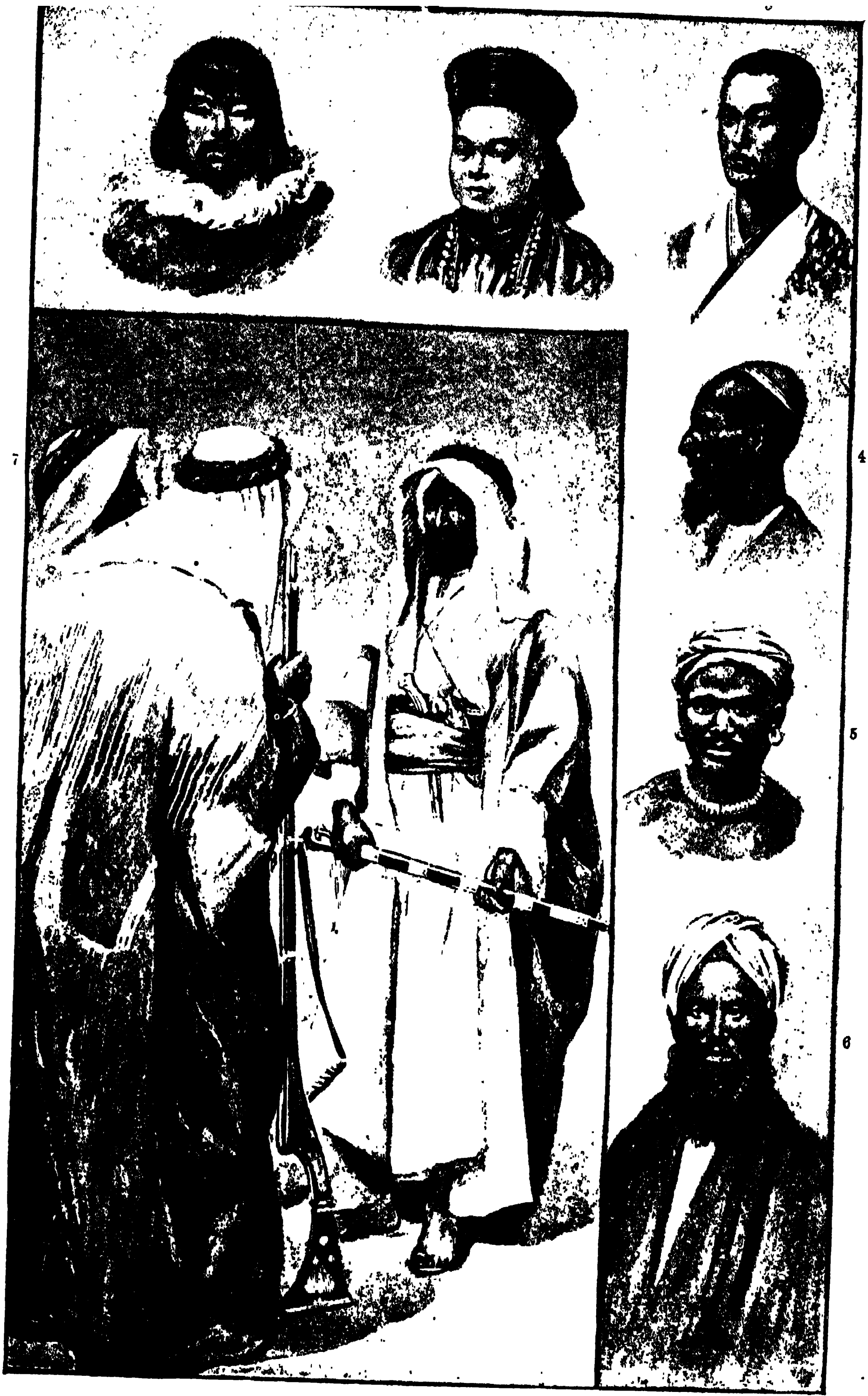
Religion.—Asia is the home of the great religions of mankind. In the W. Judaism, then Christianity, then Mohammedanism sprang up on the confines of the Arabian desert. Mohammedanism prevails over the whole of the S. and W. of Asia, S. of 55° N. and W. of 90° E., except in the Deccan and Tibet. It is also the religion of the majority in the Malay Peninsula and many of the south-eastern islands. In India, Brahminism and its offshoot, Buddhism, arose. Brahminism still prevails in India, and Buddhism throughout the Chinese empire, Japan, Indo-China, and Ceylon.

Bibliography.—General: A. H. Keane, *Asia*, 2 vols. (*Stanford's Compendium of Geography*, 1896); E. Reclus, *Nouvelle Géographie Universelle*, vols. vi.-ix., xiv. (or Eng. trans.); W. Sievers, *Asien* (1894). Physical: P. Kropotkin, 'The Orography of Asia' (*Geog. Jour.*, February-March 1904); E. Suess, *Das Antlitz der Erde*, vol. iii. (or Fr. or Eng. trans.). Climate: Buchan, Bartholomew, and Herbertson, *Atlas of Meteorology* (1899); J. Hann, *Klimatologie* (2nd ed. 3 vols. 1897); A. J. Wosikow, *Klimate der Erde* (2 vols. 1887). Vegetation: O. Drude, *Die Florenreiche der Erde* (1884) and *Atlas der Pflanzenverbreitung;* A. F. W. Schimper, *Pflanzengeographie* (1898; Eng. trans. 1903). Animals: A. R. Wallace, *Distribution of Animals* (2 vols. 1876); Marshall, *Atlas der Thierverbreitung*. Man: G. Gerland, *Atlas der Anthropogeographie*.

Asia, Western. By Western Asia is meant all that part of Asia which lies westward of a line drawn from the Caspian Sea to the Persian Gulf. Within this area we must look for most of the races and tribes mentioned in Gen. 10, the oldest ethnographical table that has come down to us. It is watered by two great rivers, the Euphrates and Tigris, which in their lower course enclose the rich alluvial plain of Babylonia. On the S. the Persian Gulf gives access to the Indian Ocean and the products of Arabia and India; to the W. the Mediterranean brings Asia into contact with Egypt and Europe. The peninsula of Asia Minor, with its thick forests and fertile valleys, forms, as it were, a bridge from one continent to the other. The art of Asia was carried to Europe, and Europe in return sent to Asia new products and artistic designs. With the exception of S. Arabia, W. Asia may be said to belong to the temperate zone. But geographical differences produce within this zone a great variety of climate.

The races of men represented within the region are similarly various, though the prevailing type is the Semitic. The primitive seat of the Semitic race was probably N. Arabia. In Babylonia the Semites were preceded by the Sumerians, who spoke an agglutinative language; their precise racial affinities, however, have not yet been settled. Eastward and northward, in Elam and Armenia, were other races, also non-Semitic. The race which inhabited Elam, where it has left us inscriptions in agglutinative dialects, is, like the Sumerian, of uncertain relationship; but the older races of Armenia were Caucasian in their origin. It was not until the 7th century B.C. that the highlands of Armenia were occupied by an Indo-European people. These latter came from the northern part of Asia Minor, into which they had migrated from Europe, the southern portion of the peninsula being peopled by a race (or races) who were probably Caucasian. The most important among the latter for many centuries were the Hittites, whose home was in Cappadocia and the Taurus. They are represented on the Egyptian monuments with yellow skins and black hair, beardless faces, and projecting jaws. From the same sources we learn that the Amorites of Syria belonged to the white race. They were blond and light-haired, with blue eyes and abundant beard, and of tall stature. They seem to have been an eastern offshoot of the Libyans, who are similarly depicted.

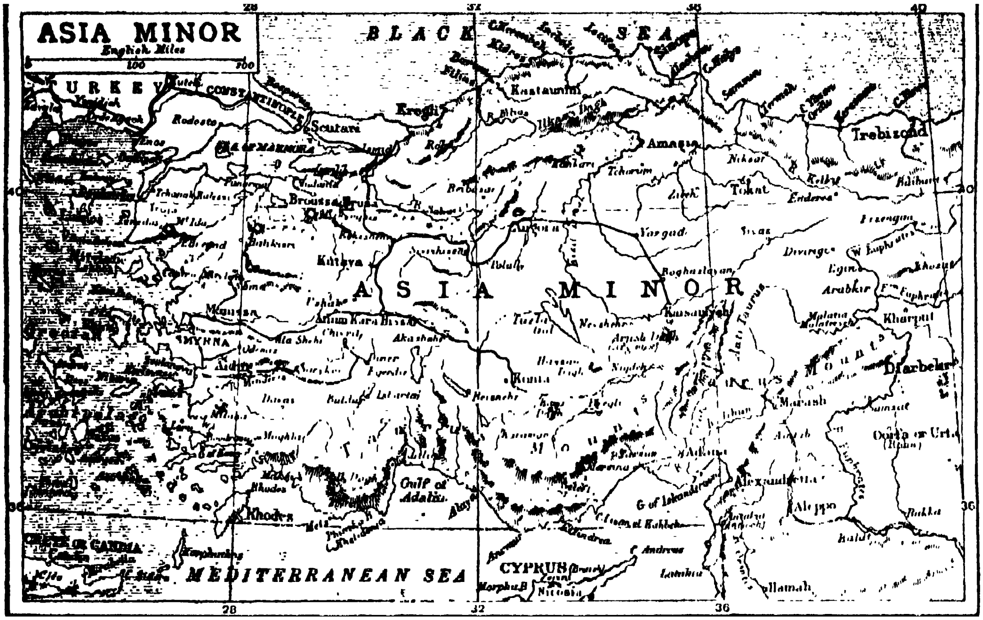
Babylonian civilization was a continuation of Semitic and Sumerian elements, the Sumerian element being the earlier. It reflected the mixed character of the population of the country, and had a profound effect upon the rest of W. Asia. Already, in B.C. 3800, Babylonian armies made their way to the shores of the Mediterranean, bringing with them the culture of Babylonia, which included its script and language, religion and laws. Two thousand years later, the cuneiform characters and language of the Babylonians had become the medium of literary and diplomatic intercourse throughout W. Asia, and Babylonian and Assyrian colonies had established themselves even in Cappadocia; and the Egyptian Pharaohs carried on their foreign correspondence in the Babylonian language and script. Before the 10th century B.C. the cuneiform syllabary had been superseded in the W. by the so-called Phœnician alphabet; two centuries later, however, it made up for its loss of ground in Syria by penetrating into the highlands of Armenia. But the simpler Phœnician alphabet generally supplanted it, and a new eclectic form of culture, which we may term Phœnician, took the place of the older Babylonian. Meanwhile a religion had



Asiatic Types.

1. Samoyede. 2. Chinese. 3. Japanese. 4. Afridi. 5. Malay. 6. Hindu. 7. Arabs.

arisen in Palestine which was destined to have a profound effect upon the civilized world, and which found its literary instrument in the Phœnician alphabet. The Jewish exile brought it under the immediate influence of Babylonian culture, and so united the two streams of literary thought which were flowing from Palestine and Babylonia. The empire of Asia now passed into the hands of the Indo-European Persians, whose official religion was Zoroastrianism, and who were therefore inclined to look with favour on the adherents of a monotheistic form of faith. The Greek conquest of Asia, however, brought with it once more a revival of polytheism, this time in an artistic form. But the triumph of polytheism was short-lived. Judaism made way for Christianity, which, like Judaism, arose in Western Asia, and from thence spread throughout the world. Henceforth the supremacy of Christianity in the civilized East was disputed only by Mohammedanism, itself also of Western Asiatic origin, but unable to adapt itself to the higher culture of the European peoples. With the rise and decline of Mohammedanism, the influence of Western Asia upon the history of the world has come to an end. It has given us our religion, our alphabet, and the elements of our civilization; it was the earliest home of the arts and sciences, of organized government and legal codes.



Asia Minor, or ANATOLIA. The name is generally applied to the western projection of Asia, to distinguish it from the huge continent of which it forms a western peninsula. The Greeks called it Anatolia, while the Turkish name, Anadoli, was usually applied to the W. and N. provinces only. Rum, reminiscent of 'Rome,' is also another local synonym for it, though Rum excludes Cilicia. Washed on three sides by the sea—the Black Sea and the Sea of Marmora, with its straits, in the N., the Ægean Sea in the W., and the Mediterranean Sea in the S. it forms a sort of bridge between Europe and Asia. The E. boundary is an arbitrary line which may be drawn from the S.E. side of the Gulf of Alexandretta or Iskanderun in a N.E. direction to the S.E. corner of the Black Sea, a little to the S. of Batum. From Cape Baba, its W. extremity, to the vicinity of the banks of the Euphrates, in the E., is about 700 m.; and from Sinope, on the shores of the Black Sea, in the N., to Cape Anamur, in the S., the distance is over 400 m.

Physically, Asia Minor is a plateau sloping from the great Taurus range in the S. to the mountains bordering on the Black Sea in the N., and westwards towards the shores of the Ægean Sea. Numerous passes through the Taurus and Anti-Taurus allow communication with the eastern portions of the Turkish empire; one of them, 'the Cilician Gates,' between Bulgar Dagh and Ala Dagh, in the Taurus range, has been of great historical importance. The general elevation of the plateau is from 2,000 to 3,000 ft. Transverse ranges intersect the plateau, and these are almost at right angles to the flanking ranges, while numerous isolated peaks rise at intervals. The chief summits are the volcanic mountain Arjish Dagh (12,650 ft.; anc. *Argæus*), lying to the W. of the Anti-Taurus range; Bulgar Dagh (11,400 ft.), in the Taurus range; Mount Olympus (6,500 ft.), near Brusa, in the N.W.; and Mount Ida (5,750 ft.), which overlooks the plains of Troy, towards the Hellespont. The central plateau, an area of Tertiary lacustrine formation, consists of sandy deserts, salt steppe lands, marshes, fertile valleys, and numerous salt lakes, the largest being Tuz-göl, 70 m. N.E. of Konia. Between the western mountains and the Ægean Sea there are plains and valleys of great fertility. The Black Sea coast is rocky, and almost unbroken; the W. coast is deeply indented, and is fringed with numerous islands; the S. coast contains the Gulfs of Adalia and Alexandretta. The rivers draining to the Black Sea are the Yeshil Irmak (Iris), the Kizil Irmak (Halys, over 500 m. long), and the Sakaria (Sangarius).

The minerals of the peninsula have a wide range, but the deposits of gold, silver, lead, antimony, coal, lignite, and chrome have not been worked to any extent. Coal and lignite to the extent of some 400,000 tons are annually mined in Brusa. There is a small production of antimony, and Eskishehr supplies some 150 tons of meerschaum annually.

The islands of the Archipelago, the 'Vilayet of the White Sea Islands,' have a fine climate, and produce great quantities of honey, fruit, wine, and oil. Samothrace, Tenedos, Lemnos, Imbros, Mitylene, Kios, Kos, Nicaria, Patmos, and Rhodes are well known in classical history. The plateau has severe winters, with such heavy snowfalls as to render communication difficult; summers of excessive heat follow. The S. and W. coasts have mild winters and temperate summers, because of the sea breezes. The rainfall is supplemented by heavy dews. The N. coasts have hot summers and cold winters, with much rain and snow. The central plateau is in general healthy, but some of the higher valleys are not so; and malaria, due to heat and moisture, is prevalent in the coastal plains towards the Black Sea.

Agriculture is in a backward state. The plateau yields wheat, and many of the lower valleys produce wheat and barley, while the lowlands give good crops of millet and rice. The vine, the olive, the orange, the lemon, the apple, and the pear flourish; and rice, cotton, opium, poppies, and madder are cultivated largely. Forests of oak, fir, beech, ash, and plane still clothe the slopes along the Black Sea coast, but have almost disappeared from the mountain lands, which were once densely wooded.

The wild animals include the wolf, the bear, the hyæna, the lynx, and the wild boar. Camels and asses are used for beasts of burden, horses for riding, the buffalo for farm work, and the Angora goat is bred for its characteristic silky hair. Bees are kept in great numbers.

The people are of mixed races, the Turkish being the predominant. Greeks and Armenians are the trading races. Jews, Arabs, and Kurds form the greater portion of the remainder. Turkish is the official language, but different languages prevail in the several districts. Agriculture occupies most of the people. Mining gives employment to many; others engage in the production of silks, in the weaving of carpets, shawls, and mohair cloth, and in the manufacture of wine; the fisheries in the Ægean Sea occupy others.

The principal exports are wheat, cotton, dried fruits (figs and raisins), wine, oil, silk, mohair, carpets, tobacco, valonia (acorn-cups for tanning), meerschaum, honey and beeswax, ores (silver, lead, and antimony). The imports consist chiefly of cotton fabrics, metal ware, sugar, coffee, petroleum, woollen goods, and coal. At least half the trade is carried on with Great Britain. The chief ports are Trebizond (40,000), Samsun, Sinope, Smyrna (201,000), Adalia (27,000), and Mersina.

The roads are in a wretched condition, and internal trade is thus greatly hindered; but some attention is now being paid to them. The present railways are (1) the Anatolian (640 m. in 1902), from Scutari, on the Bosporus, to Eskishehr, where it divides, one branch going to Angora and the other to Konia, from which a line is projected by Adana, Mosul, Bagdad, and Basrah, with branches, and an extension to Koweit, at the northern end of the Persian Gulf; (2) the Mudania-Brusa (25 m.); (3) the Smyrna-Kassaba (321 m.); (4) the Aidin (320 m.); and (5) the Mersina-Adana (42 m.).

The country is one of the great divisions of the Ottoman empire, and is divided into the following vilayets:

Vilayets.	Area in Sq. Miles	Pop.
Ismid	4,323	222,800
Brusa	28,486	1,626,900
Bigha	2,625	129,400
Archipelago	2,744	325,900
Smyrna	20,844	1,396,500
Kastamuni	19,184	1,018,900
Angora	26,055	802,900
Konia	39,681	1,088,000
Adana	14,359	403,400
Sivas	24,240	1,086,500
Trebizond	11,850	1,163,800

In addition to the seaports, the following towns deserve mention: Brusa (76,303), Scutari, Angora, Konia (44,000), Sivas (43,100), Kaisarieh (72,000), Tarsus, Adana, Erzerum, and Van.

The Mohammedans are in the majority on the mainland, the Christians in the Ægean Islands. The Mohammedans are estimated at over 7,000,000; Armenians, 576,200; other Christians, 972,300; Jews, etc., 184,600. The total population is 9,355,000. See Ramsay's *Historical Geography of Asia Minor* (1890); Sir C. W. Wilson's *Handbook* (Murray's) *for Travellers in Asia Minor, etc.* (1895); Earl Percy's *Highlands of Asiatic Turkey* (1901).

Asia, a British 84-gun ship, launched in 1824, and in 1903 doing duty as guardship of reserve and flagship of the admiral superintendent at Portsmouth. The ship-name dates from about 1678, and is associated with the capture of Martinique (1794), the battle of Navarino (1827), and the Syrian war (1840).

Asiatic Quarterly Review, THE, was founded in 1886 for the discussion of questions relating to the Indian empire and the East. Its scope was extended to Africa and the British colonies in 1891, when the full title of the publication was enlarged to *The Imperial and Asiatic Quarterly Review and Oriental and Colonial Record.* It is published by the Oriental Institute, at Woking.

Asiatic Society, ROYAL, founded in London in 1823 for the furtherance of science, art, and literature in relation to Asia, incorporating the Literary Society of Bombay (1819) and Madras (1827) and the Asiatic Societies of Ceylon and China. Since 1833 it has published the *Journal of the Royal Asiatic Society.* It established the 'Oriental Translation Fund' in 1828, which has published many volumes of Eastern literature. The oldest Asiatic society is the Dutch Colonial, formed at Batavia in Java in 1779, which has issued three important publications—*Verhandelingen* (Proceedings), since its foundation; *Tijdschrift voor Nederlandsch Indië,* since 1842; and *Tijdschrift voor Indische Taal-, Land-, en Volkenkunde,* since 1853. But the Asiatic Society of Bengal is nearly as old, having been founded in 1784; it has issued *Asiatic Researches* (1788-1836) and *Journal of the Asiatic Society* (since 1832). The Americans have the American Oriental Society, founded at Boston in 1842; its *Journal* has appeared since 1850. Several countries on the Continent have societies which devote themselves to the study of Asiatic antiquities, history, etc.—*e.g.* the Société Asiatique (1821) and Société Orientale de France (1842), at Paris; the Deutsche Morgenländische Gesellschaft (1845); Società Asiatica Italiana; and Koninglijk Instituut voor de Taal-, Land-, en Volkenkunde van Nederlandsch Indië, at Amsterdam. Outside of Europe the principal Asiatic societies are the Asiatic Society of Japan, at Tokyo, and the Peking Oriental Society.

Asiatic Turkey, the possessions of the Turkish empire in Asia, consists of Asia Minor or Anatolia, Armenia, Kurdistan, Mesopotamia, Syria (Palestine), and Arabia, with an area of between 650,000 and 700,000 sq. m., and a pop. of about 17½ millions.

Asinius. See POLLIO.

Asirgarh, a fortress in Nimar dist., Central Provinces, India, 87 m. S.E. of Indore, standing on a detached spur (850 ft. above the plain) of the Satpura range. It was captured in 1600 A.D. by Akbar, and became a British possession in 1819.

Aske, Robert (d. 1537), led the Yorkshire Pilgrimage of Grace, an insurrection caused by the suppression of the smaller monasteries and other unpopular measures. On the king's sending promises of pardon, the rebels disbanded. Aske, however, was executed at York. See Hall's (1809) and Wriothesley's (1875) *Chronicle.*

Askelöf, Johan Kristoffer (1787-1848), leading Swedish publicist; first made himself famous as an ardent disciple of the new romantic school, and in 1802 started their chief literary organ, *Polyfem,* which gave its name to the party. He became editor of the conservative organ, *Svenska Minerva* (1830-48).

Askew, Anne (1521-46), English Protestant martyr, was tried for heresy before the lord mayor, Bonner bishop of London, and others in 1545, but set at liberty. Again accused of heresy, she was sent to the Tower and tortured; but, refusing to recant, was burned at Smithfield. See Bale's two Tracts *On the Examination of Anne Askew* (1546 and 1547); Foxe's *Acts and Monuments.*

Askhabad, or Askabad, tn. and fortress of Transcaspia, capital of the province, at foot of the Kopet Dagh, in oasis of Atek, 830 ft. above sea-level. Before its Russian conquest in 1881 it was a place of 500 tents; now it is an important mercantile and political centre. Pop. (1897) about 20,000.

Askja, an immense volcano, or rather a crater valley 3,000 ft. deep, in Iceland, occupying an area of 25 sq. m., still sporadically active. All around it stretches the vast lava desert of the Odadahraun, extending over 1,500 sq. m. There was a great eruption in 1875, when some of the ashes ejected were washed ashore at Stockholm.

Asmara, tn., Eritrea, Africa, 55 m. s.w. of Massowah, with which it is being connected by rail; is the seat of the government in the Italian colony on the coast of the Red Sea. About 6 m. from it are promising gold mines.

Asmodeus, a corruption of Æshma Dæva, an evil genius in the ancient Persian religion. He became known among the Jews through the story of Tobit, a Jew who was taken captive to Nineveh, and the scene of whose adventures (in which Æshma Dæva, or Asmodeus, figures prominently) is laid in Media. (See the apocryphal *Book of Tobit.*) Asmodeus is frequently encountered in mediæval literature, and he is the supernatural cicerone in Le Sage's *Le Diable Boiteux.*

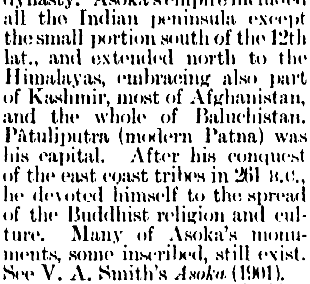
Asmoneans, or Hasmoneans, the Greek denomination of the first members of the Jewish dynasty of the Maccabees.

Asnières, tn., France, dep. of Seine; a residential suburb of Paris, to the n.w.; 2 m. from the fortifications, on the l. bk. of the Seine. Pop. (1901) 31,336.

Asoca (*Jonesia asoca*), an Indian tree of the order Leguminosæ, named after Sir William Jones. It is common throughout India, where it is associated with poetry and mythology, and is also cultivated in Mauritius.

Asoka, emperor of India from b.c. 272-232, styled in his own edicts 'King Priyadarsin' (*Pâli,* Piyadasi), which signifies 'the Humane,' was alike notable as a great monarch and as a most zealous propagandist of Buddhism. He was the third emperor of the Maurya dynasty. Asoka's empire included all the Indian peninsula except the small portion south of the 12th lat., and extended north to the Himalayas, embracing also part of Kashmir, most of Afghanistan, and the whole of Baluchistan. Pâtaliputra (modern Patna) was his capital. After his conquest of the east coast tribes in 261 b.c., he devoted himself to the spread of the Buddhist religion and culture. Many of Asoka's monuments, some inscribed, still exist. See V. A. Smith's *Asoka* (1901).

Asolo, small fort. tn. in Treviso prov., Italy, 18 m. n.w. of Treviso, at the base of a hill of over 1,000 ft., has ruins of a 13th century castle; a favourite resort of Robert Browning, and possibly the source of inspiration for parts of *Pippa Passes* and *Sordello.* The old castle was the residence (1489-1515) of Queen Caterina Cornaro, the last queen of Cyprus. Pop. (1901) 5,832.



Asp.

Asp (*Vipera aspis*), a poisonous snake belonging to the family Viperidæ, about two feet in length, exceedingly common in Italy and in the wooded elevated regions of S. Europe generally. It is also found on the opposite shores of the Mediterranean—*e.g.* in Algeria. The name asp is, however, frequently used in a loose sense to indicate a poisonous serpent, as of the serpent by means of which Cleopatra of Egypt caused her own death.

Aspalathos, Dalmatia. See Spalato.

Asparagine, amido-succinamic acid, $NH_2CO.CH_2CH(NH_2)CO.OH$, occurs in asparagus, peas, and many other plants. It can be prepared synthetically, and forms transparent, colourless crystals (sp. gr. 1·52), which are soluble in water.

Asparagus, Common (*Asparagus officinalis*), belongs to the order Liliaceæ, is found throughout Europe, and grows wild on the south and south-western coasts of England. It is cultivated in gardens as a vegetable, and in spring produces from its perennial underground stems (rhizomes) numerous fleshy, aerial stems bearing small scale-leaves. The plant flowers in August, and produces small scarlet berries, with black seeds. The seed of asparagus should be sown thinly on ground that has been well dug but not manured, any time from March to June. The drills should be about a foot apart and an inch deep. When the seeds are placed, the ground should be pressed and raked over. The plants make more root than top the first year; but if they are kept clear of weeds, and the ground stirred often between them, they will grow vigorously the second year, and be fit to plant out the following spring. Beds of asparagus may be made as late as September. Established beds of asparagus require top-dressing every spring.

Asparagus Stone, certain varieties of apatite.

Aspasia. (**1.**) Of Miletus, the most famous of Greek courtesans. She came to Athens, and Pericles lived with her until his death. Though an Athenian could not legally marry an alien, their son was legitimized by a decree of the people. Aspasia shared to the full the highest culture of the day; popular gossip gave her the credit of much of Pericles's statesmanship. When she was prosecuted for impiety, only his personal influence procured her acquittal. The best intellects of Athens, including Socrates, seem to have met in her house. After the death of Pericles she was connected with Lysicles, a demagogue. See Suidas's *Aspasia,* Landor's *Pericles and Aspasia* (1836), and Becq de Fouquières's *Aspasie de Milet* (1875). (**2.**) The younger, a Phocæan, the favourite mistress of Cyrus the younger. After his death she became the mistress of his brother Artaxerxes, king of Persia, who, when his son Darius fell in love with her, made her priestess of a temple in Ecbatana, in which strict celibacy was essential.

Aspatria and Brayton, tn., Cumberland, 8 m. n.e. by e. of Maryport; has coal mines, and an agricultural college, established in 1874, rebuilt in 1892-3. Pop. (1901) 2,885.

Aspe, Vallée d', a beautiful valley on the French slope of the Pyrenees, dep. Basses-Pyrénées; traversed by the Gave d'Aspe, a torrent 30 m. long, which rises on the Col de Somport (5,380 ft.) and flows north to Oloron. A Roman road crossing the Col de Somport connects this valley with Aragon, Spain. The Vallée d'Aspe was formerly a republic under the protection of the princes of Béarn.

Aspect in astronomy refers to the relative positions of two planets as seen from the earth. Five principal aspects were originally recognized, but only two are now in use—conjunction and opposition. A planet is in conjunction when it is seen in the same direction as the sun, and in opposition when 180° away from the sun. The aspects now obsolete were: the sextile, applied to two bodies distant 60° from each other; the quartile or quadrate, when they were 90° apart; and the trine, when they were 120° distant.

Aspen (*Populus tremula*), a British tree found in moist soils, and known as the trembling poplar. It belongs to the order Salicaceæ. Even in calm weather the leaves tremble in upward currents of air which are not strong enough to stir the leaves of other trees. The petiole of the leaf, at its junction with the blade, is flattened at right angles to the plane of the blade; the junction is thus weaker than in other leaves, so that the faintest breath is enough to move it. During the Tudor period its wood was highly valued for making into arrows. There is an old tradition in Scotland that the leaves are never at rest because the cross was made of aspen wood.

Asperges, in the Roman Catholic Church, is an antiphone taken from the *Miserere*, and sung by the choir before a high mass, during which the priest sprinkles holy water by means of a rod called an aspersorium or aspergillus.

Aspergillum, a genus of bivalve molluscs found in the warmer parts of the globe. The shells are placed at the lower end of an elongated shelly tube. They are sometimes called 'watering-pot shells,' from the shape.

Aspergillus, a genus of hyphomycetous fungi. See Mould.

Aspern, vil., l. bk. of Danube, nearly opposite Vienna, Austria, on a plain containing also the village of Essling, the scene of a sanguinary battle in which Napoleon was defeated by the Austrians under the Archduke Charles (May 21 and 22, 1809). Pop. (1900) 1,062.

Asperula. See Woodruff.

Asphalt, or Mineral Pitch, is a mixture of a number of hydrocarbons and their derivatives, containing oxygen, nitrogen, and sulphur, together with more or less mineral matter or ash. That of Val de Travers, Trinidad, and California is among the most important. Asphalts are of two main varieties—*rock asphalts*, in which the bituminous matter saturates limestone or sandstone; and *soft asphalts*, in which it is merely mixed with more or less earthy matter. Rock asphalts are dark-brown or black hard solids, containing about 90 per cent. of mineral matter; while soft asphalts are of a dark-brown resinous appearance, and contain much less ash, do not flow like pitch, and only melt at about 150° c. Rock asphalts are employed largely for paving, after mixture with soft asphalt, pitch, petroleum residue, stone dust, etc.; while soft asphalts, besides the above application, are used in the preparation of varnish and japan.

Asphodel, a plant of the order Liliaceæ and the section Anthericeæ. Eight species are cultivated in English gardens. Medicinally it has been used as a substitute for squill. The asphodel, being sacred to Proserpine, was in the days of the Romans used in funeral ceremonies. In the *Odyssey*, Minos sits in judgment in the asphodel meadows.

Bog Asphodel.
1. Petal; 2. germen.

Asphodel, Bog (*Narthecium ossifragum*), also called 'Lancashire asphodel,' is a small plant of the order Liliaceæ, whose blossom gives an orange tint to many peat bogs in Britain during July and August. The specific name, meaning 'bone-breaking,' is derived from the unfounded belief that when sheep eat the leaves their bones become fragile.

Asphyxia is commonly used to denote the condition following upon total deprivation of oxygen for respiration, from whatever cause. Drowning, strangling, irrespirable gases, and mechanical obstruction of any kind to the entrance of oxygen to the lungs, are common examples. The creature deprived of oxygen shows discomfort in a few seconds by restlessness. In warm-blooded animals a few seconds more under such conditions will bring about exaggerated respiratory movements, quickly followed by convulsions, the effect of poisoned blood (unoxygenated, and saturated with carbon dioxide) upon the great nerve-centres. Insensibility and cessation of movement now rapidly supervene, and death is possible within about three minutes from the beginning, though the time will vary with the strength of the sufferer and with the manner of asphyxiation. Respiratory efforts cease before the heart stops, which it ultimately does in diastole. Recovery is possible while the heart beats, and may even be hoped for a little later still, in some cases, if the heart's work be made easier by bleeding. Since both respiratory and cardiac movements may be present, though undetected by the untrained, it is of the first importance that help to the asphyxiated should be given at once, and all efforts continued until a fully competent person can take the case in hand. The cause of asphyxia must be removed, fresh air must be ensured, and crowding around must be guarded against. If respiration has not ceased, these steps, with the use of smelling-salts or dashing cold water on the chest, may be enough. But no time should be lost before proceeding to artificial respiration.

Asphyxiants are substances which cause death by the production of asphyxia. Examples of these are carbon dioxide, coal gas, carbon monoxide, and acetylene. Sometimes a distinction is drawn between simple and toxic asphyxiants, the first being those asphyxiants which are not in themselves poisonous, but cause death purely by filling the lungs to the exclusion of respirable air. Hydrogen and nitrogen may be taken as examples. Water is the asphyxiant in drowning. On the other hand, chloroform, chlorine, and the fumes of hydrocyanic (prussic) acid are toxic asphyxiants. Artillery shells have sometimes been filled with asphyxiants and hurled against an enemy; but their use was condemned by the Hague Peace Conference of 1899. The Chinese missile known as the 'stink-pot' seems to partake of the same character.

Aspidistra, a Chinese genus of the order Liliaceæ, introduced into Britain in 1822, and now much cultivated in houses. Three species are grown, but *A. lurida* is the one commonly seen in rooms. The branching stems are entirely underground; they soon fill the pot with cord-like roots, and send up robust leaves, which when young appear as lengthened conical growths protected by scale-leaves. A variety shows creamy white streaks or bands running lengthwise through the blade, but the whole leaf becomes green when the soil is enriched. Small purple flowers appear in early summer, and they should be removed if vigorous foliage is desired. The plant is popularly known as 'parlour palm.'

Aspidium. See MALE SHIELD FERN.

Aspinwall. See COLON.

Aspinwall, WILLIAM H. (1807-75), a New York merchant who obtained a concession in 1850 to construct a railway across the isthmus of Panama. It was completed in February 1855, and the eastern terminus was named after him.

Aspirate (Lat. *ad*, 'to;' *spirare*, 'to breathe'), in phonetics, is the strong breathing of a letter, approximating the guttural sound. From very early times there appears to have been a difference of opinion as to when and where the aspirate ought to be used. Catullus (*Ep.* lxxxiii.) ridicules a contemporary because he said '*h*insidias' and '*H*ionios' instead of 'insidias' and 'Ionios.' A similar tendency has been noticed in Sanskrit and Greek. In Gaelic it is a recognized law that a euphonic *h* shall be intruded between the final vowel of one word and the initial vowel of another; thus, 'na *h*-iasgan' (the fishes). Systematic aspiration, in certain connections, is indeed a notable characteristic both of Gaelic and Cymric. The habit of 'dropping the *h*' when (according to modern usage) it ought to be retained is prevalent in the English lower class, and this is accompanied by the contrary habit of prefixing an *h* where it is not wanted. An Englishman of this class, therefore, will say '*h*ash' for 'ash,' and ''ash' for 'hash.' Nowadays a mark of inferior breeding, this heterodox practice was once orthodox. In the 13th century, *eye*, *earl*, *old*, and *English* were written *heic*, *herle*, *hold*, and *Henglishe*; while in recent times the use of 'an' before many words, such as *hundred*, *habit*, and *household*, seems to indicate that the *h* was almost, if not altogether, silent. In the English of the cultivated class of to-day there is a tendency to restore the aspirate in some words and to drop it in others. See *The Aspirate*, by G. Hill (1902).

Aspirator, an apparatus used to draw air or gases through pipes or other apparatus connected with it. In its simplest form it consists of a vessel of glass or metal fitted with inlet and outlet cocks at the top and bottom. It is filled with water, and, by allowing the water to escape through the lower tap, air or any gas may be drawn through the upper tap, and, if necessary, through a series of tubes or bottles. The filter-pump is another form of aspirator much used in laboratories. It consists of a tube with constricted bore, through which water is passed under pressure: a small opening in the side of the tube communicates with the vessel from which air is to be withdrawn. As the water passes through the constricted tube it draws air in with it, and a partial vacuum is soon produced in the vessel.

The name is also given to a surgical instrument, introduced by Dieulafoy in 1869, for removing fluids from body cavities, as in pleurisy, ascites, abscesses, retention of urine, etc. A fine hollow needle, connected by a rubber tube with a syringe or bottle from which the air is partially exhausted, is passed through the skin; and the fluid is driven into the bottle by atmospheric pressure.

The Right Hon. Herbert Henry Asquith.

Aspland, ROBERT (1782-1845), Unitarian divine, born at Wicken, Cambridgeshire. He was for forty years minister of Gravel Pit Chapel, Hackney, London, and founded in 1813 the Hackney Academy at Durham House, for the training of Unitarian ministers. He was the editor of the *Monthly Repository*, which he founded, from 1806 to 1826, and of the *Christian Reformer* (1815-45). See *Memoirs* by R. Brook Aspland (1850).

Asplenium. See SPLEENWORT FERN.

Aspromonte, a wooded mountainous dist. in the extreme south of Italy, rising above the Strait of Messina to 6.425 ft. in Mt. Montalto. Here Garibaldi was wounded and taken prisoner (1862).

Asquith, The Right Hon. Herbert Henry (1852), lawyer and statesman, was born at Morley, Yorkshire. He was educated at the City of London School and Balliol College, Oxford, where he carried off the Craven Scholarship. Called to the bar at Lincoln's Inn in 1876, his marked legal ability rapidly brought him into prominence (notably during the Parnell Commission), and he was appointed a Q.C. in 1890. Of strong Liberal proclivities, Mr. Asquith was member for East Fife in 1886, 1892, 1895, and again in 1900, and took a prominent part in the Home Rule debates. In 1892 he moved the amendment to the Queen's Speech which resulted in the fall of the Salisbury government of that date; and during the succeeding Gladstone-Rosebery ministry of 1892-5, he held the office of Home Secretary. In 1893 he introduced an Employers' Liability Bill, which passed the Commons, but was subsequently abandoned, as the Lords refused to give way on Lord Dudley's amendment. The tact and judgment displayed by Mr. Asquith in connection with the labour disputes of 1893 and the London cab strike of 1894 have everywhere been recognized. In 1894 also his name was pre-eminently associated with the bill for the disestablishment of the Church of Wales, which, however, was ultimately rejected.

Prior to the hostilities in South Africa Mr. Asquith dissociated himself from the anti-war section of his party, and in a speech at the Reform Club in 1901, while supporting the vote of confidence in Sir H. Campbell-Bannerman, claimed for himself and others full liberty of action on South African questions without incurring the imputation of party disloyalty. In 1902 he became vice-president of the Liberal League. During 1903 he was one of the most effective Liberal speakers in opposition to the Education Bill and in denunciation of the conduct of the war as revealed by the War Commission report. He is generally recognized as the leading protagonist of free trade in opposition to Mr. Chamberlain's fiscal policy. He was made hon. D.C.L. of Oxford in 1904.

Ass, a name given to a group of species of the genus Equus, including the domestic ass (*E. asinus*), probably identical with the wild ass of Africa and the Asiatic wild asses, which seem to belong to one species, *E. hemionus.* From the horse the ass differs in its long ears, the absence of long hairs at the base of the tail, and of callosities on the inner side of the hind leg above the hock, in the erect mane, and the well-marked dorsal stripe. There is also a stripe across the shoulders, and the limbs are often banded. The domestic ass of N. Europe cannot be regarded as representative of the asses in general, for it has markedly degenerated owing to the absence of selective breeding and of careful nurture. Where, as in many parts of the East, the ass is treated as the horse is treated, it proves itself little inferior to the latter as regards the valued qualities, and has the great advantages of being less liable to disease, and much less particular as to diet. Of the Asiatic wild asses there are three varieties—the kiang (kulan), the onager, and the Syrian wild ass. The first is very horselike in appearance, and exceedingly swift in movement; it roams over the Tibetan plateau in troops, and is very wary. Its flesh is eaten by the Mohammedans of E. Turkestan. The Abyssinian wild ass is a desert animal, and seems to resemble the domestic ass in its mental characteristics as well as in appearance. From time immemorial the ass and the horse have been crossed together, the hybrid offspring being known as mules or hinnies, according as the male parent is an ass or a horse.

Assab, bay and tn. on Red Sea, Eritrea, Africa, 40 m. N.W. of Str. of Bab-el-Mandeb. It is one of the best ports of the colony, and is strongly fortified. Pop. 5,000.

Wild Asses.

1. Kiang or kulan of Tibet. 2. Abyssinian ass 3. Onager.

Assai Palm (*Euterpe oleracea*), a tree of tropical America, much cultivated for its pulpy fruit, *assai*, from which a beverage and a food are prepared.

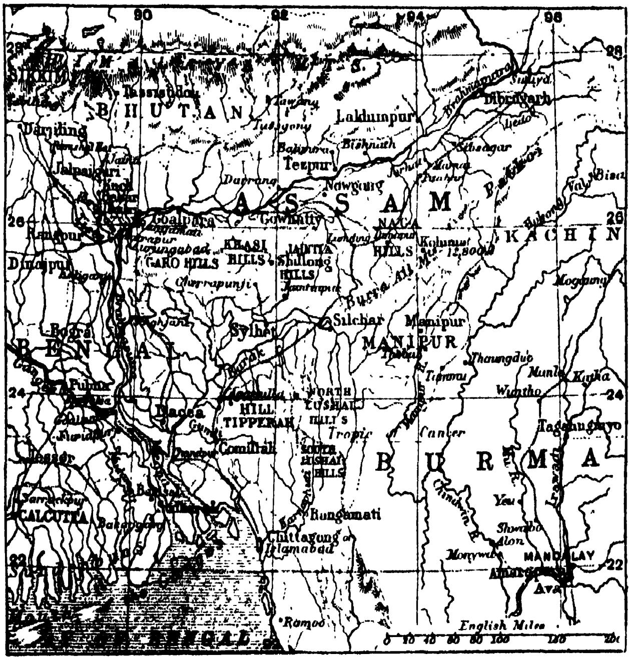
Assal, or Asal, large salt lake in volcanic basin of Adel, E. Africa, 25 m. S.W. of Tajurra, on Red Sea. The surrounding incrustations of salt supply an active caravan trade.

Assam, prov., British India, lies at the N.E. angle of the peninsula of Hindustan. Bounded on the N. by Bhutan and Tibet, it narrows at the S. extremity, and is bordered by Bengal on the S.W., and by Burma on the S.E. The total area is estimated at 45,400 sq. m., of which over 41,000 sq. m. is British territory. Mountain ranges mark its boundaries, and numerous hills are spread over the province. The Brahmaputra traverses Assam from E. to W., then S. The country is subject to volcanic disturbances, and the disastrous earthquakes of 1869, 1875, and 1897 are epochs in its history. In the Khasi and Jaintia Hills are large limestone quarries, and coal and petroleum are found in Lakhimpur; traces of coal and tin in other parts. An extremely fertile soil yields abundance of tea, rice, and mustard-seed. The people are of Siamese stock. Tea—the great commercial industry—is worked with European capital, under European supervision. The first experiment was made by government in 1835. In 1840 the Assam Tea Company took over the plantations: speculation and bubble companies led, in 1866, to a financial crisis; but since 1869 the trade has prospered. In addition to a large river-borne traffic on the Brahmaputra, the Assam-Bengal Ry. enters the province at Mantola, about the centre of the S.W. border, and stretches to Dibrugarh, at its N.E. angle. Good coal is mined near Dibrugarh, a port on the Brahmaputra. Manipur is the only feudatory state of any importance. Nearly half the inhabitants profess the Hindu faith, about one-fourth are Mohammedans, and the hill tribes, about one-sixth of the population, are animistic. Tradition points to the existence of a Hindu kingdom in Assam anterior to its invasion by Mohammedans from the west, and subsequently by Ahams and Burmese from the east. The districts of Sylhet and Goalpara were granted to the East India Company in 1765. In 1824 the first Burmese war led to the occupation of the southern portion of the country by the British, and two years later it was ceded to the crown. Cachar lapsed to the British in 1830, on the death of its ruler, and in 1835 flagrant misrule led to the annexation of Upper Assam. Assam was included in Bengal until 1874, when it was constituted a separate province. Remains at Gauhati, and ruins scattered over the valley of the Brahmaputra, are of historic and archæological interest. Pop. (1901) 6,126,343.

Assandune. See ASHDOWN.

Assassination, a term sometimes applied to any murder, but usually restricted to the killing of some prominent person from fanatical or political or religious motives. The following is a list of the most famous assassinations:—Julius Cæsar, Mar. 15, 44 B.C.; Thomas à Becket, Dec. 29, 1170 A.D.; Albert I., emperor of Germany, May 1, 1308; James I. (Scotland), Feb. 21, 1437; Alessandro de Medici, Jan. 5, 1537; Cardinal Beaton, May 29, 1546; David Rizzio, Mar. 9, 1566; Lord Darnley, Feb. 10, 1567; James, Earl of Murray, Regent of Scotland, Jan. 23, 1570; William of Orange, July 10, 1584; Henry III. of France, by Jacques Clément, Aug. 2, 1589; Henry IV. of France, by Ravaillac, May 14, 1610; Villiers, Duke of Buckingham, by Lieut. Felton, Aug. 23, 1628; Wallenstein, by Butler, Leslie, and Gordon, Feb. 25, 1634; Archbishop Sharp, May 3, 1679; Gustavus III. of Sweden, Mar. 16, 1792; Marat, by Charlotte Corday, July 13, 1793; General Kléber, June 14, 1800; Czar Paul, Mar. 24, 1801; Selim III., Sultan of Turkey, June 1808; Spencer Perceval, English premier, by Bellingham, May 11, 1812; Kotzebue, German dramatist, Mar. 23, 1819; Abraham Lincoln, by Booth, Apr. 14-15, 1865; Milosh, prince of Servia, June 10, 1868; Marshal Prim, Spain, Dec. 28, 1870; Georges Darboy, archbishop of Paris, May 24, 1871; Earl of Mayo, viceroy of India, Feb. 8, 1872; Abdul-Aziz, Sultan of Turkey, June 4, 1876; Czar Alexander II., Mar. 13, 1881; President Garfield, U.S.A., by Guiteau, July 2-Sept. 19, 1881; Lord Frederick Cavendish and Mr. Burke, May 6, 1882; President Carnot, France, by Caserio (*anarchist*), June 24, 1894; Stefan Stambulov, Bulgarian statesman, July 15, 1895; Empress Elizabeth of Austria, by Lucchini (*anarchist*), Sept. 10, 1898; King Humbert of Italy, by Bresci (*anarchist*), July 28, 1900; President M'Kinley, U.S.A., by Czolgosz (*anarchist*), Sept. 6, 1901; Alexander I. and Draga, king and queen of Servia, June 11, 1903; Grand-Duke Sergius, uncle of the Czar, Feb. 17, 1905.

Assassins, a powerful fanatical sect which sprang from the secret order Ismailis and flourished in Persia and Syria from the 11th to the 13th century. It was founded by Hassan-ibn-Sabbah, a Shiite of Khorassan, who seized, in 1090, the fortress of Alamut in Persia, where he established his society, consisting of a supreme ruler, the Sheikh el Jebel, or 'Old Man of the Mountain' of European historians, besides three grand priors, priors, *refiks* or associates, and the *fedavis*, the assassins proper, who, when selected for the commission of a murder, were first intoxicated with *hashish* (hemp), the origin of the name assassin, from *hashishin* (hemp-eaters). This society soon made its power felt, and the reign of its rulers, during and after Hassan's death in 1124, was marked by a long series of assassinations of famous men. The last of their



The Province of Assam.

rulers was Rukhn ed-Din, who murdered his father, Mohammed III., in 1255. In 1266 their power in Persia was completely broken by the Mongols under Hulaku, 12,000 of the Assassins being massacred. A Syrian section, which had asserted its political independence in 1169, was subjugated by the Mameluk Sultan Bibars in 1270-3. The crusading chiefs Raymond of Tripoli and Conrad of Montserrat both fell under their daggers. Certain analogies of their doctrine still exist among the Druses and the small Syrian race Ansarii. See Von Hammer-Purgstall, *Geschichte der Assassinen* (1818); F. Walpole, *The Ansayrii, or Assassins* (1851); Guyard, *Fragments relatifs à la Doctrine des Ismaelis* (1874), and *Un Grand Maître des Assassins au Temps de Saladin* (1877).

Assault, an offer of personal violence to another. Thus, to threaten to strike a person within striking distance, or to shake one's fist in his face, or to present a gun at him when within range, to pull a rosette off his coat, or to incite a dog to attack him, or to attempt to kiss a woman, or to do any act accompanied by circumstances which denote both intention and ability at the time to molest or do violence to the person, is an assault. If a blow is struck or violence actually used, it is a battery; but the word assault is frequently used in the sense of a battery. Verbal abuse does not amount to an assault. A person actually struck is justified in striking back in self-defence, but not in revenge. His retaliation must, therefore, not be greater than is necessary to put an end to the assault. A person assaulted may either bring an action for damages, or prosecute the assailant criminally, or both. For the purposes of criminal proceedings, assaults may be divided into (1) common assaults, and (2) aggravated assaults. A common assault is punishable, on summary conviction, by a fine of £5, or two months' imprisonment; but if the case goes for trial, the punishment may be one year's imprisonment. If an aggravated assault is committed on a boy under fourteen, or on a woman, it is punishable, on summary conviction, by a fine of £20, or six months' imprisonment. An assault on a police constable in the execution of his duty may also be similarly punished. There are a large number of offences, principally statutory, which are punishable upon indictment with various terms of imprisonment or penal servitude, and which are all forms of aggravated assault. Such are assaults causing actual bodily harm; indecent assaults; malicious wounding; wounding or shooting at a person with intent to maim, disfigure, or disable, or to resist apprehension; assaults with intent to rob, or to commit any felony; attempting to choke, suffocate, or strangle, or to render any person insensible, with intent to commit an indictable offence; poisoning so as to endanger life, or with intent to injure; using or sending explosives with intent to injure; assaulting clergymen in performance of their office, or gamekeepers protecting game; assaults within royal palaces or in the High Court of Justice.

The common law of Scotland with regard to assault is very similar to the law of England. The remedy is both civil and criminal, and assaults are regarded as aggravated (1) by the intent, as to kill, to rob, to ravish, or to rescue prisoners; (2) by the mode, as by using firearms, stabbing, cutting, or throwing acids; (3) by the extent of the injury; (4) by the place, as the presence of the sovereign, or in a court of justice; (5) by the quality of the persons assaulted, as parents or young children. See Russell, *On Crimes* (16th ed. 1896); Macdonald's *Crim. Law of Scotland* (3rd ed. 1894).

Assaye (*Asái*), vil., Haidarabad (Deccan), India, 46 m. N.E. of Aurungabad. Here the British under Wellesley defeated the Mahrattas (Sept. 23, 1803).

Assaying. This term, formerly restricted to the estimation of a metal in its ore or alloy, is now often used as synonymous with analysis; but it is better to confine it to the determination of certain constituents of a substance, particularly in the 'dry' way, and to reserve the word 'analysis' for the estimation of every constituent of a body. Assaying is 'wet' or 'dry' according as to whether the operation is carried out in solution or by the action of fire. The first process in either method is the selection of a typical sample, on which much of the value of the examination depends. Dry assays are carried out in muffle furnaces, in which the substance is heated in a small fireclay oven, or in wind furnaces, where the combustion is urged by blast or draught. The actions vary much in particular cases, of which the following are examples.

Copper.—Take a yellow ore, for example. Twenty-five grammes of ore, 20 grammes of borax, 20 grammes of glass, 25 grammes each of lime and fluor-spar, and 6 grammes of nitre. The first fusion will produce regulus and slag. The regulus is crushed fine, roasted sweet, and fused with 4 grammes of sodium carbonate, 5 grammes of tartar, and 3 grammes of borax. The slag is cleaned by fusing with 2 grammes each of sodium carbonate and tartar and half a gramme of carbon. The copper is refined by heating in a crucible till bright, then adding 6 grammes of refining flux. In two minutes the contents are poured into a mould, the slag cleaned, and all the copper weighed.

Lead.—Galena is generally fused in an iron crucible which gives the lead direct; but fluxes are often necessary, and a clay pot may be used—ore, 25 grammes; sodium carbonate, 25 grammes; tartar, 3 grammes. After breaking off the slag the metal is weighed and the percentage calculated.

Silver.—(1.) Bullion, coin, and plate. By the cupellation method three-quarters of a gramme is wrapped in 10 grammes of lead, and heated in a cupel in the molten state in a muffle until the base metals are oxidized and absorbed into the cupel. The silver is then detached, cleaned, and weighed. (2.) Ores and compounds. Twelve grammes of ore, 30 grammes of red lead, 2 grammes of charcoal, 18 grammes each of sodium carbonate and borax. The mixture is fused in a clay crucible until all action ceases. If sulphides are present, a little iron must be added. The contents are poured into a mould, cooled, the lead detached from the slag and cupelled.

Gold.—Bullion assay is the same as for silver. Ore assay is also much the same as in the silver-ore assay, but much larger quantities are used *viz.* 60 grammes of ore, 80 grammes of sodium carbonate, 30 grammes of red lead, and 2 grammes of carbon. Fuse as for silver assay. Cupel the button of lead and weigh the gold. If much base metal is present, it must be partly removed by scorification, and then the remaining lead cupelled. If silver is present, the alloy must be so proportioned as to contain two and a half times as much silver as gold. By digesting in nitric acid the silver is dissolved, the gold remains unaltered, and after ignition may be weighed.

Tin.—Take 60 grammes of tinstone, mix with excess of anthracite, and reduce in a plumbago crucible. After pouring off the tin the residue is ground fine, the excess of carbon washed away, and the residue fused with a little sodium carbonate to collect the remaining tin. Or the ore may be reduced in a clay pot with five times its weight of common potassium cyanide and a little charcoal.

Antimony.—Sulphide of antimony is reduced by iron, like galena, or it may be reduced by fusing with an excess of common potassium cyanide. Loss by volatilization introduces an error, and must be allowed for.

Mercury.—The chief ore is cinnabar (HgS). It is assayed by distillation in a glass tube. Three to five grammes are well mixed with excess of lime, and heated with bunsen burners until all the mercury is reduced. It collects in the cool end of the tube. The residue is washed, to extract the small entangled globules. After drying the metal is weighed.

The ores of metals other than the above are best determined by wet methods, as follows:—

Iron.—The estimation of iron in ores is generally effected by a volumetric method, and in alloys by a gravimetric method. There are two chief volumetric methods —*viz.* the 'bichromate' and the 'permanganate' methods. (1.) In the bichromate method, which is most used, a standard solution is made to contain about 8 grammes of the salt per litre; 0·25 gramme of pure iron is then dissolved in hydrochloric acid, and when this is colourless, the standard solution is run in from a burette until the ferrous salt is just oxidized to the ferric condition. To determine this point an indicator is used, which consists of about 1 gramme of potassium ferricyanide in 100 c.c. of water. When a drop of this solution just ceases to be coloured blue by the iron solution, the oxidation is complete. By observing how many cubic centimetres of the standard solution have been run off, its value per c.c. is obtained. To estimate iron in ores, they must be crushed very fine, and about ½ gramme to 1 gramme dissolved in HCl. As the ore is probably in the state of the higher oxide, it must be reduced to the ferrous state by means of zinc or sodium sulphite. The standard solution is run in as before, and the number of cubic centimetres required gives the amount of iron present. In alloys, iron is usually precipitated from solution as hydrated oxide by means of ammonia, if manganese, chromium, and aluminium are absent. The precipitate is washed, dried, ignited, and weighed as Fe_2O_3, from which the percentage of iron is computed.

(2.) The permanganate method is as follows:—A solution of potassium permanganate has a purple colour, which is discharged as long as any ferrous salt remains unoxidized; but immediately it is all oxidized a single drop of the permanganate will give a rose tint to the solution. A standard solution of the permanganate is made and standardized by a known weight of pure iron dissolved in H_2SO4. Iron in ores, etc., is dissolved as before, decolourized by zinc or sodium sulphite, and the iron estimated from the solution required for complete oxidation.

Copper may be estimated (1) by potassium cyanide in ores and slags free from manganese, nickel, cobalt, silver, mercury, and zinc. The reaction is based on the fact that when potassium cyanide is added to a copper solution which has been rendered blue by ammonia it gradually loses its colour. By ascertaining the amount of standard solution required to decolourize a known weight of copper in solution, the value of each cubic centimetre of the standard solution is found. A standard solution may be made to contain 60 grammes of potassium cyanide per litre of water. The pure copper for standardizing is dissolved in a measured quantity of nitric acid, and when cold the solution is just made blue by the addition of ammonia. Ores may be digested with HCl and a little nitric acid added. When dissolved, cooled, and the requisite ammonia added, the standard solution is run in, and the copper estimated. Sulphur ores are first moistened with sulphuric acid, then digested with strong nitric acid for an hour. If much iron is present, it may be precipitated with ammonia and filtered off. If this precipitate is redissolved, the iron may be estimated by potassium bichromate.

(2.) Coloration method. Copper in slags and products may be approximately estimated by comparing the colour produced in the solution of potassium ferrocyanide or hydrogen sulphide as compared with a series of copper solutions of known strength.

(3.) The sodium thiosulphate method is valuable for alloys in which lead and iron are not present in large quantities. The process is based on the reaction between iodine and thiosulphuric acid, and the completion is determined by the bleaching effect that is produced upon a solution of starch added during the experiment. A standard solution may contain 40 grammes of pure crystallized thiosulphate per litre. Pure copper is dissolved in dilute nitric acid, 3 oz. of water being added, neutralized with sodium carbonate, acetic acid being added in slight excess, then crystals of potassium iodide. The standard solution is run in until the solution is yellow, about 3 c.c. of starch solution are introduced, and the standard solution added drop by drop until the liquid is completely bleached. The solution being standardized, ores and copper alloys may be dissolved and the copper estimated as above.

(4.) Electrolytic method. Copper in commercial ores and in alloys may be very accurately determined by dissolving half a gramme in about 3 c.c. of nitric acid, evaporating partly to dryness, then adding 1 c.c. sulphuric acid, and diluting with water to 200 c.c. in a beaker in which are placed a platinum cone and a spiral of platinum wire. The cone is connected with the zinc and the spiral with the carbon of a bunsen cell. By weighing the cone before and after the experiment the amount of copper is obtained.

Lead. By the wet method, lead is generally determined by precipitation as sulphate. In ores the dry method is sufficiently accurate. In alloys, about one gramme is dissolved in dilute nitric acid; and if the solution is clear, dilute sulphuric acid is added, then twice its volume of alcohol, and the solution allowed to stand several hours. The $PbSO_4$ is then filtered off, washed with alcohol, dried, ignited, and weighed. The precipitate contains 0·683 of its weight of lead.

Silver.—The ordinary volumetric assay is based on the affinity of silver for chlorine, by which an insoluble chloride is precipitated (Gay-Lussac method). (1.) Standard solution. Pure NaCl is dissolved in water in sufficient quantity to precipitate one gramme of silver *i.e.* 0·542 gramme of salt is dissolved in 500 c.c. water. A solution is also made to contain one-tenth of the above: one gramme of silver is dissolved in nitric acid and diluted to one litre, so that each cubic centimetre contains 0·001 gramme of silver. After testing the standard by a known weight of pure silver, it may then be used for estimating silver in alloys. One-half to three quarter gramme of alloy is dissolved in nitric acid, diluted, 50 c.c. of the stronger solution run in, and the liquid well shaken; when the solution is practically clear, add the weak solution until the silver just ceases to yield a precipitate. The amounts of strong and weak solutions added, having definite values, indicate the amount of silver in the alloy.

(2.) Volhard method. Silver may be volumetrically estimated by means of a standard solution of potassium sulphocyanide, using iron alum as an indicator (*Eng. and Min. Jour.*, Jan. 1883). Knorr recommends a normal solution of common salt and a deci normal solution of sulphocyanide, which obviates the tedious shaking of the Gay-Lussac method.

Tin. Tinstone is decomposed by fusing with four times its weight of potassium fluoride. The fluorine is then expelled with sulphuric acid. On diluting with water, filtering, and boiling, the tin is precipitated as hydrated oxide.

Tin oxide may be fused with eight times its bulk of sodium hydrate dissolved in hot water, and the tin precipitated by SH_2 forming the sulphide, which may be roasted to oxide and estimated as SnO_2.

Zinc.—(1.) By a standard solution of sodium sulphide. When a zinc solution containing oxide of iron has been made alkaline with ammonia and the standard solution run in, the zinc is first precipitated as a white sulphide, then the iron, which is recognized by the dark colour. (2.) By a standard solution of potassium bichromate. When zinc sulphide is mixed with ferric chloride and hydrochloric acid, the iron is converted into the ferrous state. The amount of $FeCl_2$ may then be estimated by the bichromate method.

Antimony.—The metal in stibnite (Sb_2S_3) may be estimated by means of gallic acid (Crookes's *Select Methods*, p. 400). The ore is heated with HCl until sulphuretted hydrogen ceases to be expelled. The residue is filtered off, and the solution concentrated by evaporation. Gallic acid solution is then added, and the precipitate, after settling, is collected on a weighed paper, dried at 100° c., and weighed. The dry precipitate contains 40·85 per cent. of antimony.

Sulphur.—(1.) Pyrites, purple ore, etc. Three grammes are digested for an hour in three parts nitric to one part hydrochloric acid, then HCl added until nitrous fumes are expelled, evaporated to dryness, redissolved in HCl and water, and barium chloride added. The precipitate formed is $BaSO_4$, which is washed, dried, ignited, and weighed, and the sulphur computed. (2.) Estimation of sulphur in coal. Mix one gramme of coal with one gramme MgO and half a gramme Na_2CO_3, and ignite over a spirit lamp; boil with bromine water, digest with HCl, filter, and add barium chloride to the filtrate to precipitate $BaSO_4$.

See Crookes's *Select Methods of Chemical Analysis* (3rd ed. 1894); Sutton's *Volumetric Analysis* (8th ed. 1900); Rhead and Sexton's *Assaying and Metallurgical Analysis* (1902); Hiorns's *Practical Metallurgy and Assaying* (1888); Aaron's *A Practical Treatise on Testing and Working Silver Ores* (1876); Beringer's *Text-book of Assaying* (1902).

Assegai, the Zulu spear, of which there are two varieties—the long javelin, or throwing-spear; and the shorter 'stabbing' assegai, for use at close quarters.

Assemani, JOSEPH SIMON (1687-1768), Orientalist; born at Tripoli in Syria, but studied in Rome. In 1715 he was sent to the Levant to collect Oriental MSS. for the Vatican Library, of which he was appointed keeper. He wrote *Bibliotheca Orientalis Clementino-Vaticana* (1719-28), *Opera Ephraemi Syri* (1732-46), etc.

Assembly. See GENERAL ASSEMBLY.

Assembly, NATIONAL. See FRANCE—*History*.

Assembly, UNLAWFUL, an assembly of three or more persons with intent to commit a crime, or with intent to carry out in common any purpose, lawful or unlawful, which is likely to lead to a breach of the peace. An unlawful assembly may be dispersed by force, and all parties to it are guilty of a common law misdemeanour punishable by fine and imprisonment. See RIOT, PRIZE FIGHT.

Assembly of Divines at Westminster. See WESTMINSTER.

Assen, tn., cap. of prov. Drenthe, Netherlands, 16 m. by rail S. of Groningen. Pop. (1899) 11,191.

Asser, JOHN (d. 909 ?), bishop of Sherborne, was reader to King Alfred from about 885. He is author of *De Rebus Gestis Ælfredi Magni*, first published in 1572. Best edition by Wise (1722).

Assessment. See RATING, VALUATION LIST.

Assessors are experts who sit with and assist a judge in matters requiring special technical knowledge, but they have no part in the judgment. By s. 56 of the Judicature Act, 1873, they may be employed in all cases in the High Court. By s. 14 of the Appellate Jurisdiction Act, 1876, the archbishops and bishops may be appointed assessors to the Judicial Committee of the Privy Council when trying ecclesiastical matters. By the Supreme Court of Judicature Act, 1891, the House of Lords may employ assessors in Admiralty appeals. By the Patents, Designs, and Trade Marks Act, 1883, either party in a patent action may require that a case be heard with an assessor. By the Merchant Shipping Act, 1894, courts of survey are constituted consisting of a judge and two assessors. In the Admiralty Court assessors are generally Trinity Brethren. Assessors may also be employed in county court cases. See also Clergy Discipline Act, 1892.

Assets. This term signifies, in law, property available for distribution among creditors. They are 'legal' or 'equitable;' but the distinction is too technical to be more than referred to here. Formerly, in administering assets, 'specialty' creditors, or those whose debts arose by virtue of a bond or other instrument under seal, were entitled to payment in priority to simple contract creditors; but now both classes of debts are payable *pari passu* out of the assets. In distributing assets of a deceased person, funeral and testamentary expenses are always payable before anything else; then the order of payment out of 'legal' assets is—subject to crown debts by specialty or record, and debts having statutory priority—(1) judgments against the deceased if registered; (2) judgments against the executor or administrator according to priority of date; (3) recognizances and statutes; (4) specialty and simple contract debts, and unregistered judgments against the deceased; (5) voluntary obligations. But in distributing 'equitable' assets, all classes stand on the same footing. The right of an executor to prefer one creditor to another, and to retain a debt due to himself in preference to other creditors of equal degree, exists only with regard to legal assets.

In applying assets in payment of debts, the rule is that the general personal estate is to be first exhausted, then the real estate; and if both these are insufficient, recourse must be had to the legacies, and to property appointed under a general power of appointment.

If assets are distributed before the debts are paid, creditors may follow them into the hands of the persons who have taken them. As to administration of assets of a bankrupt or deceased insolvent, see BANKRUPTCY.

Assiento (Span. 'treaty'), a contract made between Spain and other powers, by which the monopoly of importing slaves into Spanish America was conferred upon the latter. It was first held by a Flemish company from 1517; then by the Genoese, from 1580; by the French Guinea Company, from 1702; but the treaty of Utrecht (1713) gave it to Britain, along with the right of sending yearly a ship carrying 500 tons merchandise to the Spanish colonies—a privilege exercised for twenty-six years by the South Sea Company. Britain relinquished that right in 1750 for £100,000 and certain other concessions.

Assignation, the term applied by Scots law to any deed of conveyance by which rights of either a permanent or a temporary nature to movable property are transferred. The maker of the assignation is called the cedent, the receiver the assignee; and if the subject assigned be a debt, the debtor is called the common debtor. An assignation is not complete without intimation of it to the debtor or debtors. Forms of intimation are provided by statute; and it is sufficient proof of intimation that the debtor has written acknowledging the receipt of a certified copy of the assignation. Indorsations of bills of exchange, assignations in favour of trustees on sequestrated estates, and assignations operating by marriage in favour of a husband, do not require intimation. The general effect of an assignation is to vest the assignee with the whole right of the cedent; but a mere assignation of corporeal movables without possession is nothing but a personal obligation, and confers no preference on the assignee in a question with the cedent's creditors. An assignation of a debt from an assignee to another person is called a translation; and if the assignee reconvey the debt to the cedent, the deed of reconveyance is called a retrocession.

Loi du 23 Mai 1793
Serie 1301
L'an 2me de la Republique
Domaines-nationaux.
Assignat de cinquante sols, payable au porteur.
LA LOI PUNIT DE MORT LE CONTREFACTEUR
LA NATION RÉCOMPENSE LE DÉNONCIATEUR
50

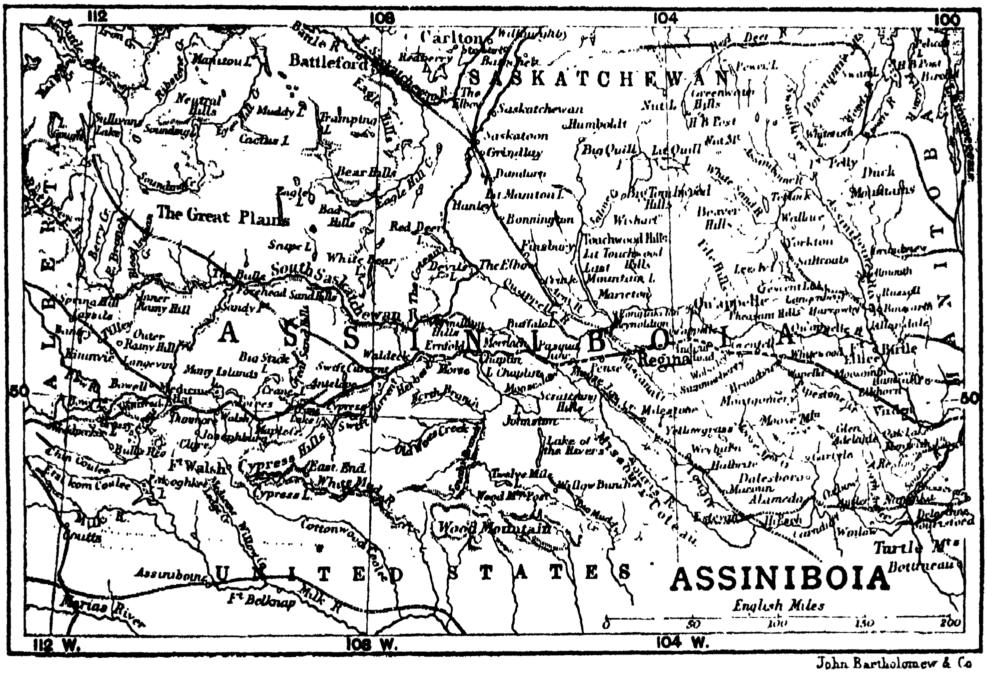
Assignat or Note of the French Republic (1793).

Assignats. During the period immediately preceding the French revolution, the National Assembly declared the church lands to be national property, and offered them for sale to the various municipalities throughout the country; accepting, in lieu of cash payment, paper notes or bonds of equivalent value, consequently styled *assignats.* Later, assignats were issued against the property of the *emigrés* and the crown. But the simplicity of the system led to a continued issue of assignats (to a total face value of 45,500 million livres), which ultimately became so depreciated as to be almost valueless. Assignats were in circulation in France from 1790 to 1796, being exchangeable in the latter year for *mandats,* which were called in in 1797, at the value of $\frac{1}{100}$ of the original assignats.

Assignment, a legal term denoting a transfer of property from one person to another. It takes place (1) by operation of law—*e.g.* on bankruptcy; or (2) by the voluntary act of a person—as on a sale or other disposition. Generally speaking, any kind of property may be assigned. But the assignment of pensions and salaries of public officers is void, as contrary to public policy; while assignments which are fraudulent or for illegal purposes are also invalid. The effect of an assignment of property is generally to put the assignee in the same position as the assignor, with all the rights, and subject to all the obligations, attaching to the property assigned. When the property consists of a debt or other chose in action, notice of the assignment should be given to the debtor; otherwise, if the latter should pay the assignor without notice, he could not be compelled to pay over again to the assignee. As to the special incidents of an assignment of leaseholds, see LANDLORD AND TENANT. By an act of 1571, all transfers of real or personal property intended to defeat creditors are void, unless they are for good consideration, and the purchaser has no notice of the fraud.

Assimilation, the process by which organisms take up and transform foreign substances into their own tissues, as in digestion and respiration.

Assiniboia, one of the four N.W. Territories of the Dominion of Canada, defined in 1882. It lies between the 49th and 52nd parallels of N. lat., with Manitoba on the E., and a survey line nearly corresponding with 111 W. long. on the W. Its area is 90,340 sq. m., and it is physically divided into two regions—the eastern and the western. E. Assiniboia, which has an average altitude of 1,600 ft., is mainly prairie with patches of woodland. The soil is a friable loam, easily worked, and producing excellent crops of wheat, coarse grains, and vegetables. Pop. (1901) 49,693. W. Assiniboia has an average elevation of 2,000 to 3,000 ft., and consists mostly of open plains covered with buffalo grass. Without irrigation it is too dry for crops, but is a good stock-raising and dairy-farming country. Pop. (1901) 17,692. The whole territory is well watered by the S. Saskatchewan R., the Qu'appelle R., the Assiniboine R., White Sand R., and many others. In the S. are the Souris R. coal fields. Coal is also obtained in the Wood Mts., on the White Mud R., and near Medicine Hat. Alkali is found in the S., and natural gas occurs near Medicine Hat,



John Bartholomew & Co

and at Langevin, on the W. frontier. The main line of the C.P.R. crosses the territory from E. to W., and there are branch lines from Moose Jaw to the S.E., and from Regina, the capital of the N.W. Territories, to the N. The Manitoba and N.W.R. also crosses the N.E. of the territory. The chinook winds blow over the country as far E. as Regina, and the snowfall is slight. On July 1, 1905, Assiniboia became part of the new province of Saskatchewan.

Assiniboine ('River of the Stony Sioux'), a river of Brit. N. America, rising in S.E. of Saskatchewan dist., flows S.E. through Assiniboia, to which it gives its name, then E. to Red R., which it joins at Winnipeg, after a course of about 600 m. It is navigable for vessels of 100 tons to Fort Ellice, at its junction with the Qu'appelle.

Assiniboines, an Indian tribe of Canada belonging to the Siouxan stock, and akin to the Crows and Dakotas. They are mostly gathered in reservations, but conduct an extensive fur trade with the Hudson's Bay Company.

Assisi (the ancient *Asisium*), tn. and episc. see, prov. Perugia, Italy, 15 m. by rail S.E. of Perugia, the birthplace (1182) of St. Francis Bernardone, founder of the Franciscan order (1209); his bones (since about 1822) have been interred in a crypt underneath the double church of the Franciscan order. These two edifices, both built between 1228 and 1253, stand one above the other, and are adorned with frescoes by Giotto, Cimabue, Memmi, and others. Assisi contains also a church built out of a temple of Minerva, a cathedral (12th to 13th century), the tomb of St. Clara, founder of an order of nuns, and below the town the grandiose church of Sta. Maria degli Angeli, built (1569) over the oratory of St. Francis. Here were born the Latin poet Propertius (middle of 1st century B.C.) and the Italian poet Metastasio (1698). Pop. (1901) 17,240. See Cruikshank's *The Umbrian Towns* (1901).

Assisi, ST. FRANCIS OF. See FRANCIS.

Assiut, ASSIOUT, or SIUT. (**1.**) Province (mudirieh) of Upper Egypt; area, 840 sq. m.; pop. 782,720, 30,000 of them being nomads. (**2.**) Capital of above prov., between l. bk. of Nile and Bahr Yusuf; 27° 10′ N.; is the site of a Nile barrage and lock. Pop. (1897) 42,078.

Assize of Clarendon (1166), Henry II.'s first measure of judicial reform, remarkable by its institution, in criminal trials, of the germ of the jury system—the justices and local sheriffs trying accused persons by grand juries of the county. With the *Assize of Northampton* (1176) it was effectual in removing the administrative machinery from the power of the barons. See Stubbs's *Select Charters*, 140–146 (8th ed. 1895).

Assizes, the sittings of the judges of the High Court at the various towns which they visit periodically on their circuits for the trial of civil and criminal cases—the whole of England and Wales, outside the district of the Central Criminal Court, being for this purpose divided into circuits. All questions of law as well as of fact can be disposed of as fully as in the High Court. The names of all the judges are included in the commissions, but in practice only the judges of the King's Bench Division go on circuit. The King has power to appoint any King's counsel, or serjeant-at-law, or county court judge a commissioner of assize, with all the powers of a judge of the High Court.

Assmannshausen, vil., prov. Hesse-Nassau, dist. Wiesbaden, Prussia, on the r. bk. of the Rhine, 16 m. W. of Mainz; produces a well-known wine, and has alkaline springs. Pop. (1900) 1,028.

Associated Counties, those counties in the east of England which united in 1642 to raise a Parliamentary army, and to keep the war outside their boundaries. The association included Essex, Cambridge, Norfolk, Suffolk, and Hertford, and, at a later date, Lincoln and Huntingdon. The force was first commanded by Lord Grey of Werke, and later by Cromwell.

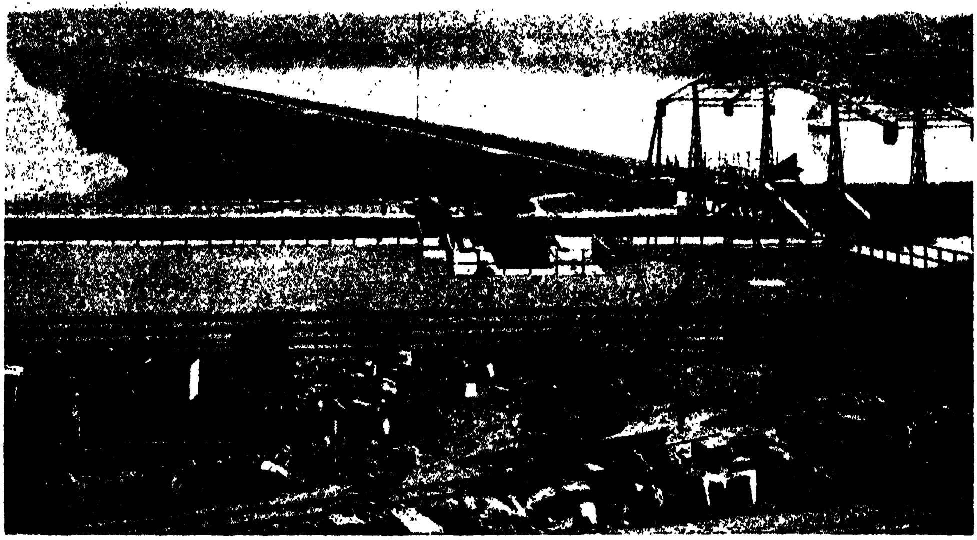
Associated Press. See PRESS ASSOCIATION.

Associates are clerks of the Crown Office, and, as such, officials of the King's Bench Division of the High Court, whose duties are mainly concerned with the trial stage of legal proceedings. They prepare the cause lists, attend the judge in court, note the judgment, enter the verdict, and deliver the 'record' to the proper party. They also keep the records of the court. They must be barristers or solicitors.

Association, THE, in William III.'s reign, was formed in 1696 for the security of William's person and government, as a result of a plot—the Assassination Plot—to kill William. The Association was popular; its badge an orange ribbon, with the words 'National Association for King William' in letters of gold.

Association Football. See FOOTBALL.

Association of Ideas, the manner in which, or principle according to which, ideas or images succeed each other in the mind when their succession is not interrupted from without, or determined by logical thinking. By Hume and Hartley the conception was given a fundamental importance in psychological and philosophical theory, and their general view has been maintained since their time by a line of thinkers to which the name of the Associationist School has been given, and of which the most prominent later representatives have been the Mills and Professor Bain. The philosophical application of the conception has all along been a matter of dispute, while within recent years the purely psychological significance and range of the conception have also been the subject of much critical discussion. Various laws of association have been formulated from the time of Aristotle onwards, but the two most generally accepted are those of Contiguity (ideas that have once been presented together tend to suggest each other) and Similarity (ideas presented at different times, but resembling each other, tend to suggest each other). It is a disputed question whether one of these two laws is more fundamental than the other, and, if so, which. Those who hold contiguity to be more fundamental, argue that the explicit consciousness of similarity involves comparison—*i.e.* already implies the presence of *both* similars before the mind. So that, if we represent the similar ideas by XY and XZ (resembling each other in respect of the common element X), the really operative principle of revival is the contiguous association of the common X, now present in XY, with Z, its former associate in XZ; and the consciousness of the similarity of XY and XZ can only exist when XZ has thus been reinstated alongside of XY. But since XZ is not, to begin with, before the mind, but exists only as a memory trace or residuum, the above analysis implies a process, not in consciousness, by which the present X operates the trace or residuum x in the residual whole xz. This process is called by Ward 'Assimilation;' and he points out that such a process is implied in all association, contiguous and similar alike. For in every case the present idea can operate only through the corresponding memory trace, apart from which it would be a new idea, and awaken no memories at all. And it is a process distinct from that of association, because X and x are not, as X and Z are, distinct ideas before the mind. Thus contiguity remains the only law of association proper, but implies the action of a prior law of mental process—prior, because assimilation is implied in perception as well as in memory. From this point of view, a lower limit has been assigned to the action of association, which cannot come into play until after a considerable development of perception, since traces of impressions serve at first only for the perceptual recognition of objects without constituting a distinct memory of them. From the other or higher side, it has been shown that the action of mere association is continually being modified by the thinking process whose material it supplies. See Stout's *Analytic Psychology* (1896), vol. ii. bk. ii. ch. 5 and 6. For a general view of the place of association in mental life, see PSYCHOLOGY. For more special criticism of the psychological doctrine of association, see Bradley's *Principles of Logic* (1883), bk. ii. pt. ii. ch. 1; Külpe's *Outlines of Psychology* (trans.), sec. 27-33 (1859); and articles in *Mind*, July 1893 and Oct. 1894, by Ward. For the philosophical doctrine of associationism, see HUME and MILL.



The Nile Reservoir and Dam, Assouan.

Assoilzie, a term used in Scots law signifying 'to acquit' or absolve from the charge made.

Assonance, a kind of imperfect rhyme consisting in the recurrence of the same vowel sounds. It differs from rhyme proper in paying no regard to the accompanying consonants. (See RHYME.) *Pain* and *care*, *waver* and *fairest*, are examples of perfect assonants. The oldest romances of the French *trouvères* are generally assonantal, one vowel sound being often carried through the whole composition; but French poets early rejected assonance and restricted themselves to rhyme. Nevertheless, some of the younger contemporary French poets, in their attempt to widen the range of their lyric poetry, have recently essayed the reintroduction of assonance. In Spain it has more than held its own against the more highly developed forms of rhyme imported from Italy, and has retained its position in the romance (or ballad) metres, in the dramas of Calderon and Lope de Vega, in popular songs, and in lyric poetry generally. Its most striking development, however, is to be found in Celtic poetry, which compensates for its almost total absence of perfect rhyme by the establishment of a highly artificial and intricate system of assonantal harmonies, which includes not only the usual terminal correspondence of one line with another, but also a further assonance between the terminal word of one line and a medial word in the line following, together with the regular employment of internal 'chiming' within the bounds of the line itself. Assonance is only suitable to languages in which the vowel sounds predominate over the consonants. Hence, while rejected in English, it is tolerated in Scottish poetry.

Assos (now BEHRAM), ruined city at the entrance to Gulf of Adramyti, Asia Minor, opposite the island of Mitylene or Lesbos, and 12 m. E. of Cape Baba. See *Investigations at Assos*, ed. F. H. Bacon (1903, etc.).

Assouan, or ASWAN, in Upper Egypt, at the first cataract of the Nile, the site of the *barrage* or dam built by the Egyptian government after the design of Mr. W. Willcocks, the contractors being Messrs. John Aird and Co., who are to receive for the work £4,800,000 in thirty annual instalments. The dam, which is 2,187 yards long, is designed to form a reservoir regulating the flow of the Nile and irrigating the surrounding country. It is built of solid masonry, weighing a million tons, with a sloping buttress throughout its length, but having 180 under-sluices, which when opened will allow free passage to the early floods the later annual inundation being, of course, conserved. At its present level the dam will hold up no less than 35 milliards of cubic feet of water; and it was intended (by adding to its present height) that it should be capable of impounding double that volume of water, thereby, it is estimated, providing for the irrigation of 600,000 acres of sugar-cane and cotton land. This scheme, however, has been postponed (March 1905) owing to the development by Messrs. Atcherley and Pearson of a new theory regarding the stresses on masonry dams. Navigation is provided for by a 'ladder' of four locks. The dam was completed on July 31, 1903, and formally opened by the Duke of Connaught in December.

Assumpsit, a form of action abolished by the Common Law Procedure and Judicature Acts. The action was for damages in respect of the breach of a simple contract, and was so called because in the pleadings it was always stated that the defendant undertook (*assumpsit*) to perform the contract.

Assumption of the Virgin, a day observed by the Eastern and Western Churches, but ignored by Protestants, which commemorates the ascent of the Virgin Mary into heaven. The belief in this miracle cannot be traced before the 6th century.

Assur, ASUR, or ASSHUR, the ancient national god of Assyria.

Assurance, LIFE. Life assurance (or insurance) may be defined as a system or business the object of which is to provide a capital sum as compensation against loss by premature death, in return for a comparatively small sum, called the *premium*. The business originated from marine insurance; for merchants sending goods by sea in early times usually accompanied the ship themselves, and were liable to capture by Moorish or Turkish pirates. With a view to providing the ransom necessary to secure their release, it became customary for them before embarking to pay an agreed premium to certain individuals, called underwriters, who were willing to guarantee payment of the ransom in the event of the merchant being captured. From this beginning the practice was gradually extended to insuring the lives, first of mariners, and then of other persons, the underwriters agreeing, in return for a certain premium, to pay a fixed amount (called the *sum assured*) if the person insured should die within a year. The document embodying the contract was called the *policy*, and the same term is applied to all the widely different forms of insurance contract which have since been invented. The premium charged appears to have been not less than 5 per cent. of the sum assured, irrespective of the age of the life insured - probably because that was the rate usually charged for insurance of ships at the time. It has been suggested that this rate was fixed because the annual rate of mortality in London was about one in every twenty persons; but, as a matter of fact, the mortality was never so heavy, even during the visitations of the plague. In 1574 Queen Elizabeth granted a patent to Richard Chandler, under which he established a Chamber of Insurance in London, with the object of regulating all contracts of insurance; but this chamber, with probably all its records, was destroyed by the great fire of 1666. The earliest recorded life policy was issued on June 18, 1583, and provided that if a certain William Gybbons should die within twelve months, the underwriters would pay £383, 6s. 8d., the premium being at the rate of 8 per cent. He died on May 29, 1584, and the underwriters refused to pay, on the ground that he had not died within twelve months of twenty-eight days each; but the court decided that the twelve months mentioned in the policy meant a complete year, and therefore ordered payment to be made. The object of these early insurances was undoubtedly to protect creditors, no mention of life insurance as a provision for wife and children being made until 1622. It was customary to buy appointments in those days; and if the purchaser, as frequently happened, had not sufficient money of his own to pay the purchase price, he borrowed it on security of the salary attached to the appointment. As the salary would cease at death, the lender might lose his money if the borrower died soon after purchase, and a policy of assurance therefore became an essential feature of such transactions. An 'Office of Assurances' succeeded the Chamber of Insurance above mentioned, and exercised much the same functions. All policies of assurance could be registered there *verbatim*, and commissioners were appointed to hear and decide disputes; but probably this office related chiefly to marine insurance. Up till 1699 all life insurances appear to have been underwritten by individuals, and the first scheme for granting assurances by an association, 'The Society of Assurance for Widows and Orphans,' was established in that year. It was to consist, 'when full,' of 2,000 members, who were to contribute 5s. each on entry to pay for the first claim, and 5s. on every subsequent death that occurred among the members, thus providing a sum of £500 for the widow and children. The number of members did not amount to 1,000 until nearly eight years had elapsed, and at that time the sum paid at each death was about £220. The association seems to have come to an end by 1712. 'The Amicable Society for a Perpetual Assurance' was established in 1705, and obtained a charter in the following year. It was to consist of 2,000 members, each of whom paid 10s. as an entry fee, and an annual subscription of £6, 4s. One-sixth of the contributions was to be divided amongst those who died in the first year, one-third in the second year, and so on until, in the fifth and all subsequent years, five-sixths of the contributions were to be divided—the remainder, with all profit made by the sale of annuities, being accumulated as a *reserve*. Thus the amount of each claim depended on the number of deaths in the year it occurred, as well as on the number of members, and in consequence it varied very considerably, increasing from about £30 the first year to about £90 a few years later. Its average amount up to 1749 was about £93, and after that date it increased to as much as £260 in 1760, falling again to £125 the following year. It will be noted that all the members paid the same contribution irrespective of their ages; but the precaution was taken of admitting no person under the age of twelve years or over fifty-five (afterwards altered to forty-five). Not until 1807 was the contribution made to vary with the age at entry; and thus the older entrants had an advantage over those who were younger. This society continued to transact business for about one hundred and sixty years, and was finally amalgamated with the 'Norwich Union' in 1864. The main distinction between these two societies lies in the fact that one set aside part of the contributions to form a reserve (albeit on no scientific basis), and the other did not; and they are a striking illustration of the principle that no assurance society can be permanent unless it establishes a sufficient reserve. Attempts have been made over and over again to establish companies on what is called the *assessment* principle, which is to form no reserve, but make calls upon the members each year of sufficient amount to pay the claims of that year. In the early years of such a company the mortality is light and the calls are small, because the average age is small, and most of the lives are in good health, as the entrants are usually examined by a doctor, and all the unhealthy or diseased are rejected; but with the lapse of time, unless a *constantly-increasing* number of new entrants is obtained, the average age increases and the proportion of healthy lives decreases, so that the rate of mortality increases rapidly. The amount of the annual call must, therefore, be raised, and this not only renders it more difficult to obtain new entrants, but increases the number of those who drop their policies and withdraw from the scheme, necessitating still further increases in the calls made upon those who remain. The result is that those who are still young and in good health can obtain insurance more cheaply in offices established upon sound principles, and therefore withdraw in large numbers. The bulk of those who remain are of advanced age or in bad health, and the death-rate therefore becomes so high that the annual calls are prohibitive, the scheme at last collapses, and nothing is left for the unfortunate remnant of members. Since no association can obtain a *continually-increasing* number of new entrants, every such scheme must inevitably end in disaster, and the experience of scores of such companies has proved the unsoundness of the assessment principle over and over again. Not a single company now transacts business on this plan in the United Kingdom.

Up to 1720 about fifty assurance societies were started (most of them on unsound principles), but the bursting of the South Sea Bubble in that year swept away every one of them except the Amicable. At this period it was practically impossible for any association to obtain a charter of incorporation to enable it to carry on the business of life assurance. Any such association was, therefore, a mere partnership, and every member was individually liable for the whole debts of the association. There were many other drawbacks to unincorporated associations, among which may be mentioned the difficulty in the way of taking legal proceedings or holding property; and these led to a series of attempts to secure incorporation by purchase of existing charters, which had been granted for other purposes. For example, a charter had been granted in 1690 to 'The Governor and Company of the Undertakers for Raising House Water in York Buildings,' empowering them (among other things) to purchase lands; and the company having got into difficulties, sold their charter in 1719. Now an act passed in that year, in order to facilitate the sale of the estates which had been forfeited to the government in the Jacobite rebellion of 1715, empowered any corporation which purchased any of those estates to grant annuities; and the purchasers of the charter therefore proceeded to buy certain of the estates, and to transact annuity and assurance business. A practice of insuring lives as a pure speculation grew up about the middle of the century, and spread to an extraordinary extent. For example, when any well-known person was said to be ill, large sums were insured on his life, the premium varying with every rumour as to his state of health; and the evils of this gambling on lives became so apparent that the celebrated Gambling Act was passed in 1774, rendering it illegal to effect any insurance on a life unless the person effecting the insurance had a pecuniary interest in the life.

The first office to transact life-assurance business on scientific principles was the Equitable, founded in 1760, owing chiefly to the exertions of one Dodson who wished to get his life insured, but was refused admittance to the Amicable, as his age was over forty-five. The plan adopted by the Equitable was to fix both the sum assured and the premium at the time of making the assurance, so that by payment of a fixed annual premium a definite and a certain sum was secured at death whenever it might happen. The rate of premium was regulated by the age at entry, and the scale adopted was derived from the Northampton table of mortality, which overstates the mortality throughout the greater part of life. The great majority of the premiums were, therefore, too high, and after payment of all claims and expenses, and making the necessary reserves for future claims, a surplus was gradually accumulated. This was divided among the members from time to time, thus originating the modern system of bonus-giving. The same table was adopted by most other insurance companies from this time onward, and was not entirely discarded until more than a century later. Had the errors of this table been in the other direction, making the premiums too small, there can be little doubt that the early insurance companies would have become involved in difficulties, and the growth of the business would probably have been checked for a generation. As it was, the number of companies increased rapidly, and in 1870 there were 113 offices, insuring a total sum of £329,000,000 under about 638,000 policies, against which liabilities they held funds of about £92,000,000, and an annual premium income of about £9,500,000. Shortly before this date the number of companies was larger; but a rage for amalgamations set in, and many companies were amalgamated in the most reckless manner. Two well-known companies, the Albert and the European, failed from this cause, having respectively absorbed no less than 26 and 40 others; and these disasters threw much undeserved discredit upon the principle of amalgamation. The amalgamation of small companies on well-considered terms is generally advantageous, the union resulting in a company which is stronger than either of the original companies, owing to the risks being spread over a larger area, thus adding to stability; and the fusion of the two organizations furnishes an opportunity of reducing the expenses of management. The amalgamations effected by the Albert and European, however, were not of this nature, having been conducted on the most extravagant or even dishonest terms. The Life Assurance Companies Act of 1870 was framed with the object of preventing the repetition of such scandals, and protecting the public against unsound companies - not by exercising any control over the management of the companies, but simply by making them publish sufficient information regarding their transactions to enable any competent person to understand their true financial position. The chief provisions of the act are that every company transacting life assurance business in the United Kingdom must publish an annual balance sheet and revenue account in a prescribed form, and periodical valuations of liabilities and assets; the terms of every amalgamation must be made public, and receive the sanction of the court; and no new company can commence business until it has deposited £20,000 with the Board of Trade as a guarantee to the policy-holders. The spirit of the act has been tersely expressed in the phrase 'freedom and publicity,' and its object has been attained with remarkable success. The force of public opinion has compelled most companies to adopt more and more stringent methods of valuation, thus strengthening their position; and the well-deserved confidence inspired by this movement has helped to foster a large increase in the business. The deposit of £20,000 has proved a considerable check on the formation of new companies, and the tendency is for the number of companies to diminish while their size increases rapidly. Excluding American and foreign companies, there are 85 offices transacting ordinary life assurance business and 10 transacting industrial business in the United Kingdom, the extent of their operations being indicated by the figures in the following table. The assets are increasing by about £11,000,000 each year, and new ordinary assurances to the amount of about £45,000,000 are effected annually.

Ordinary insurance companies are those which transact business among the upper and middle classes, the policies issued by them being seldom for less than £100 each, and the premiums being payable yearly, half-yearly, or quarterly. Industrial companies, on the other hand, confine their operations to the working classes, their policies usually being for sums of about £10 each or even less, and the premiums being collected by weekly instalments. As each premium is generally only a few pence, and its collection involves the visit of a paid collector to the house of the assured, the expense of conducting the business is necessarily very great. The British workman, however, prefers this system to the cheaper but (to him) highly inconvenient method of paying his premiums to the office in a lump sum once or twice a year.

In 1864 the government adopted a scheme for enabling assurances to be effected through the Post Office. The amount which can be assured is not less than £5, nor more than £100, on a life of either sex between the ages of fourteen and sixty-five, and not more than £5 on a child between the ages of eight and fourteen. Although the security offered is without parallel, and the government may be said to have an agent to push the business in every post office in the kingdom, and the premiums can be paid in instalments of 1s. through the medium of the post-office savings bank, the scheme has not been a success, probably because the government pays no commission to agents for the introduction of business. The total number of policies in force is only about 12,000, insuring a sum of about £720,000; and the number of new policies issued each year is about 800, for the sum of £43,000.

	Ordinary Companies.	Industrial Companies.	Total.
	£	£	£
Sum assured	616,911,783	181,135,538	798,047,321
Assets	278,891,384	21,512,384	300,403,768
Annual premiums received .	21,259,186	8,422,577	29,681,763
Annual interest received . .	8,755,116	615,503	9,370,619
Annual claims paid	15,881,168	3,410,642	19,291,810
Annual surrenders paid . .	1,005,723	35,372	1,041,095
Annual cash bonuses and reductions of premium paid .	893,426	2,019	895,445
Annual commission and expenses paid	2,938,106	3,598,207	6,536,313
Percentage of expenses to premiums	13·8	42·7	..

As a further encouragement to assurance, the government allows every income-tax payer to deduct from his income the amount of any premiums paid to any British office for assurances, or for deferred annuities, on the life of himself or his wife, to the extent of one-sixth of his total income.

Ordinary insurance companies may be divided into two classes—(1) Mutual Companies, which have no shareholders, so that all the profits of the business belong to the policyholders; and (2) Proprietary Companies, which belong to a body of shareholders, who receive a share of the profits in return for the additional security furnished by their capital. As in most cases the dividends paid to the shareholders are only a small part of the total profits, this distinction is of very little importance to the policyholder. Most companies issue two classes of policies—*viz.* those which share in the profits and those which do not, the latter being subject to smaller premiums, as they have not the chance of being increased by the addition of bonuses. It is usually considered more advantageous to insure under the 'with profit' class, as in a well-managed office the bonuses to be received will, on the average, be more than the equivalent of the difference in the premiums. Some offices issue a third class of policy, under which future bonuses are anticipated and applied in reduction of the premium, which is thereby made lower than the 'without profit' rate. Such policies are, however, liable to be reduced in amount, or to have their premiums increased, should the bonus fall below the anticipated rate. The most common form of contract is a 'whole life' policy. This provides that if a fixed premium (annual or otherwise) be regularly paid to the office during the whole life of the assured, the office will, on his death, pay a fixed sum (with or without bonus as the case may be). Varieties of this are policies where the premium is either a single payment or ceases after a fixed number of years. Another form of almost equal popularity is endowment assurance. This kind of policy provides that the sum assured shall be payable on the life assured attaining a specified age, or at his death, if that occurs before the agreed age is attained, thus furnishing a provision for his own old age, in addition to a provision for his dependants in the event of his premature death. The Married Women's Property Acts of 1870 and 1882, and the Married Women's Policies of Assurance (Scotland) Act, 1880, provide that policies may be effected so as to form trusts for the benefit of the assured's wife and children, and thus be protected against his creditors should he become bankrupt.

When a policyholder desires to stop payment of the premium and give up his policy, the office will generally return him a part of the premiums he has already paid. This return, which is called the surrender value, usually varies from one-third to one-half of the premiums paid in ordinary cases, but may be as much as, or even more than, the whole of the premiums, if the policy has been in force for many years, and the life assured is of advanced age. Most companies will grant loans on security of their policies, to an extent closely approaching the surrender value.

The calculation of premiums for life insurance is based upon the theory of compound interest, combined with the probabilities of human life; and an estimate of these probabilities is, therefore, a necessary preliminary to the calculation. Many tables have been formed which show the rate of mortality prevailing at different places or among different classes of the population, among which may be mentioned the Carlisle Table, which was for many years the standard table employed by most offices; and the Institute of Actuaries Tables, published in 1869, which, with the Select Tables deduced therefrom by Dr. Sprague and published in 1882, have gradually supplanted the Carlisle Table, and are now generally regarded as the standards. Applicants for insurance are almost invariably put through a searching examination by a doctor, and many inquiries are made with a view to ascertaining their state of health; and, as a rule, none are admitted unless this is found to be satisfactory. In consequence, practically all new entrants are in excellent health, and the rate of mortality among them is very low. In the course of time some of them fall into bad health, and the rate of mortality gradually rises, so that the mortality among a body of men who have been insured, say, ten years is much heavier than the mortality among a similar body of the same age who have been recently admitted. The rate of mortality, therefore, depends not only on the age, but also upon the length of time the lives have been insured; and as this peculiarity is due to the office selecting the good lives and rejecting the inferior ones, tables which allow for it go by the name Select Life Tables. In constructing every standard table used prior to 1882, all lives of the same age were grouped together irrespective of the length of time they had been insured, thus forming what is known as an *aggregate* mortality table; and although such tables are convenient for many purposes, especially for making a periodical valuation, their employment in the calculation of premiums results in the rates being too low for young entrants and too high for entrants of advanced age. The above-mentioned Select Tables are, therefore, generally adopted as the basis for the calculation of premiums. In the calculation provision has to be made for the expense of conducting the business, and a margin allowed to cover any unforeseen contingencies; the addition made on those accounts being called the [illegible] is the figure arrived at before any allowance has been made for expenses or contingencies. The following table shows the 'expectation of life' (1) of newly-entered male lives; (2) of male lives who have been insured for ten years; (3) of assured male lives according to the aggregate method; and (4) of the general population. The figures in column (1) are all greater than the corresponding figures in column (2), thus showing the superior longevity of newly-entered lives over those who have been insured for a number of years. A comparison of columns (1) and (3) shows that the aggregate method overestimates the longevity of young entrants, and underestimates it in the case of those entering at age forty and upwards; and a comparison of column (4) with the other three columns shows that assured male lives as a class live considerably longer than the general male population.

Age.	EXPECTATION OF LIFE			
	Of newly-entered Males.	Of Males insured for more than 10 years.	Of Males, by the aggregate method.	Of the general Male population.
	(1)	(2)	(3)	(4)
20	43·3 years	42·4 years	43·7 years	39·5 years
30	35·6 ,,	34·9 ,,	35·6 ,,	32·8 ,,
40	28·2 ,,	27·6 ,,	27·9 ,,	26·1 ,,
50	20·9 ,,	20·5 ,,	20·6 ,,	19·5 ,,
60	14·8 ,,	14·0 ,,	14·1 ,,	13·5 ,,
70	10·3 ,,	8·7 ,,	8·7 ,,	8·5 ,,

The rate of mortality also varies in the different classes of assurance—policyholders in the endowment assurance class having greater longevity than those in the 'whole life with profits' class, who in turn are superior to the holders of whole life policies without profits. Although female *annuitants* are, on the average, longer lived than male annuitants, *insured* female lives are inferior to insured male lives until they become middle-aged; and to allow for this, most companies charge an annual extra premium of 5s. per cent. for all insurances on the lives of females under the age of fifty, the extra being removed when that age is reached. The same extra is charged by some offices for insurances on the lives of persons who have not been vaccinated, while others admit them only on the condition that the sum assured is not to be paid if death occur from smallpox. Extra premiums, at various rates, are charged in the case of persons engaged in hazardous occupations *e.g.* mariners, coal-miners, masons, etc., or in the retail liquor trade, as well as in the case of persons residing in unhealthy climates. Persons engaged in active military service are charged extras varying with the nature of the risk run by them. In the S. African war the usual charge was from five to seven guineas per cent. the first year, in addition to the ordinary premium; and owing to the heavy mortality [illegible]ed, [illegible] this la[illegible] was found to be barely sufficient to compensate the offices. Several companies, however, have schemes for insuring the lives of military men at a small extra, usually about 10s. per cent. per annum payable throughout the whole term of the assurance, instead of a heavy extra payable only during active service, thus freeing the insured from the risk of being called upon to make an inconveniently heavy payment. These schemes also enable the insured to reside in any part of the world without payment of any further extra.

Owing to the competition between the different offices, there has for many years been a decided tendency to steadily relax the conditions of assurance, and many companies now free their policies, after they have been five years in force, from all conditions except payment of the premium. See *Text-book of the Institute of Actuaries*, pt. i. and ii.; *Journal of the Institute of Actuaries and Assurance Magazine.*

Assurance, LEGAL, as defined in the Mortmain and Charitable Uses Act, 1888, includes a gift conveyance, appointment, lease, transfer, settlement, mortgage, charge, incumbrance, devise, bequest, and every other assurance by deed, will, or other instrument. In short, an assurance includes any act in the law, or instrument, by which an estate in land may be created, extinguished, enlarged, merged, defeated, transferred, or released. Assurances may be divided, in respect of the source of their validity, into (*a*) common law assurances—*e.g.* feoffments, exchanges, releases; (*b*) customary assurances *e.g.* assurances of copyhold; (*c*) statutory assurances —*e.g.* a conveyance on sale under the Settled Land Acts.

Assur-bani-pal. See ASSYRIA and SARDANAPALUS.

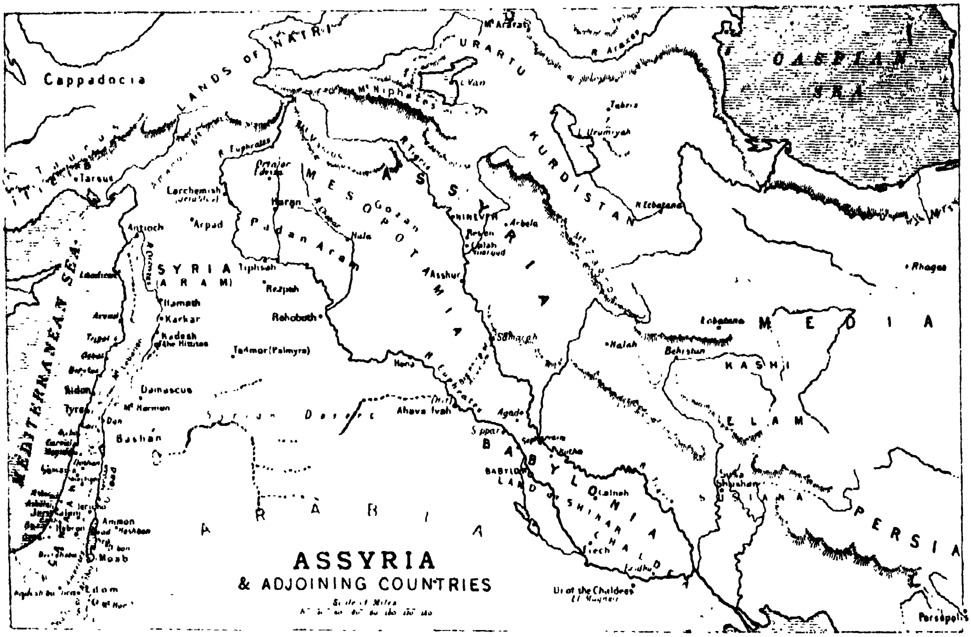
Assynt, LOCH, in the par. of Assynt, Sutherlandshire, Scotland, 8¼ m. W. by S. of the head of Loch Shin. Length 6¼ m., by ½ to ¾ m. wide. It drains W. into the Minch. The trout fishing is good.

Assyria. This name is derived, to all appearance, from the native Assur or Asur, a word which was borrowed by the Hebrews under the form of Asshur, and which is frequently pronounced, in the East, Athur, the ancient Aramaic form. The name Assur, standing for Assyria, is derived from that of the city Assur, the old capital of the country, which, in its turn, was so called after the god Assur, the patron divinity of the land. Another form of the name, not in general use, was Ausar. (There are two suggested etymologies for Assur or Asur one being that it means 'the holy one,' and the other that it is for Assar, from an older Ansar, the god personifying the heavenly host.)

Assyria proper was that tract of country to the east of Mesopotamia having as its E. boundary the modern Kurdistan. Its S. boundary was Babylonia, often called Kar-Dunias in the inscriptions. On its N. border it had the land of Armenia, called Urartu (Ararat) and *mât Mannda* (the land of the Vannites) in the inscriptions. Its W. boundary embraced a certain portion of the country on the W. bank of the Tigris, and therefore encroached slightly on Mesopotamia proper. The country was exceedingly fertile, with excellent clay for brickmaking and pottery (including tablets), and also good building stone, in the possession of which it had the advantage over Babylonia.

The ancient capital, Assur, now called Kalaat Shergat, about 60 m. below Mosul, was the residence of the early kings and viceroys; but the place was seemingly abandoned as the capital about 1300 B.C., and Nineveh substituted. It is noteworthy that the ancient form of the name of this city is Ninua or Ninâ, and that there was a little town of that name in the small kingdom of Lagas, in Babylonia, so called after the temple of the goddess Nina, which was situated there. The origin of the name was in all probability in both cases the same. Nineveh is now represented by the mounds of Kuyunjik and Nebi Yunus, opposite Mosul.

Another important city was Calah, the Kalakh of the inscriptions, about 12 m. S. of Nineveh. It is now represented by the mounds known as Nimrud. The city of Resen probably lay in the same neighbourhood, and has been identified with the modern Selamiyah. A city Res-eni (which is the same name) is mentioned by Sennacherib, but seems to have been situated to the north of Nineveh. The name, however, was in all probability a common one. Rehoboth-Ir ('the streets of the city') seemingly indicated a suburb of Nineveh, and if so, must be the Rêbit Ninua ('streets of Nineveh') on the north-east, towards Khorsabad. This last was named in ancient times Dûr-Sargina, or 'the fortification of Sargon,' and was built by him on the site of a city called, before his time, Magganubba. Another important city was Arbela, the modern Ervil, near the mountains on the east. It was an important centre of Assyrian worship, the patron goddess of the city being Istar.



The date when the colonists from Babylonia established themselves in Assyria is doubtful, but it is generally regarded as having taken place about 2500 B.C., when the amalgamation of the Semitic and the non-Semitic elements of the population had already been accomplished. A slight difference in the racial type of the Babylonians and the Assyrians suggests that the latter absorbed, in course of time, the original inhabitants of the country, who possibly had some relationship with the Armenians. On entering Assyria, the migrants brought with them the civilization, the manners, the customs, the religion, and the literature of the Babylonians, with whom they originated, and it is largely owing to them that that literature has been preserved.

The earliest rulers of Assyria, like those of Babylonia, were called *patesi*, or, in the Semitic idiom, *issaku*, rendered 'priest-kings' or 'viceroys.' Of these rulers, the most ancient known seems to have been Isme-Dagan, who ruled about 1850 B.C. He was succeeded by Samsi-Addu I., who built a temple at Assur to the gods Anu and Addu. Other rulers of later date were Igur-kapkapu and Samsi-Addu II., who rebuilt the great national temple to Assur at the same place. A brick in the British Museum gives us the names of Hallu, and Irisum, his son, who seems to have built a temple, or rebuilt the temple of the god Asur (Assur), in the city of that name, for the preservation of his life.

According to the oldest traditions of the Assyrians, the monarchy was founded by a king named Bel-kapkapu, but there is no information as to his age or deeds. It is the name of Assur-bêl-nisi-su (about 1480 B.C.) which, in the documents at present at our disposition, first comes before us in connection with history in the true sense of the word He was a contemporary of the Babylonian king Kara-indas; and during his reign, and that of Puzur-Assur, contemporary of the Babylonian king Burna-burias, and Assur-nadin-âhê, about 1420 B.C., agreements or treaties were made between the two nations with regard to their common boundaries. His son, Assur-uballit, states that his father received from the king of Egypt a present of twenty talents of gold.

To all appearance, Kara-indas of Babylonia had married a daughter of Assur-uballit, the successor of Assur-nadin-âhê, and the issue of the marriage was Kadasman-Murus, who was killed by some disaffected Kassites. The Assyrian king avenged his son-in-law by invading Babylonia, and deposing and putting to death his murderer, at the same time setting Kurigalzu on the throne. (See BABYLONIA.) The relations of Assur-uballit's successors - Bel-nirari, Pudi-ilu, and Addu-nirari I. (about 1345 B.C.)—were not so peaceful, and portions of the north of Babylonia were annexed to Assyria.

The son of Addu-nirari I., Shalmaneser I., came to the throne about 1330 B.C., and was regarded by the Assyrians as one of the more renowned of their kings. He seems to have extended the boundaries of the empire as far as the neighbourhood of Diarbekir, and is stated by King Assur-nasir-apli (885 B.C.) to have been the founder of Calah. His son was Tukulti-Ninip I., who signalized his reign by an expedition to the Sebbeneh-Su, where he had an image of himself carved on the rock. To all appearance, this king ruled also over Babylonia. About 1210 B.C. Assyria and Babylonia again came into conflict, the latter country, evidently having the advantage. The energy of Ninip-apil-Esarra, however, shortly before the year 1200 B.C., gave victory to the Assyrians, though it was not until the time of his son, Assur-dan I., that a satisfactory treaty was made with the Babylonians, whose king, Zagaga-sum-iddina, saw several of his cities fall into the hands of the Assyrians.

He was succeeded by Mutakkil-Nusku, concerning whom but little is known. The son of the latter, Assur-rês-isi (*c.* 1140 B.C.), however, again raised the name of the Assyrian empire, overthrowing the Ahlamites, Lulumites, and Kutites, and defeating Nebuchadnezzar I. of Babylonia when he attempted to take possession of the borderlands between the two countries. Still more renowned than Assur-rês-isi was his son, Tiglath-pileser I. (*c.* 1120 B.C.), whose long and complete inscriptions from the ruins of the temple at Assur speak of his numerous expeditions against the Moschians (Mesech), Kummuha or Commagene, Hatte (the land of the Hittites), Musri, on the north of Assyria, and other places—altogether forty-two lands and their princes 'from beyond the lower Zab to the other side of the Euphrates, the Hittites, and the upper western sea.' He also fought against Marduk-nadin-ahê of Babylonia, and captured many of his cities, including Babylon, Sippar, and Opis. His son was Assur-bêl-kala, who espoused the daughter of the Babylonian king Addu-abla-iddina (about 1180 B.C.); after which there is a great gap in the history of the country.

Assyrian Sculpture—Siege of a City by Assur-nasir-apli (*about 880 B.C.*).

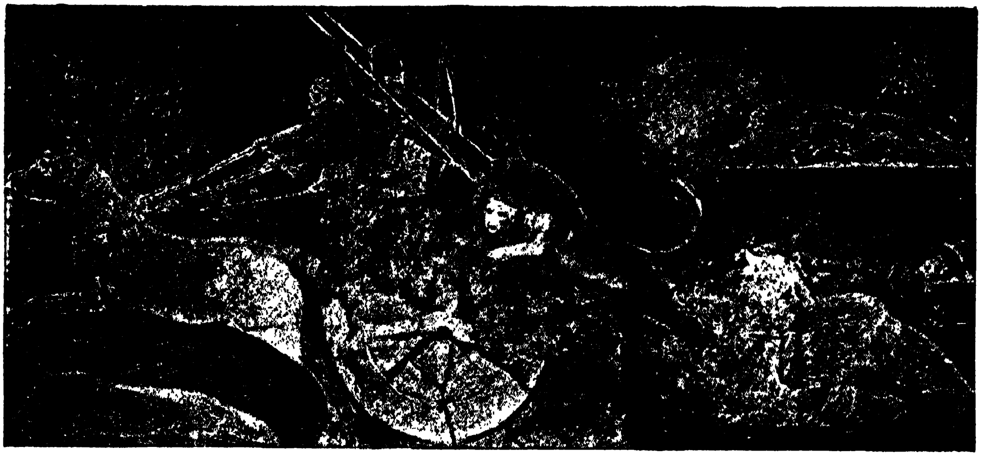
Isolated names only occur in this gap, until we come to Tiglath-pileser II., after whom the series of rulers is unbroken to the end of the monarchy. This king was succeeded by Assur-dan II. about 930 B.C. The son and successor of the latter, Addu-nirari II. (911), warred against Samas-mudammiq, king of Babylon, and his successor, Nabu-sum-iskun, with success; and when peace was concluded, it was sealed by the marriage of the daughters of the two kings by each other respectively.

Whether on account of this marriage or not is not known, but the son and successor of Addu-nirari, Tukulti-Ninip II. (890 B.C.), made himself master of Babylonia, and ruled over the country until his death in a rebellion, in which his son and successor, Assur-nasir-apli, took part. By this, his first recorded act, is the character of Assur-nasir-apli revealed. He appears to have been the cruellest of a race not renowned for mercy, and carried fire and sword on every side. In his lengthy and tedious record he states that he conquered the region of the Urumia lake (884 B.C.), Huluh, Kummuha (Commagene), and the region of the Khabur. In succeeding campaigns he marched to the region of the Sebbeneh-Su; on the east to the districts of the Radanu and the Tornadotos; Suhu (the Shuites), far to the south-east; and Carchemish, on the west. In one of these expeditions he found himself opposed by Babylonian troops; but he was never in open conflict with Babylonia. He was successful in the land of Suhu, however, and took a terrible revenge. Besides Carchemish, on the west, he took tribute from Tyre, Sidon, Gebal, Arvad, and other places. Notwithstanding his great military activity, he was also a great builder.

His son, Shalmaneser II. (860 B.C.), followed in his father's footsteps. After a military visit to Babylonia, in which he took the side of Marduk-sum-iddina against his brother, who laid claim to the throne, he turned his chief attention to the west of Assyria, where he came into conflict with Hazael of Damascus, as well as his murderer, Addu-'idri (Ben-hadad), Ahab of Israel, and other kings of the west, the principal occasion being at the battle of Qarqar (854 B.C.). He also received tribute from Tyre, Sidon, Gebal, and Jehu, 'son of Omri.' As his eldest son rebelled against him, the throne was inherited by Samsi-Addu II., a younger son, and, like his father, a great warrior, who, besides his conquests on the west, carried his arms into Media. He also attacked Babylonia, and brought away great booty.

The reign of Addu-nirari III. (811), son of Samsi-Addu, brings with it the same story of conquest: Tyre, Sidon, Israel, Damascus, Edom, Arpad, etc., felt the force of his arms. Babylon, Umlias, and places on the south-east were also overrun. It is noteworthy that the wife of this king was called Sammuramat—regarded as the same name, though not the same person, as the Semiramis of Herodotus. Shalmaneser III. (782) warred in Armenia, Damascus, and Hadrach. His successor was Assur-dan III. (772), whose reign was an unfortunate one, distinguished by many rebellions against the power of Assyria, and pestilence. An eclipse of the sun is recorded for the year 763 B.C.

With Tiglath-pileser III., his successor (745), a new dynasty begins. He is noted as the king of Assyria who went farther west than most of his predecessors, and as having deposed Azariah, replacing him, seemingly, by Eni-ilu. He is the Pul of 2 Kings 15:19, that being his name in the Babylonian canon. Later on he received tribute from Ahaz of Judah, Mitinti of Askalon, and others. In his inscriptions he relates how the people of Israel killed their king, and that he thereupon set Hoshea on the throne over them, and exacted tribute. He is renowned also as the conqueror of Çhinziros of Babylonia, whose empire he annexed to Assyria. (See BABYLONIA.) He was succeeded (727) by Shalmaneser IV., the Ululâa (Elulæus) of the Babylonian canon, a king whose five years' reign was distinguished by great attempts and but little success. He failed to capture the city of Tyre, and besieged Samaria, but died before the place was taken. To Sargon, his successor (722), fell the honour of receiving the city's submission. Sargon then led his forces against Hamath, Carchemish, and Ashdod, and on each occasion the nations around felt the force of his arms. These campaigns were followed by his long struggle with Merodach-baladan of Babylon, ending in the conquest of the country in 709 B.C., though operations against Merodach-baladan and his supporters still continued. Mesech, Commagene, Cyprus, Armenia, and numerous other countries felt the force of his arms, and sent tribute. Sargon is renowned as the builder of the great palace at Dûr-Sargina, now called Khorsabad. He was, to all appearance, assassinated in the year 705 B.C., and Sennacherib, his eldest son, mounted the throne.



Assyrian Sculpture - Assur-bani-apli in his Chariot hunting Lions.

The connection of Sennacherib with Babylonia will be found under that article. In consequence of the aid Elam had given to the Babylonians, that country was attacked by the Assyrian king. But, in all probability, the campaign which is regarded as being of the greatest importance is that against Hezekiah, king of Judah, caused by the latter's interference in the affairs of Ekron. The result was the siege of Jerusalem, which, however, was not taken, for some reason not stated in the inscriptions. (See 2 Kings 18:13 37; 19; Isa. 36, 37.) As related in the Old Testament, Sennacherib was assassinated by his sons whilst worshipping in the temple of Nisroch (Assur), or, according to the Babylonian chronicle, by one of his sons, who was leader of a revolt against him. The murderers fled to Armenia, whither, to all appearance, their younger brother, Esarhaddon, pursued them, and defeated their adherents, afterwards mounting the Assyrian throne (680 B.C.).

The new ruler was also a successful one, adding prudence and mildness to warlike zeal. He fought against Abdimilkutti, king of Sidon, whose head, together with that of the king of Sanduarri, was brought to Nineveh. It was probably about this time that Manasseh was taken with 'hooks' (or fetters) and brought to Babylon (2 Chron. 33:11). Egypt was likewise attacked, and made practically an Assyrian province. Esarhaddon also defeated, in Cappadocia, Teuspa the Kimmerian, the first of those hordes which were, later on, to join in the destruction of the Assyrian empire. Esarhaddon died in 669 B.C., when on his way to Egypt for the third time, and was succeeded by Assur-bani-apli (the great and noble Asnapper) in Assyria, and Samas-sum-ukin (Saosduchinos) in Babylonia.

The reign of Assur-bani-apli saw the culmination of Assyrian power, and also the beginning of its decline. A great rebellion in Egypt was put down; but the success was short-lived, for Psammeticus put an end to Assyrian overlordship for ever. After receiving the tribute of the kings of the west—Manasseh of Judah and his contemporaries—the Assyrian ruler had to turn his attention to the east, where the Elamites were stirring up the Aramean tribes against Assyria. The result was the defeat and death of Te-umman, king of that country. Having divided the country, and set there two vassal kings, the Assyrian ruler had to send an army to Babylonia, where his brother Saosduchinos had revolted against his authority. The result was the conquest of Babylonia, and the death of its king in his burning palace. (See BABYLONIA.) Further expeditions to Elam were found necessary in order completely to subdue that country, and were carried out successfully. Arabia and Ararat also felt the force of the Assyrian arms.

Of Assur-bani-apli's son and successor, Assur-êtil-îlâni (-ukinni), nothing is known, except that he claimed to rule over Babylonia, and began to build a palace at Calah. He was followed by Sin-sarra-iskun, the Saracos of Syncellus, under whom the Assyrian empire saw its downfall. It would seem that either he or his predecessor, foreseeing impending disaster from the Medes, raised two armies, one of which he sent to Babylonia under Nabopolassar, with orders to hold the district of Babylonia against the enemy. Nabopolassar, however, turned his arms against his royal master, and advanced with the allied forces against Nineveh, where, in consequence of a breach made in the walls by the Tigris undermining them, the city was taken, and Sin-sarra-iskun, seeing that all was lost, set fire to his palace, and perished in the flames.

Thus ended the great Assyrian empire. Of the same race with the Babylonians, whom they closely resembled, the Assyrians added to their love of art, letters, and capacity to rule a great power of organization and warlike energy. Inheriting all the literature of the ancient Babylonians, both Semitic and non-Semitic, their liking for that literature surpassed, if anything (especially from the time of Sargon onwards), that of the people of the country where it originated. Babylonian history was likewise a study to which Assyrian scribes paid attention, the more especially, apparently, with regard to those periods when the two nations came into contact for the rectification of their boundaries, etc. Babylonian laws, too, seem to have been their study only less than it was the study of the Babylonians themselves. Like the Babylonians, they were excellent agriculturists and equally good builders, and though they imitated their teachers by a large employment of brick, for the interior decorations of their palaces they used alabaster, which enabled them to produce bas-reliefs which were real works of art, and are even now the wonder of the beholder. Boastful as they were bold, they were fond of the composition of long inscriptions, and the frequent writing of reports to the king.

One of the most remarkable characteristics of the Assyrians was that aptitude which brought about their success in war. In all probability this was due to their superior mobility, and also to the perfection of their defences and their engines of attack. In the sieges which they carried on, they constructed enormous towers on wheels, which were pushed up specially-constructed causeways, approaching so close to the walls that battering-rams worked from within the towers could be brought into play. To this must be added their skilfully-made chain-mail and scale armour, which, with their enormous wicker shields, enabled their soldiers to fight to the greatest advantage. Indeed, it is not impossible that they were the masters and teachers of the ancient world in the art of war.

The religion of the Assyrians was practically the same as that of the Babylonians, the chief difference being that they gave their national god, Assur, the highest place in the pantheon. To all intents and purposes he replaced the god Merodach, who was also worshipped by the Assyrians, and with whom he seems to have been identified. See Hommel's *Geschichte Babyloniens und Assyriens* (1885); Mürdter-Delitzsch's similar title (1891); George Smith's *Assyria*, S.P.C.K.; A. H. Sayce's *Assyria: its Princes, Priests, and People*, R.T.S. (1885); Maspero's (ed. by Sayce) *The Dawn of Civilization* (1896), and *The Struggle of the Nations* (1897); J. F. M'Curdy's *History, Prophecy, and the Monuments* (1894 and 1896); T. G. Pinches' *The O.T. in the Light of the Records and Legends of Assyria and Babylonia* (1902); and for translations, *The Records of the Past*, 1st series, ed. by S. Birch, vols. i., iii., v., vii., ix., xi., 1873, etc.; 2nd series, ed. by A. H. Sayce, vols. i.-vi., 1888-92; and from time to time in the *Proc. of the Soc. of Bib. Arch.*, and *Jour. of the R.A.S.*, etc. Compare also BABYLONIA and CUNEIFORM.

Astacus, the genus to which belongs the common fresh-water crayfish of Britain.

Astarte, the Syrian Venus, is identical with 'Ashtaroth the abomination of the Zidonians' (2 Kings 23:13), and with the Ishtar of Assyria, besides having affinities with other classic deities. The licentious worship of the devotees of Astarte in her temples in Tyre and Sidon rendered the names of these cities, in the utterances of Jesus of Nazareth, synonymous with all that was wicked. There was a temple in her honour at Memphis as early as the period of the 19th Egyptian dynasty, about which time it is supposed that the cult of Astarte was brought into Egypt from Assyria.

Astatic Couple. See GALVANOMETER.

Astatki is the residue from the distillation of Russian petroleum. It is largely used for fuel in the neighbourhood of its production (Baku), and in the Caucasus and Caspian regions.

Aster, a genus of plants, with about 200 species, belonging to the Compositæ, chiefly natives of N. America. They are much cultivated in gardens, under the name of Michaelmas daisies, because they flower about Michaelmas. They are conspicuous for their pink, blue, lilac, or purple ray florets, and yellow discs. The plants vary, according to species, from a few inches to several feet in height; their leaves are willow-like, on wiry stems which become woody, but all the aerial parts die down in winter.

Aster, CHINA (*Callistephus chinensis*), a species of Compositæ, native of China and Japan; first cultivated in France at the end of the 18th century. There are now many varieties in size and colour, but all are annuals.

Aster, ERNEST LUDWIG VON (1778-1855), Saxon military engineer, born at Dresden. In 1815 he joined the Prussians, fought at Waterloo, and was made a general and inspector of fortifications. He superintended the elaborate defence works of Coblenz and Ehrenbreitstein.

Asterabad. See ASTRABAD.

Asteroids, small planets circulating between Mars and Jupiter, and thus named by Sir William Herschel in 1802. They seem to replace a single large planet, conjecturally located, before they were found, in the wide interval occupied by them, and collectively represent a term in the series of planetary distances designated as 'Bode's Law.' The first asteroid (see CERES) was discovered on Jan. 1, 1801; and on Jan. 1, 1903, the known members of the family numbered about 540. Their detection has been accelerated by the use, now almost exclusive, of the photographic method introduced by Dr. Max Wolf in 1892. Its principle is that a sensibly moving object leaves a trail instead of a dot on a plate exposed in a telescope following the diurnal movement of the stars. Through the availability of this rapid and easy process, fifty new asteroids, down to the fourteenth stellar magnitude, were registered in 1902. These bodies differ greatly in size. The largest has a diameter of nearly five hundred, the smallest of probably less than twenty miles, and there may be multitudes beyond the range of perception, constructed on the modest scale of shooting-stars. None can possess appreciable atmospheres; yet their markedly diverse albedoes suggest unexpected varieties in physical constitution. Their joint mass is almost certainly much smaller than that of the moon, but cannot be estimated with any approach to precision. The zone tenanted by the asteroids is fully 200 millions of miles in width, the mean distance of Adalberta, the nearest to the sun—except Eros—being 194 million, that of Thule, the most remote, 400 million miles, while their respective periods are three years *plus* three days and nine years *minus* one month. The distribution of these 540 interlacing ellipses presents some significant features. They are most crowded near the place where, by Bode's Law, the missing planet should have revolved—*i.e.* at 2·8 times the earth's mean distance from the sun—but there are conspicuous gaps in their scattering, and the occurrence of these just where a commensurability of periods with that of Jupiter would have come in, attests the powerful influence of the great planet over the localization of his pigmy neighbours. See authorities cited under ASTRONOMY.

Asterolepis, an extinct genus of fishes, remains of which are found in the Old Red Sandstone of Nairn, Orkney, and Shetland, in Scotland. It was covered with bony plates, marked with star-shaped tubercles, and resembled pterichthys in general configuration. See Dean's *Fishes, Recent and Fossil* (1895).

Asterophyllites (for which the synonym Calamocladies is used by some botanists) is supposed to be the foliage of certain fossil Equisetaceæ, such as calamites, which flourished principally in the Carboniferous epoch. The branches are long and slender, and bear at their numerous nodes whorls of little linear or lanceolate leaves, each with a midrib down the centre. As preserved they are usually flattened out, and have a stellate appearance. In some cases the bases of the leaves were fused to form a continuous sheath. In *Annularia* the leaflets were unequal, and lay in one plane, which was oblique to the axis of the branch. See Seward's *Fossil Plants* (1898, etc.); Scott's *Studies in Fossil Botany* (1900).

Asthenopia, weakness of sight.

Asthma, a respiratory disease, spasmodic and recurrent in character, marked by great temporary difficulty of breathing. The causes of asthma may be divided into *predisposing* and *exciting*. Heredity is the great predisposing factor. Not that a child inherits asthma; but it inherits some weakness of constitution, often neurotic, which makes it more liable to attack. Other predisposing causes are said to be gout, syphilis, skin diseases, and kidney diseases, in all of which the blood is more or less affected, and might be supposed to affect, in its turn, an unstable nervous system. Exciting causes are many and various. Almost every asthmatic patient seems to have his idiosyncrasy, both in cause and cure. An attack may be started by a sudden variation of temperature, or by a change of residence from inland to the coast, or *vice versâ*. It may follow closely on exhaustion from any cause, on sudden physical exertion, or on an error in diet.

There is no sure or marked premonitory symptom before the initial wheezing begins; half an hour before the height of an attack the sufferer may be quite at ease. A slight heaviness of breathing develops to a condition in which, to all appearance, the patient is fighting for his last gasp, with slow, loud, convulsive respiratory efforts, in which every muscle of the body seems to be strained, the face taking an appearance of anxious effort, and being often covered with sweat. In half an hour or an hour the illness may end, leaving merely exhaustion in proportion to the severity of the attack. Or the paroxysm may last for days, with occasional short intervals when it seems as though the disease had worn itself out. During the paroxysm there is undoubtedly spasm of the non-striped muscle in the bronchioles, and some hold that there is congestion of the mucous membrane.

The treatment between the attacks must depend upon the predisposing cause. For the relief of an attack, antispasmodics, stimulant or sedative, are the most generally useful, though which of them will suit any particular case can only be discovered by experiment. One patient can often stave off a commencing illness with a teaspoonful of neat liqueur brandy; another must burn a nitre-paper; another finds a stramonium cigarette most serviceable; a fourth tries all possible drugs, and journeys to Italy, Algeria, and Egypt in vain, flying at last to rooms in the East End of London whenever an attack is threatened. Chloroform will often break the course of a paroxysm, and the patient will wake well; but chloroform cannot safely be self-administered. Chloral hydrate, given every four hours until the breathing improves, will often stop an attack; but with chloral, as with injections of morphia another possible remedy - the danger of habit must be reckoned with, as well as that of an overdose if self-administered. Recently it has been found that some attacks yield to firm pressure upon the vagus nerves in the neck. A regular, healthy life will help all cases. Children developing asthma early often outgrow it as they mature, if care be taken not to tax their strength too severely.

Asti, tn. and episc. see, prov. Alessandria, Italy, 22 m. by rail S.W. of Alessandria; the birthplace of the poet Alfieri (1749-1803), to whom a marble statue was erected in 1862. Asti was one of the most powerful of the republics of the middle ages, and a great centre of commerce. Its cathedral dates from the 13th and 14th centuries; and it has a baptistery of the 10th century, and another church of the 10th or 11th. Asti is famous for its wine and its gardening, and manufactures silk, matches, cream of tartar, joinery, and produces silk cocoons. Pop. (1901) 39,251.

Astigmatism, that defect of vision in which the rays of light proceeding from a point do not reach the retina as a point, but as an area or spot. This is owing to irregularity in the refracting surfaces in front of the retina, through which the rays first pass. The treatment is by glasses made to focus the rays rightly on the retina.

Astilbe Japonica, a saxifrage from Japan, erroneously termed spiræa, because of the resemblance of its foliage and flowers to those of that species. The dark-green leaves are much divided, and the small white flowers form a conspicuous inflorescence. It requires much water, and is perfectly healthy when the pot is left standing in water. Other species are found in Japan, China, and India.

Astle, THOMAS (1735-1803), bibliophile, author of the *Origin and Progress of Writing* (1784; new ed. 1876), a work of importance, for its explanations of mediæval handwriting. His other works include *The Will of Henry VII.; An Account of the Seals of the Kings, Royal Boroughs, and Magnates of Scotland* (1792). The valuable MSS. of his collection are now in the British Museum.

Astley, SIR JACOB, LORD ASTLEY (1579-1652), Royalist general, born in Norfolk. After several years' military service in the Netherlands and Denmark, he became governor of Plymouth (1638). He fought at Edgehill, Newbury, and Naseby; but in 1646 he was defeated and captured at Stow-on-the-Wold. Imprisoned in Warwick Castle, and released at the surrender of Oxford to Fairfax, he was afterwards brought before the council in London, but allowed to return to his house at Maidstone.

Astley, SIR JOHN DUGDALE (1828-94), English sportsman, born at Rome; served in the Crimea, and was wounded at the battle of the Alma. He was a successful owner of racehorses; patron of boxing, swimming, and walking competitions, and of other sports. See his *Fifty Years of my Life in the World of Sport* (1894).

Astley, PHILIP (1742-1814), equestrian performer and theatrical manager, was a cabinetmaker who, after distinguishing himself at Emsdorff and Friedberg, during the Seven Years' War, travelled through the country as a tradesman or as a performer at fairs and markets, and subsequently gave theatrical and equestrian performances, for which he built nineteen circuses, chiefly in London (Astley's Royal Amphitheatre, 1770), Dublin, and Paris. See De Castro's *Memoirs* (1824), and Brayley's *Theatres of London* (1826).

Aston, or ASTON MANOR, par. Warwickshire, England, N. of Birmingham, with which it is partly included. The Hall and surrounding grounds were opened in 1858 as a public recreation ground. The Hall (now partly a museum, winter garden, and aquarium) sheltered Charles I. before the battle of Edgehill. The division has returned one M.P. since 1885. Pop. (1901) 77,310.

Aston, SIR ARTHUR (d. 1649), Royalist general. After several years' service on the Continent against the Poles, Turks, and Austrians, he was engaged in quelling the Scottish rebellion (1640). He took an active part in the civil war, commanding the dragoons at Edgehill, defended Reading, and thrice successfully repulsed the Parliamentary forces. His death took place two years afterwards, in the slaughter which followed Cromwell's capture of Drogheda.

Astor, Johann Jakob (1763-1848), founder of the American Fur Company; born near Heidelberg; sailed for America (1783); entered the fur trade, which he carried to the Pacific by a chain of trading stations from the Great Lakes along the banks of the Missouri and Columbia, at whose mouth he founded Astoria in 1811. At his death he left a legacy of $350,000 to found a public library (Astor Library) in New York, and the remainder of his wealth, consisting largely of real property in New York City, estimated at $30,000,000, to his son, William Backhouse (1792-1875) who added $550,000 at different times to his father's library bequest.—William Waldorf (b. 1848), great-grandson of Johann Jakob, was appointed U.S. minister to Italy (1882-5); settled in England (1891); became (1893) proprietor of the *Pall Mall Gazette, Budget*, and *Magazine*, and bought the Duke of Westminster's Cliveden estate (1893). See Parton's *Life of John Jacob Astor* (1865), and Washington Irving's *Astoria* (1836).

Astoreth. See Astarte.

Astorga, Baron Emanuele d' (1681-1736), Italian musician, born at Palermo. He developed his musical talent in the monastery of Astorga; led a life of adventure, in the course of which he visited Portugal, Italy, and England; and died in Bohemia. His best-known compositions are a *Stabat Mater* for four voices; an opera, *Dafne;* and cantatas entitled *Quando Penso* and *Torna Aprile.*

Astoria, city, Oregon, U.S.A., co. seat of Clatsop co., at the mouth of the Columbia R. It has a large lumber industry and numerous salmon canneries. Founded by J. J. Astor in 1811. Pop. (1900) 8,381.

Astrabad, or Asterabad, walled tn., cap. of prov. of Astrabad (area, 5,791 sq. m.; pop. 80,000); stands 20 m. from S.E. corner of the Caspian Sea, Persia, was formerly the residence of the Shahs, and contains the ruins of a fine palace erected by Shah Abbas. It exports rice, grain, salt, silk, caviare, and carpets by caravan to Afghanistan, and also to Russia. Pop. 25,000.

Astræa, goddess of justice, daughter of Zeus and Themis, or of Aristæus and Eos (Aurora), and the last of the celestials to leave the earth during the Iron Age (Ovid's *Metamorphoses*, bk. i.). She is the Virgin, the sixth sign of the zodiac. It is she who rears up Sir Artegal (*Faërie Queene*, v. i.). The name was often applied to Queen Elizabeth, to whom Sir John Davies (?1560-1626) addressed his *Hymns of Astræa*, a series of twenty-six acrostics making the words 'Elisabetha Regina.' Dryden's *Astræa Redux* (1660) celebrates the restoration of Charles II. Astræa was also a *nom de plume* of Mrs. Aphra Behn.

Astræa, a British second-class cruiser launched in 1893. In the British navy Astræa has been a ship-name since 1739, and it commemorates the capture of the Spanish *Astræa* at Porto Bello by Vice-admiral Edward Vernon in that year. It is associated with the capture of the *Gloire* (1795), the action off L'Orient (1795), the capture of Barbados (1796), Egypt (1801), Schomberg's victory off Madagascar (1810), and the action with the *Sultane* and *Etoile* (1814).

Astragal, a small moulding: usually applied to the bars in windows which carry the glass.

Astragalus, one of the bones forming the ankle-joint. It is commonly called the ankle, huckle, or sling-bone.

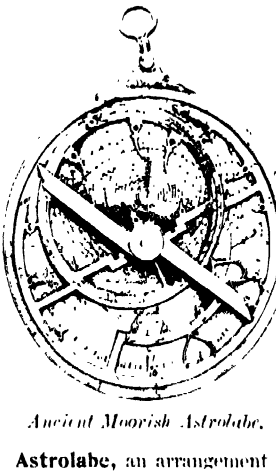
Astragalus, a large genus (1,200 species) of plants, of the order Leguminosæ, found in almost every country except Australia. Many are spiny, the stump of the leaf adhering to the stem and assuming a sharp point. There are three British species *A. hypoglottis*, 'purple milk vetch;' *A. glycyphyllos*, 'sweet milk vetch' or 'wild liquorice;' and the rare *A. alpinus*, found only on certain Scottish mountains. *A. gummifer*, a native of Asia Minor and Persia, is the source of tragacanth gum, chiefly used for stiffening textile fabrics. The seeds of *A. bæticus* are used in Hungary as a substitute for coffee.

Astrakhan. **(1.)** Government, the extreme S.E. prov. of European Russia. Area, 91,237 sq. m. Pop. (1897) 994,775, of whom 700,000 are Russians (including Cossacks), 120,000 Kalmucks, and 134,000 Kirghiz. The surface is mainly level, treeless steppe; but the Ergheni Hills, along the r. bk. of the Volga, reach 500 ft. Fishing and salt export are the main industries. The wool, soap, and caviare are famous. **(2.)** City, cap. of Astrakhan gov., 40 m. from the Volga estuary. The town consists of the 'Kreml,' the 'White City,' and the suburbs. In the first named are the bishop's palace and the cathedral (1696). The industries include soap and candle works, tanneries, distilleries, and breweries. It is the most important port on the Volga, with an export trade of £9,600,000, and an import trade of £4,760,000; and has one of the most important fairs in Russia. Fish, wool, caviare, and petroleum are the chief objects of transport into the interior of Russia; cotton goods, sugar, and manufactured articles into foreign parts, mainly Persia. Imports are cotton, fruit, rice, silk, and leather, principally from Persia and Central Asia. It has rapidly advanced since 1880. Pop. (1863) 42,800; (1897) 113,000.

Astrakhan Fur, prepared skins of Astrakhan lambs.

Astral Spirits, in the language of theosophy, 'inhabit the "astral plane," or "light," which, although belonging more especially to the realm of soul, is, nevertheless, as substantial a reality as the atmospheric air we breathe;' and, indeed, the grosser element is interpenetrated by this mystic ether. Its existence was believed in by the alchemists, to whom it was known as the *Anima Mundi*, or Azoth. See Theosophy; also *The Mystery of the Ages*, by Maria, Countess of Caithness (1887), and Nizida, *The Astral Light* (1889).

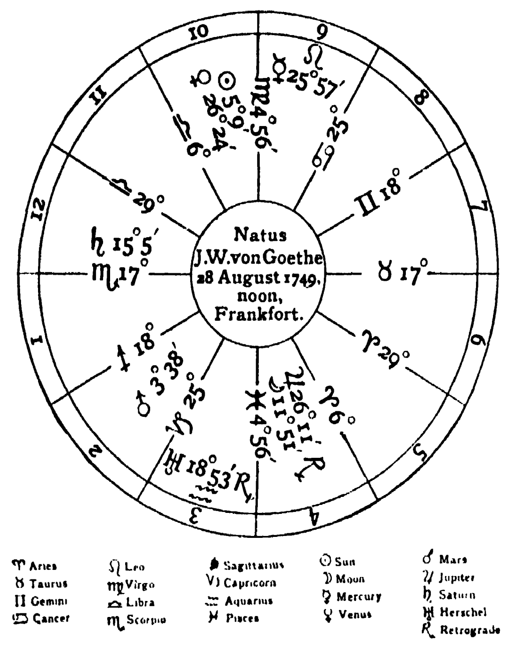
Astringents, drugs which contract tissues, chiefly by coagulating albumin. When applied in the form of lotions or ointments, they reduce the congestion of mucous membranes, and thus assist in the healing of wounds and ulcers; when taken internally, they are useful in cases of hæmorrhage or diarrhœa. Ferric chloride, sulphate of copper, alum, nitrate of silver, tannic and gallic acids, have an astringent action. Another has quite recently been made from the adrenal bodies.



Ancient Moorish Astrolabe.

Astrolabe, an arrangement of rings representing the equator, prime meridian, ecliptic, etc., which was used by astronomers in the middle ages. Chaucer wrote a *Treatise on the Astrolabe* in 1391, which was edited by Professor Skeat for the Early English Text Society in 1872. An instrument used by mariners in the age of the great discoveries for ascertaining the altitude of the sun was also called an astrolabe. It consisted of a graduated disc with an alidade pivoted on the centre. See *S.G.M.*, vol. xiv. p. 357.

Astrology is the science whereby celestial phenomena are interpreted for the direction of mundane affairs. Originally identical with astronomy, the two sciences were long regarded as one. (See ASTRONOMY.) Astrology proceeds from the assumption that a careful study of the stars may serve to guide us through life as certainly as their observation guides the mariner at sea. The astrologer's judgment is founded on the configuration of the heavens at a given moment, and depends principally on the seven planets (Saturn, Jupiter, Mars, Sun, Venus, Mercury, Moon), their 'aspects,' or the angles between them (conjunction, opposition, trine or 120°, quartile or 90°, sextile or 60°), and their positions among the 12 signs of the zodiac and the 12 'houses' of heaven. Each planet has one or two signs of the zodiac ascribed to him for his 'mansion,' and may be further 'fortified' by 'exaltation,' 'term,' 'triplicity,' or 'face;' or he may be weakened in his 'detriment' or 'fall,' or should he be 'retrograde,' 'combust,' or 'peregrine.' Among the planets, Jupiter and Venus are generally benefic, Saturn and Mars malefic. Of the aspects, sextile is good, opposition and quartile evil; conjunction is neutral. The 12 houses are equal divisions of the sky, 6 above the horizon and 6 below; and all save circumpolar stars necessarily pass once through each house every twenty-four hours. The first house, or 'the ascendant,' is that immediately below the eastern horizon, so that the stars in it are on the point of rising. The second follows immediately after; and so on to the sixth house, which contains the stars immediately below the western horizon. The seventh house is the first above the horizon, and contains the stars about to set; the eighth and ninth lie above it; and the tenth, in the 'mid-heaven,' contains the stars approaching culmination; while the eleventh and twelfth, containing stars recently risen, lie between the mid-heaven and the ascendant. The astrologer's first care would be to draw a figure of the heavens, visible and invisible, divided into 12 houses, and to mark on it the zodiacal signs and the planets at their proper places. This is called 'casting the horoscope,' or the 'nativity' if it refers to the birth of a child. He next observes which sign is rising, and takes the planet whose mansion it is for the 'lord of the ascendant,' or the querent's significator. Then, if a significator is wanted for the quesited, or person inquired about, he looks to the sign in the proper house. Thus, the lord of the seventh would stand for the querent's wife, the lord of the fourth for his father, etc. When all the evidence has been carefully weighed, judgment may be given.



Goethe's Horoscope.

(*Described and interpreted according to the principles of Astrology.*)

The 17th degree of the celestial sign Scorpio was rising upon the cusp of the ascendant at the time of Goethe's birth. The 18th degree of Sagittarius was upon the cusp of the 2nd, the 25th degree of Capricorn upon the 3rd, and the sign Aquarius was also 'intercepted in the 3rd house; 4 degs. 56 min. of the sign Pisces was upon the cusp of the 4th, the 6th degree of Aries on the cusp of the 5th, and the 29th degree of the same sign on the cusp of the 6th; the 17th degree of Scorpio was upon the cusp of the 7th, the 18th degree of Gemini upon the 8th, the 25th degree of Cancer upon the 5th, while Leo was 'intercepted' in the 9th. 4 degs. 56 min. of Virgo was upon the meridian; the 6th degree of Libra was upon the 11th, and the 29th degree of the same sign upon the cusp of the 12th.

Saturn, the planet of profundity, had just risen upon the ascendant in the sign Scorpio; the Sun and Venus were culminating in the sign Virgo; Mercury was placed in the sign Leo in the 9th house, affecting his philosophy or religion; the Moon and Jupiter were in the nadir in the sign Pisces, affecting the environment and denoting the satisfactory condition at the close of life. The planet Uranus (metaphysics) was placed in the 3rd house in Aquarius, governing the intellect; while Mars, the planet of force, was in the 2nd house, influencing finance.

Three planets occupied earthy and watery signs respectively, and one each the fiery and airy signs in the above map, while four planets were in common or mutable signs, three in fixed and one in cardinal, and no less than five planets were angular. It is from the planetary positions and aspects which they form to each other that the astrologer draws his judgment - favourable aspects, as the trines and sextiles are termed, denoting a favourable career, while the oppositions and squares give indifferent success and many obstacles to overcome.

At the moment of Goethe's birth the ponderous planet Saturn had just risen in the 15th degree of the ascendant. The luminaries and the benefic planets were angular; thus five planets occupied the angles of the Nativity. Goethe's first love was at fifteen years of age, when the Moon had progressed in his horoscope to the conjunction of the love planet Venus. It is said that from youth Goethe was never without a passion--a fact that is clearly demonstrated by the angular position of Venus and the trine aspect of the Sun to the planet Mars. Goethe's love of the mystical is fully borne out by the rising of the weird planet Saturn in the mystical sign Scorpio, and his literary ability by Mercury in the 9th house in the sign Leo, a dramatic and poetic sign. He was a student of Lavater, and also deeply interested in all scientific research work; but underlying all his studies there is to be seen that deeply metaphysical vein which his nativity so plainly denotes.

Astrology has now fallen into general disrepute. One must recollect, however, that the present reflection on astrology is not more conclusive proof of its fallacy than its former acceptance was of its truth. But even though astrology could be revived, the pretensions of modern astrologers must be abandoned. The discovery of Uranus and Neptune, not to mention the planetoids, placed them on the horns of a fatal dilemma. They might have denied the influence of the new planets altogether, but they preferred to find new influences for them. Thus they have confused the distribution of the 'mansions;' acknowledged, in effect, that up to 1845 (including all the centuries during which it was highly esteemed) the science was grossly delusive; and created the suspicion that, since new planets may be discovered at any time, we can never trust it again. Further complications have been introduced by the invention of new 'aspects,' lacking many of the geometrical properties of the old. Thus, the sesquiquadrate (135°) is not a division of the circle; and the quintile (72°) lies under the same reproach in respect of its supplement. It would seem, too, that astrologers are without the mathematical ability required to erect their 'houses' on a secure foundation, for a little knowledge of the geometry of the sphere reduces the haphazard division of houses published in astrological tables to an utter absurdity. See Ptolemy's *Tetrabiblos*; Lilly's *Christian Astrology* (1647); Sibley's *Astrology* (1789); and, for modern astrology, Foulsham's publications and Meyer's *Handbuch der Astrologie* (1891).

Astronomer Royal, the official title of the head of Greenwich Observatory. He receives his appointment directly from the prime minister, and holds office by warrant under the royal sign manual. The present astronomer royal is Sir W. H. M. Christie, K.C.B., the eighth holder of the office since its establishment in 1675. The astronomer royal for Scotland is Professor R. Copeland, director of the Royal Observatory, Edinburgh; and the corresponding office for Ireland is held by Professor C. J. Joly.

Astronomy first took definite shape in Babylonia, where, in the third millennium B.C., the sphere began to be measured, and the zodiac was delimited and divided. But it developed into a coherent science only through the formative influence of Greek genius. The theory of homocentric spheres, invented by Eudoxus of Cnidus (406 350 B.C.) and elaborated by Aristotle, represented a memorable effort to grapple with the problem of celestial movements. But the line of great astronomers started with Hipparchus (about 140 B.C.), whose adoption of the epicycles and eccentrics of Apollonius decided the plan of the great edifice raised by Claudius Ptolemæus three hundred years later. Even Copernicus did not attempt its subversion. He changed the point of view, but not the principle of interpretation. Ptolemy's *Almagest*, though undermined, stood erect until brought to the ground by the impact of Kepler's discoveries. Wren, Hooke, and Halley all divined the law of gravitation, but failed to apply it as the mainspring of the planetary machine. Newton came to the rescue; and his continental successors, Euler, D'Alembert, Lagrange, and Laplace, using the flexible methods of analysis, needed a full century to complete in its details the colossal work he had reared on a massive base. Laplace's *Mécanique Céleste* (1799-1805) was the complement to Newton's *Principia* (1687), and presented astronomy under the aspect of a solved mechanical problem.

Meanwhile, descriptive or telescopic astronomy, initiated by Galileo (1564-1642), was assuming predominant importance through the labours of William Herschel (1738-1822). Attention had until then been concentrated on the solar system, stars and nebulæ being regarded incidentally. Herschel originated their systematic study, which prescribes the leading methods of modern astronomy.

A typical 20th-century observatory combines astrophysics with astrometry. Investigations into the nature of the heavenly bodies proceed side by side with determinations of their positions and movements. For the latter purpose the transit circle is essential. It consists of a telescope movable in the plane of the meridian, attached with a large graduated circle to a rigid horizontal axis. The culmination of a star is fixed by noting the successive instants of its transits across a set of vertical spider-lines, an electric chronograph serving as the recorder, while the corresponding declination is read off on the perpendicular circle. Fifty or sixty such complete observations constitute a good night's work, and the materials accumulated serve, when reduced and corrected, for the construction of star catalogues, and for the improvement of solar, lunar, and planetary tables. Extra-meridional determinations of position on the sphere are made with the prime vertical, and the altitude and azimuth instruments; and the zenith telescope is used primarily for measuring star declinations, secondarily for investigating variations of latitude and the constant of aberration.

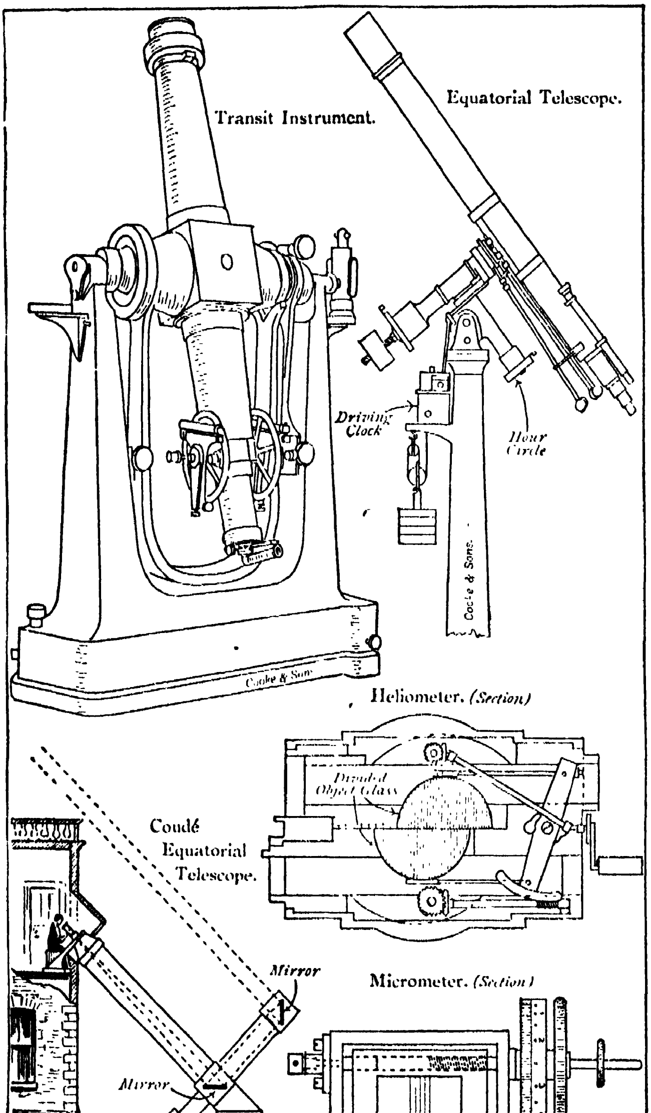
The relative situations of adjacent objects in the sky can be accurately ascertained by means of an equatorial and micrometer. A telescope is said to be equatorially mounted when it follows, actuated by clockwork, the diurnal revolution of the heavens. One of a pair of crossed axes, directed towards the pole, carries the 'hour circle;' the other, at right angles to it, supports the telescope and 'declination circle.' Any object with known co-ordinates can then, by setting the circles, be readily brought into the field of view; and to keep it there, it is only necessary to start a driving-clock, by which uniform rotation, once in twenty-four hours, is imparted to the polar axis. In the 'Coudé' form of equatorial, recently adopted at Paris, a revolving plane mirror reflects the objects to be observed into the tube of the telescope, which itself remains stationary.

Micrometers are of two principal types. In the first, fine wires are moved by delicate screws until they bisect the objects to be determined. This gives their distance apart; and the angle made with the meridian by the line joining them is learned by rotating the apparatus until the threads run parallel to that direction, and then reading the 'position circle.' Measures of double stars are always thus executed, while the heliometer gives the best results for stellar parallax. A heliometer is an equatorial with a divided object-glass: as the segments slide apart, the image of each star or planet is duplicated, and the amount of displacement needed to produce coincidence between the opposite members of the pair of objects to be measured gives their angular distance on the sphere.

A profound change has been brought about in the scope, no less than in the methods, of astrometry by the adoption of the camera as an instrument of precision. Much progress has already been made with the preparation, at eighteen observatories, of a catalogue likely to embrace some 4,000,000 stars; and the corresponding chart of the sky will secure the identification of perhaps 30,000,000. Mainly photographic, too, was the remarkable solar parallax campaign of 1900-1, when combined determinations of the minor planet Eros were made at 58 observatories. Detected in 1898 by its motion-trail on a negative strewn with the round images of fixed stars, Eros proved to be the one known asteroid circulating nearer to the earth than Mars.

The characteristic astrophysical instrument is the spectroscope, or rather the spectrograph; for the spectra of the heavenly bodies are now ordinarily recorded photographically. (See SPECTRUM.) By means of spectroscopic investigations, the heavenly bodies have been assimilated chemically, as they were physically by the discovery of gravitation, to our common earth.

By the application of 'Doppler's principle,' the spectroscope has been made available for determining the radial movements of celestial objects, and in this novel research astrometry and astrophysics find common ground. The direct use of the telescope supplies only the component of velocity at right angles to the visual line; the other remained undeterminable until Sir William Huggins, in 1868, succeeded in measuring the line-displacements in stellar spectra depending upon the approach or recession of the stars themselves. The effect is similar to that of motion upon sound, exemplified by the rise and fall in pitch of a steam-whistle as a train dashes past a stationary auditor. The method has afforded valuable information regarding the sun's rotation, cyclonic velocities in prominences, and the constitution of Saturn's rings; and it obtained a vast increase of refinement through Vogel's substitution, in 1887, of photographic for visual measurements of motion-shifts. Remarkable discoveries have resulted from these researches.



Astronomical Instruments.

Double stars, revolving too close together for telescopic separation, disclose their nature through the evidence of rapid periodic motion legible in their spectra. 'Spectroscopic binaries' are very numerous; nearly threescore are already known, and the list continually lengthens. Professor Campbell estimates that one star in five or six is double. These wonderful systems are held to be in the most primitive stage of development: their members sometimes revolve almost in contact, but will, according to Dr. See, gradually withdraw from one another under the influence of tidal friction; yet many of them, though very large, are non-luminous. A certain proportion, moreover, are subject to eclipses, because circulating in a plane that passes approximately through the earth. Twenty-five or twenty-six occulting systems have been recognized.

Systematic determinations of stellar radial movements are, or will shortly be, carried on at Potsdam, Pulkowa, and Lick, at the Yerkes Observatory near Chicago, and at the Royal Observatory, Cape of Good Hope. They are mainly designed for the promotion of knowledge regarding the mechanism of the sidereal universe, but their by-products in the detection of individual stellar systems are of more immediate, if less sublime, interest.

The 'double-slit' method, suggested by Janssen in 1869, was, in 1891, successfully applied by Hale and Deslandres to the photography of solar prominences and faculæ. The power which it gives of isolating any given quality of light supplied the means of turning to account for their portrayal the singular vividness, in those objects, of the violet rays of calcium. Professor Hale devised a special instrument the 'spectroheliograph,' now installed at the Yerkes Observatory - for the purposes of this novel kind of photography. Other instruments in astrophysical use are heliostats, for throwing the light of a moving object into a fixed telescope; bolometers, for exploring the invisible heat spectrum; concave gratings, by which rays are simultaneously concentrated and analyzed; galvanometers, refractometers, photometers, comparators. Photometric researches have been extensively prosecuted, under the direction of Professor Pickering, at Harvard College Observatory, and at its southern station in Peru, with the result that the relative lustre of all the stars in the sky down to and even below the seventh magnitude is now very exactly known. A similar but more limited photometric survey is approaching completion at Potsdam. The equalization of the compared images is effected, at both establishments, by means of a polarizing apparatus.

Portrait lenses of short focus are used for photographing the Milky Way and finding the utmost extension of diffused nebulosity. Lenses, on the other hand, of great focal length are used in eclipse photography to record the details of structure in the sun's corona, and for the direct scrutiny of the lunar surface. In the portraiture of nebulæ reflectors are found, in general, to give better

results than refractors; and their natural achromatism recommends them for employment in certain branches of sidereal spectroscopy. Refractors do not, like reflectors, lend themselves indifferently to visual and photographic use; and so greatly has the latter come to preponderate, that large object-glasses are frequently, by correction for the actinic rays, rendered unserviceable to the eye.

At the opening of the 19th century astronomy seemed almost a completed science. Now problems are numerous and insistent. A few out of the multitude may be specified. Taking first those that relate to the earth, we encounter Dr. Johnstone Stoney's theory, still *sub judice*, of the selective dissipation of planetary atmospheres. Their composition, if it be true, depends upon the mass of the globes they encompass; and the earth, though capable of holding oxygen and nitrogen, was helpless to control the swifter velocities of hydrogen molecules, and may also have been obliged to surrender a primitive helium envelope. Another question of profound interest relates to the nature of the solar influence upon terrestrial magnetism. Sun-spots, auroræ, and magnetic disturbances obey an identical period. What is the common cause that determines their cyclical vicissitudes?

The sun itself presents a crowd of pending problems. His peculiar mode of rotation; the level of sun spots; the constitution of the photospheric cloud-shell, its relations to the faculæ which rise from it, and to the surmounting vaporous strata; the nature of prominences; the alternations of coronal types; the affinities of the zodiacal light all await investigation. And the importance insensibly accruing to inquiries into the functions of cosmical electricity is significant as to the line which such investigations must take. Provisionally, at least, the forms of all bright comets and of some nebulæ, as well as the marvellous traceries in the solar corona, may be ascribed to electromagnetic influences; and a multitude of spectral phenomena can be elucidated only by the study of electrical discharges in high vacua, and of the modifying effects upon light-emission of a powerful magnetic field.

The origin of meteors, and the part played by them in the scheme of things, are still largely enigmatical. The mystery of non-gaseous nebulæ (which are the immense majority) has not been penetrated; every star cluster embodies a most formidable dynamical problem; while intrinsic stellar variability sets theory at naught. The sudden apparitions of new stars cannot be detached from the recurrent outbursts of those that are periodical; yet a harmonizing principle is difficult to find. Nor are the quick, punctual changes of cluster components less difficult to rationalize. The evolutionary history of the stars is likely to remain long in debate. It gives rise to most interesting considerations; and one of the prerequisites for its adequate treatment is to obtain complete experimental acquaintance with the spectrum of hydrogen.

The formidable topic of sidereal construction can be profitably discussed only in reference to the distances of the stars, their proper movements, the translation among them of the sun, their distribution in space, the structure of the Milky Way, the relations of nebulæ and clusters to that great annulus.

Astronomical enterprises tend more and more to assume an international character. England commands both hemispheres through the activity of the sister establishments at Greenwich and the Cape. The organization centred at Harvard College has been extended from pole to pole by the foundation of a post at Arequipa; and the recent dispatch, from the Lick Observatory, of an expedition to southern latitudes is a further sign of the desire to give the widest possible scope to research. The meeting of an astronomical congress at Gotha in 1789 was an early symptom of a social tendency among observers; and it took permanent form through the foundation, in 1820 and 1863 respectively, of the London and German Astronomical Societies. The wants, however, of a more general public are provided for by the British Astronomical Association in this country; abroad, by the Société Astronomique de France, the Urania Gesellschaft in Berlin, the Russian Astronomical Society, by the Astronomical Societies of the Pacific and of Toronto, and the Astronomical and Astrophysical Society of America. The Società degli Spettroscopisti Italiani is more special in its aims. Most of these bodies issue journals or memoirs; numerous periodicals, besides, are devoted to the interests of the science, such as the *Astronomische Nachrichten*, *Sirius*, *Himmel und Erde*, the *Bulletin Astronomique*, the *Observatory*, *Popular Astronomy*, and the *Astrophysical Journal*; news of discoveries is flashed round the globe from the 'Centralstelle' at Kiel.

Historical Works.—Grant's *Hist. of Physical Astronomy* (1852) is of standard authority; Sir George Cornewall Lewis's *Astronomy of the Ancients* (1862) has permanent interest; Berry's *Short Hist.* (1898) and Clerke's *Popular Hist. of Astronomy during the 19th Century* (4th ed. 1902) supply recent information; Mädler's *Geschichte der Himmelkunde* (1873) and Wolf's *Geschichte der Astronomie* (1877) should also be consulted.

Handbooks for Practical Use.—Chauvenet's *Manual of Spherical and Practical Astronomy* (2 vols. 1893), Loomis's *Introduction to Practical Astronomy* (7th ed. 1894), Wolf's *Handbuch der Astronomie* (2 vols. 1893), W. W. Campbell's *Handbook of Practical Astronomy* (1891), can be recommended; and, as an encyclopædia of instrumental lore, Dr. L. Ambronn's *Handbuch der Astronomischen Instrumentenkunde* (2 vols. 1899).

Text books for Students. Barlow and Bryan's *Elementary Mathematical Astronomy* (2nd ed. 1892) is serviceable and compact; Young's *Elementary Astronomy* (1890), *Manual of Astronomy* (1902), and *General Astronomy* (revised ed. 1898) form an admirable series of graduated difficulty; Proctor's monumental *Old and New Astronomy*, ably completed by A. C. Ranyard in 1892, and Chambers's *Handbook of Descriptive and Practical Astronomy* (4th ed. in 3 vols. 1889-90), are instructive as regards traditional astronomy; while the astrophysical branch is included in Comstock's *Text-book of Astronomy* (1901). Airy's *Gravitation* and Herschel's *Outlines of Astronomy* are still invaluable aids to acquaintance with the theory of planetary perturbations.

Books for General Reading.—Sir Robert Ball's *Story of the Heavens*, frequently reissued, is of deserved popularity; Professor Turner's *Modern Astronomy* (1901) appeals to a higher class of readers. Other works, variously meritorious, are: Newcomb's *Popular Astronomy* (2nd ed. 1883); Ledger's *The Sun: its Planets and their Satellites* (1882); *Concise Astronomy*, by A. M. Clerke, A. Fowler, and J. E. Gore (1898); Langley's *New Astronomy* (1888); H. A. Howe's *Elements of Descriptive Astronomy* (1898); *Stars and Telescopes* (1899), and *A New Astronomy* (1898), by David P. Todd; Gregory's *Vault of Heaven* (1893); and Meyer's splendidly illustrated *Weltgebäude* (1898).

Books for Amateur Telescopists. The first place is due to Webb's *Celestial Objects for Common Telescopes* (5th ed. in 2 vols. 1893); Admiral Smyth's *Cycle of Celestial Objects*, revised by G. F. Chambers in 1881, is brilliant, but less accurate; Denning's *Telescopic Work for Starlight Evenings* (1891), Fowler's *Telescopic Astronomy* (1896), Mary E. Byrd's *Laboratory Manual of Astronomy* (1899), Mee's *Observational Astronomy* (2nd ed. 1897), *Astronomy with an Opera*

Glass (8th ed. 1902) and *Pleasures of the Telescope* (1901), by Garrett P. Serviss, Dunkin's *Midnight Sky* (1891), and Noble's *Hours with a Three-Inch Telescope* (1886), will also be found useful.

Works on Special Subjects.—The sidereal heavens form the theme of Newcomb's *The Stars: A Study of the Universe* (1901); Clerke's *System of the Stars* (1890); of *Traité d'Astronomie Stellaire*, by Ch. André (2 vols. 1899–1900); *The Visible Universe*, by J. E. Gore (1893); and *Les Etoiles*, by Flammarion (1882). Stellar classification is ingeniously but unconvincingly treated of in Sir Norman Lockyer's *Meteoritic Hypothesis* (1890) and *The Sun's Place in Nature* (1897). The solar constitution is dealt with in Young's excellent monograph *The Sun* (revised ed. 1897), and in Lockyer's *Chemistry of the Sun* (1887), enforcing the theory of celestial dissociation. Volumes on *The Moon*, by E. Neison (1876) and T. G. Elger (1896) respectively, describe the superficial features of our satellite. The condition of individual planets is discussed in Proctor's *Saturn and its System* (1865), Flammarion's *La Planète Mars* (1892), in Percival Lowell's clever but highly speculative *Mars* (1896), R. A. Gregory's *The Planet Earth* (1895), and in E. M. Clerke's pamphlets, *Jupiter and his System* (1892) and *The Planet Venus* (1893). A forthcoming work on comets, by Professor Young, will fill a blank. Guillemin's *World of Comets* (1876) is out of date, and W. T. Lynn's *Remarkable Comets* (7th ed. 1899) is on a diminutive scale. It belongs to a capital set of booklets by the same author, diligently re-edited at short intervals, entitled severally, *Astronomy for the Young*, *Celestial Motions*, and *Remarkable Eclipses.* Particular stress is laid upon spectroscopic results in A. M. Clerke's *Problems in Astrophysics* (1902); and Scheiner's *Astronomical Spectroscopy* (Frost's trans. 1894) supplies a solid groundwork for the study of the newer methods. Kayser's authoritative *Handbuch der Spectroscopie* (2 vols. 1900-2), Scheiner's *Photographie der Gestirne* (1897), and Müller's *Photometrie der Gestirne* (1897) are of great technical importance. Valentiner's *Handwörterbuch der Astronomie* (1897, etc.) is a high-class work of reference; while G. H. Darwin's *The Tides and Kindred Phenomena in the Solar System* (1898) is both popular and profound. Finally, children and beginners should read Miss Giberne's *Sun, Moon, and Stars* (revised ed. 1893), and *Radiant Suns* (1894), together with Sir R. Ball's *Primer of Astronomy* (1901), and *Star Land* (1900).

Astrophel (Gr. 'star-lover'), the name under which Sir Philip Sidney addressed his sonnets to Stella ('star') or Penelope Devereux. Spenser's *Astrophel* celebrates the death of Sir Philip.

Astruc, JEAN (1684-1766), physician and theologian, born in Languedoc. After studying medicine at Montpellier, he was appointed (1710) professor of anatomy at Toulouse, and then (1716) at Montpellier; finally he settled (1717) in Paris, where he became professor of medicine and consulting physician to Louis XV. European fame was gained by the publication of his medical researches, especially in venereal diseases, *De Morbis Venereis* (1736). To Biblical critics he is specially interesting as the anonymous author of *Conjectures* (in French, published in 1753, professedly at Brussels, but really at Paris) regarding the original (Jahvistic and Elohistic) documents used by Moses in compiling the Book of Genesis. This work gave the clue to the critical analysis of the Pentateuch. See *Reformed and Presbyterian Review for 1892* (full bibliography).

Astura, anc. tn., prov. Rome, Italy; stood on a promontory of the Mediterranean coast, 9 m. E. of Antium (now Anzio); is known in history as a place of ill-fortune. Here Cicero had a villa, where (*Ep. ad Att.*, xii. 15) he spent many unhappy days; here the Emperor Tiberius contracted his last fatal illness; and here the last of the Hohenstaufen emperors, Conradin, was, in 1268, betrayed into the hands of his enemies by Frangipani, the lord of the town. In requital of this treachery the Sicilians burned the town in 1286.

Asturias, principality, Spain; now the modern prov. of Oviedo. Since 1388 the heir to the thrones of Leon, Castile, and Spain has borne the title of Prince of Asturias.

Astyages, son of Cyaxares, was the last king of Media, reigning from 585 to 550 B.C., when he was conquered and dethroned by Cyrus.

Asuncion, cap. of Paraguay, 50 ft. above the Paraguay R., on the E. bank, 827 m. from Buenos Ayres. Principal buildings the Government House, cathedral, Lopez's palace, now occupied by the Bank of Paraguay, and the National College. The Central Paraguayan Railway runs into the interior, and tramways are laid to San Lorenzo, 10 m. to the S.E. Vessels anchor in three fathoms close to the shore. Asuncion was founded on the day of the Assumption of the Virgin (Aug. 15, 1536). Pop. (1900) 51,700.

Asylum. See LUNACY.

Asylums Boards. (1.) The METROPOLITAN ASYLUMS BOARD was appointed in 1867, by order of the Poor Law Board, under the powers conferred by the Metropolitan Poor Act, 1867, for the purpose of dealing with the relief of paupers in all the unions and parishes not in union, within the district, who are suffering from fever or smallpox, or are insane. Diphtheria was added by an act of 1889, which also authorized the admission into the hospitals of the board of persons who are not paupers. The district over which the board has control consists of what is now the administrative county of London. By the Metropolitan Poor Act, 1869, guardians and managers of school and asylum districts were empowered to acquire and manage training ships for boys. Thus the Admiralty vessel the *Exmouth* is under the management of the Metropolitan Asylums Board. It lies at Grays, in Essex, and has accommodation for between 500 and 600 boys. For fever patients the board have 12 hospitals, two being for convalescing patients; two smallpox hospitals, both at Dartford, Kent; and a smallpox convalescent hospital at Gore Farm, Dartford, Kent, which has at times been used as a convalescent hospital for fever cases. Smallpox cases are provided for in two hospital ships—the *Castalia* for men, and the *Atlas* for women. For imbeciles the board have five asylums—Leavesden (Herts), Caterham (Surrey), Darenth (Kent), and Tooting Bec (opened in 1903), for adults; and Rochester House, Ealing, for children. The insane paupers dealt with by the board and admitted into their asylums are harmless persons of the chronic imbecile class who could lawfully be detained in a workhouse. (2.) The LANCASHIRE ASYLUMS BOARD, for the management of asylums in the county of Lancashire. It consists of representatives of the County Council and the councils of most county boroughs in the county. For details as to its constitution, etc., see the Lancashire Lunatic Asylums (and other powers) Act, 1891. See LUNACY.

Asymptotes (Gr. 'not coinciding') are lines which continually approach a curve, but which, though they and their curve were infinitely continued, would never meet, and may be conceived as tangents to their curves at an infinite distance. They may be rectilinear or curvilinear. See CURVE.

Asyndeton (Gr. 'not bound together'), a figure of speech consisting in the omission of the usual connectives, as in the famous *Veni, vidi, vici,* 'I came, I saw, I conquered.'

Atabapo. See ORINOCO.

Atacama. A desert region of Chile embracing the provs. of Atacama and Antofagasta. From the coast it rises in terraces crossed by numerous ridges up to the Cordillera Real, and covers some 77,000 sq. m. Between the ridges are dry, sandy plains, several being the beds of dried-up lakes. The wealth of this region consists in mines of silver, copper, and nitrate. The Oruro (Titicaca)-Antofagasta Ry. carries to the coast nitrate, the products of the silver mines of Caracoles, lying on the flank of the cordillera 22 m. from Sierra Gorda, and the borax from Carcote and from Lake Ascotan, a basin, 25 m. long by 4½ m. wide, covered with a dazzling white deposit of salt, borax, sulphate of lime, etc. The prov. of Atacama has an area of 28,370 sq. m., and pop. (1895) 59,713.

Atacamite, the native hydrous oxychloride of copper, a not uncommon mineral in veins of copper ores, and usually a decomposition product. It is green or dark green, soft (hardness = 3), with a vitreous lustre, and crystallizes in the rhombic system. When a fragment is heated before the blowpipe it colours the flame cornflower blue (chloride of copper).

Atahualpa (d. 1533), a son of Huayna Capac, the great Inca emperor of Peru. On the death of Huayna Capac (1525) a struggle for power began between Atahualpa and his half-brother Huascar, who had succeeded to the throne. This civil war ended in the complete victory of Atahualpa, and he was the recognized emperor of Peru when the memorable meeting took place between him and Pizarro at Caxamarca (1532). To the demands of the Spanish leader that he should accept Christianity and become the vassal of Charles V. the Peruvian monarch naturally returned a direct refusal; whereupon the Spaniards seized the Inca, and massacred hundreds of his unsuspecting followers. On Aug. 29, 1533, Atahualpa was executed, after a mock trial. See Prescott's *Conquest of Peru.*

Atalanta. (**1.**) The Arcadian Atalanta is said to have been the daughter of Iasus and Clymene: her father exposed her on the Parthenian (virgin) hill; she was suckled by a she-bear. She took part in the hunt of the Calydonian boar (see Swinburne's *Atalanta in Calydon*). When her father wished her to marry, she made it a condition that every one of her suitors should compete with her in a foot-race. As she was the swiftest of mortals, she was only beaten by Milanion, thanks to his dropping, one after another, three golden apples, which she stopped to pick up. She and her husband were turned into lions for having defiled with their embraces a sacred grove of Zeus. (**2.**) The Bœotian Atalanta was a daughter of Schœneus, and married Hippomenes. The same stories are told of her as of the Arcadian Atalanta. It is certain that in both cases Atalanta is only another form of Artemis. For the story, see Ovid's *Metamorphoses*, bk. x.; and as to her connection with Artemis, Farnell's *Cults of the Greek States* (1896).

Atalanta, a sailing sixth-rate used as a training vessel in the British navy. She foundered in March 1880, on her passage from Bermuda, all on board perishing.

Ataman. See HETMAN.

Ataulf (d. 415?), king of the Visigoths; succeeded his brother-in-law, Alaric I. (411), and laid the foundations of the great West Gothic kingdom. He conquered Aquitaine, and married a sister of Honorius. He was assassinated at Barcelona.

Atavism, the inheritance from a more or less remote ancestor of any bodily or mental quality which has failed to show itself in intervening generations. In sociological writings the term is commonly employed by Lombroso and other criminologists of the Italian and French schools to denote reversion to a more primitive type, as an explanation of criminal instincts and other pathological aberrances. See HEREDITY.

Atbara, trib. of Nile, Egypt; has its source in the mountains to the N.W. of Lake Dembea or Tsana, in Abyssinia, and flows in a N.W. direction through S. Nubia, and joins the Nile at El Damer. Its chief tributaries are the Takazze and Mareb. In its course of some 700 m. it passes the towns of Tomat and El Fasher, to which the river is navigable from June to September. A barrage has been constructed across the river near its junction with the Nile, in order to regulate its flow and to keep out the Nile flood from its valley. At the Atbara, on April 8, 1898, General Kitchener defeated the khalifa's force.

Atchafalaya Bayou, a river of Louisiana, U.S.A., near the junction of the Red R. and the Mississippi. It takes the flow of the former, and when the latter is in flood supplies are received from it also. It enters the Gulf of Mexico, 150 m. W. of the mouth of the Mississippi, through Atchafalaya Bay. It is 225 m. long, and is navigable for steamboats.

Atchison, city, Kansas, U.S.A., the co. seat of Atchison co., on the Missouri, about 50 m. from Kansas City, named after David Rice Atchison (1807–86), a prominent pro-slavery politician, who was twice president *pro tem.* (1846–49 and 1852–4). It has three colleges, and is an important commercial centre. Pop. (1900) 15,722.

Atchison, or ATCHESON, a copper coin plated with silver, struck in Scotland in the reign of James VI. Its value was 8d. Scots, or two-thirds of an English penny.

Atchison, Topeka, and Santa-Fé Railway runs through the American states of Missouri, Arkansas, Texas, Kansas, and Colorado, and New Mexico, Oklahoma, and Indian Territories. The railway proper covers 4,843 m., but there are other lines included in the system, which brings up the whole to 8,300 m. (1904). The company fell into the hands of receivers in 1893, but was reorganized in 1895-6. Beginning with August 1900 full dividends have been paid on the preferred shares, and 1½ to 2 per cent. on the common shares. The surplus for 1903-4, after deducting dividends, was $5,572,861. $3,000,000 was written off in respect of betterments, etc., and the credit to profit and loss was $19,187,003. The outstanding funded debt on July 1, 1903, was $231,930,250.

Ate, an ancient Greek divinity, daughter of Eris (Strife) according to Hesiod, and of Zeus according to Homer. In the tragic poets, particularly in Æschylus, she is regarded as the power which avenges sin on its doers, and so becomes almost identical with Nemesis (Vengeance) and Erinnys (the Fury).

Atef Crown, a symbolic head-dress worn by Egyptian deities, consisting of the tall white cap of Upper Egypt, flanked with two plumes, and bearing the solar disc and uræus in front.

Ateles. See SPIDER MONKEY.

Ateliers Nationaux. See SOCIALISM.

Atellanæ Fabulæ, so called from Atella, a town of Campania, and also known as *Ludi Osci*; a kind of unpolished popular drama which was performed in Roman theatres, in the Oscan dialect, to excite the laughter of the more cultured Romans. The most popular characters, Maccus and Bucco, were probably the origin of the modern harlequin.

A tempo, or A TEMPO PRIMO, in musical score, denotes a return to the original time after any acceleration or retardation. *A tempo giusto* means 'in just, marked, or proper time.'

Atessa, tn., prov. Chieti, Italy; stands on the eastern slope of the Apennines, 26 m. S.S.E. of Chieti; manufactures sausages (*salami*) and woollens. Pop. (1901) 10,905.

Ath, tn., prov. Hainault, Belgium, 32 m. by rail S.W. of Brussels; is the seat of cotton industries, the manufacture of cutlery, machinery, gold and silver wares, brewing, and lime-burning. Pop. (1900) 10,873.

Athabasca. (1.) One of the N.W. Territories of the Dominion of Canada, lies between 100° and 120° W. long., and between 55° and 60° N. lat. It was defined in 1882, and its area is 251,300 sq. m. Its E. half is part of the Archæan plateau. (See CANADA.) In the S.W. are open poplar woods and large tracts of prairie. Athabasca is well supplied with rivers, as the Peace, Athabasca, and Churchill, and with lakes (Athabasca, Reindeer, Little Slave), which abound in fish. Except a few fur traders, there is no white population. The Athabascans form one of the great families of N. American Indians, whose most collective name is Dinné or Tinné, 'men.' Their domain also includes the Yukon Basin (Alaska), besides an extensive S. enclave about the United States and Mexican frontiers, and a few isolated tribes (Hupas, Umpquas, Tolowas) on the Pacific coast between Oregon and California. Apart from these there are two main groups: Northern, comprising the Ahtonas, Kutchins, Nagailers, Slaves, Hares, Yellow Knives, Taculli, Chippewayans, Dog Ribs, and many others, collectively numbering 8,600 in 1900; Southern Apaches, Navajos, Lipans, Chikuns, and Chishi, about 23,500, nearly all in reserves. The northerners are generally of inferior physique, even degraded in appearance, timid, and servile, but peacefully inclined and friendly to the whites, being largely employed about the stations of the Hudson's Bay Company. The southerners are, on the contrary, amongst the most ferocious and indomitable of all the aborigines, with a splendid physique of the normal redskin type, so that the sole connecting link between the two groups is their common speech --a very harsh and guttural stock language of polysynthetic structure. (2.) RIVER (or *La Biche*, 'red-deer or elk river'), Canada, rises in Alberta, E. of Mt. Hooker, and flows N.E. in a deeply-cut valley for 60 m. through a mountainous and heavily-wooded country. At Athabasca Landing, an important Hudson Bay station, the river bends to the N., and becomes navigable for stern-wheel steamers drawing 2½ to 3 ft. as far as Grand Rapids, a distance of 166 m. From this point to Fort M'Murray, 85 m. to the N., the river drops 360 ft., and is impeded by rapids and falls. From Fort M'Murray to its mouth in Lake Athabasca, a distance of 200 m., the river is again navigable. Its total length is some 550 m. (3.) LAKE, in N. Athabasca, Canada, is about 200 m. long and from 5 to 35 m. broad, with an area of 2,850 sq. m. It is navigable throughout. The shores are rocky, and unfit for cultivation. The lake has its outlet in the Slave R. See annual reports issued by government, Ottawa; Adam's *Canadian North-West* (1885); Tuttle's *Our North Land* (Canadian North-West and Hudson Bay route, 1885); Dawson's *Canada and Newfoundland* (Stanford's Compend., 1897); Parkin's *The Great Dominion* (1895); Osborn's *Greater Canada* (1900); Bradley's *Canada in the Twentieth Century* (1903).

Athaliah, daughter of Ahab and Jezebel, married Jehoram, king of Judah. On the death of her son Ahaziah, she caused all the royal male children to be put to death - Joash alone escaping—and usurped the crown, which she wore for six years (841-836 B.C.). At the expiry of this period Joash was made king, and Athaliah perished in a tumult. (See 2 Kings 11; 2 Chron. 22 *f.*) Handel and Mendelssohn have treated the subject musically, and Racine's drama *Athalie* is founded on the story.

Athamas, son of Æolus and Enarete, married the goddess Nephele, but secretly loved Ino, daughter of Cadmus, and by her had two sons, Learchus and Melicertes. Discovering this, Nephele returned in anger to heaven, and demanded the sacrifice of Athamas, who thereupon became mad and killed Learchus. Ino and Melicertes, to escape from him, threw themselves into the sea. Athamas had to flee from Bœotia, and settled in Athamania.

Athanaric (d. 381), king of the Visigoths, waged war against the Emperor Valens, but was defeated (369). In 374 the Gothic empire was invaded by the Huns, and the Goths were allowed by Valens to settle in Mœsia. Athanaric, however, defended himself in the mountains of Dacia, but was forced to ask the protection of Theodosius (380) at Constantinople, from whom he received most favourable treatment.

Athanasian Creed. See CREEDS.

Athanasius (*c.* 296-373) was born at Alexandria. Early in life he attracted the attention of Bishop Alexander, by whom he was in due course ordained. In 325 he was with this bishop at the Council of Nice, at which 318 bishops were assembled to deal with questions which had arisen over the teaching of Arius, already locally condemned by councils at Alexandria in 315 and 319. Athanasius, at this time about twenty-nine, and in deacon's orders, displayed at the council something of those unusual powers of mind and determination which afterwards established him as the champion of the orthodox faith. When he returned to Alexandria he was elected by acclamation bishop, in room of Alexander, who died four months after the conclusion of the council. After the death of Helena, the Emperor Constantine was influenced in favour of the Arians, and Arius brought with him to Alexandria the imperial command that he should be admitted to communion. Athanasius refused, and, though for the moment successful in his attitude of stern resolve to uphold orthodoxy at any cost, was made the victim of cabals against him by the opposite party, who obtained his banishment to Trèves. The wheel again turned in his favour after Constantine's death, and he made a triumphant return to Alexandria. Constantius, however, was with the Arians, and Athanasius was driven to seek refuge at Rome. The Council of Sardica endorsed the decision of a provincial council at Rome in Athanasius's favour. In 349 he was again in his episcopal seat at Alexandria. In the meanwhile Arianism spread under the patronage of Constantius, and again Athanasius was driven into exile. Under Julian he returned in 361, but was soon involved in a struggle with the pagan party, and again fled. In 363 he was restored, only to be driven out by Valens in 367. The popular voice in this case restored him, and he remained undisturbed till his death in 373. '*Athanasius contra mundum*' became a proverb. Nor were his labours in vain. Arianism had nearly triumphed, and it needed a man of exceptional resolution to turn the tide. Mr. Froude says of Carlyle: 'In earlier years he had spoken contemptuously of the Athanasian controversy. . . . . He now told me that he perceived Christianity itself to have been at stake. If the Arians had won, it would have dwindled away to a legend.'

Atheism is the formal opposite of theism. It is a distinct denial of God's existence, whether as a thing without *evidence* or as *disproved*. Few men have accepted the position of atheists, thinking it odious, and perhaps dangerous. Whatever be true of Democritus, his successor in Greek atomic speculation, Epicurus, provided a theory of otiose gods who were indifferent to human welfare or sin. This, no doubt, is practical atheism. It recalls the 'atheistic religion' of Buddha, who verbally, and perhaps in earnest, admitted the existence of gods, but taught that they too needed salvation from the evil of life, and that each man or god must save himself. As is our view of theism, so will be our definition of atheism. The early Christians were called atheists because they set aside the mythology and superstition of their time. When Spinoza is called an atheist by the sceptics Bayle and Hume, their criticism is apt to be endorsed by those who miss in Spinoza's teaching the possibility of communion with a personal God. His defenders—Novalis ('Spinoza is a God-intoxicated man'), Schleiermacher, Goethe, Hegel—test him by a different standard, namely, the philosophical depth of his thought of the infinite substance; and in that, of course, he excels. It is hardly necessary to add that Spinoza is properly a pantheist. Comte's refusal to be called an atheist (or a materialist) is stranger, since he regards the theological and metaphysical stages of thought as both thoroughly obsolete. He speaks, no doubt, as an agnostic; he is himself fully alive to the difficulties of atheism, summed up by Bacon: 'I had rather believe all the fables in the Legend, and the Talmud, and the Alcoran, than that this universal frame is without a mind.' Voltaire, too, was as much in earnest as it was in his nature to be when he wrote the line: 'Si Dieu n'existait pas, il faudrait l'inventer.' Still, there have been dogmatic atheists—generally materialists. Materialism is the one dogmatic theory of the universe which justifies atheistic denial. At the present day agnosticism is in fashion rather than materialism, mainly through the influence of the negative side of Kant's thinking. It is equally dogmatic with atheism, for it tells us that *men never can know* ultimate truth; but it regards atheism and theism as kindred extravagances. Practically, such agnosticism differs little from atheism. See Flint's *Anti-Theistic Theories* (1885).

Athelney, a vil. and par. in Somerset, England, 9 m. E.N.E. of Taunton. The district to the N., known as Athelney Isle, and nearly surrounded by the Parret and Tone, is famous in history as the place of Alfred's retreat, in 879, before the Danish onslaught. The 'Alfred jewel,' now in the Ashmolean Museum, Oxford, was discovered at Newton Park, in the vicinity, in 1693.

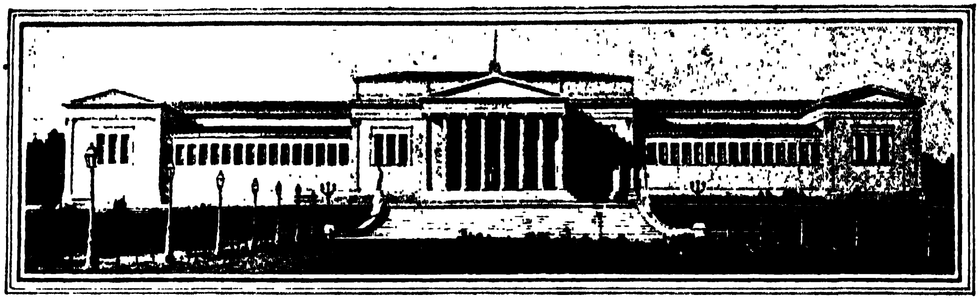
Athelstan, king of the English (895-940), was a son of Edward the Elder, and therefore grandson of Alfred the Great. He succeeded his father in 925, and extended still further the sway of his dynasty, obtaining many victories over the Welsh of Devonshire, Cornwall, and Wales proper, and defeating the Northumbrian Danes and their northern and Irish allies at the battle of Brunanburh (937). Athelstan was king of the English, instead of merely king of the West Saxons, as his father had nominally been. See the *Anglo-Saxon Chronicle* and Freeman's *Old English Hist.* (1869).

Athena, or ATHENE, also PALLAS ATHENE, or PALLAS, one of the greatest of the Greek divinities, was the daughter of Zeus (Jupiter) and Metis (Counsel); but she was born from her father's head, because, having been warned that any child born of Metis would overthrow its father, he enticed Metis to transform herself into a fly, and then swallowed her. Her parentage indicates her character: she represents a combination of might and wisdom. Although her worship was spread through Greece, it was at Athens that she was reverenced with the deepest devotion. She is described as the patroness of agriculture, city life, war, and the industrial arts. She was held to have taught mankind the use of the plough; but her chief boon was the creation of the olive tree. There is a legend that Athena and Poseidon were contending for the possession of Attica. Poseidon offered the people a horse, which was his creation; but the olive of Athena carried the day. It is, however, in her aspect as Athena Polias, the goddess of the city, that she was specially venerated at Athens: to her Æschylus attributed the establishment of the court of the Areopagus. As the goddess of war she differs greatly from Ares, who personifies the lust of battle; she is rather the deity of civilized warfare. The arts of weaving and spinning were especially attributed to her teaching. Though a maiden goddess, Athena is so rather because of the essentially unfeminine nature of her characteristic occupations; under this aspect she was revered as Parthenos at Athens, but her worship set up no ideal of chastity. It was as the goddess of public law and political virtue that she influenced the Greek mind. In the myths, we find that in the war with the giants she buried Enceladus under Sicily, and slew Pallas; in the Trojan war she favoured the Greeks, and especially protected Achilles, Diomedes, and Odysseus. She was represented in ancient art with a serious countenance and a somewhat masculine figure, wearing the helmet, the ægis, and a shield with the Gorgon's head; she is invariably clothed. Phidias made three famous statues of her—one of ivory, ornamented with gold, 30 ft. in height, which stood in the Parthenon; a second, still larger, of bronze, which stood on the Acropolis; the third a small bronze statue, called the Lemnian, because dedicated by the Lemnians at Athens. Athena is also known under the title Hippia, as the tamer of horses; Nike, as the goddess of victory. The Romans identified the Etruscan goddess Minerva with Pallas.

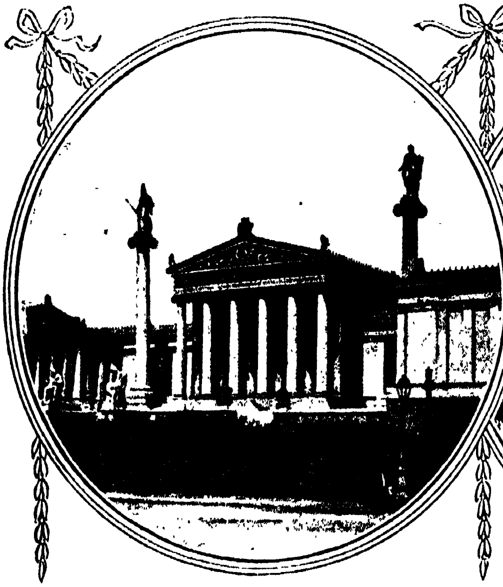
Athenæum. (**1.**) The Athenian temple of Pallas, where poets and philosophers met to read their works. (**2.**) A school founded by the Emperor Hadrian at Rome, on the Capitoline Hill. It appears to have maintained its reputation until the 5th century A.D.

Athenæum, THE, an English weekly journal of literature, music, science, and the fine arts, was first published on Jan. 2, 1828, by J. Silk Buckingham. Dr. Stebbing and Charles Knight were among the first contributors, and the former soon became real editor. On July 30 the *Athenæum* was united with the *London Literary Chronicle*, and the united journals were purchased by a group of friends, chief among whom were John Sterling and F. D. Maurice. The latter filled the editorial chair until May 1829, when he was succeeded by Sterling. The most noteworthy feature of Sterling's term of office was the warm welcome extended to Tennyson's *Timbuctoo* in the issue of July 22. The magazine was, however, in a very bad way financially when, on June 5, 1830, Charles Wentworth Dilke took on himself the editorship and sole control of the journal. In 1831, John Francis, future publisher of the paper, joined the staff as junior clerk, and was quickly entrusted with the entire business management. Among the contributors at this period were Elizabeth Barrett, Walter Savage Landor, and Thomas Carlyle. Charles Lamb contributed both prose and verse; and the other writers embraced John Hamilton Reynolds, Tom Hood, William and Mary Howitt, William and Thomas Roscoe, Allan Cunningham, Barry Proctor, and Harriet Martineau. Dilke was succeeded in the editorship in 1846 by T. K. Hervey, who occupied the post until 1853, when he was succeeded by W. Hepworth Dixon. On the retirement of the latter in 1869, he was followed by Norman Maccoll. During this epoch the *Athenæum* played a prominent part in the agitation for the repeal of taxes on knowledge. Its pages included numerous historical articles by Dr. Doran, and scientific articles by Professors Hunt and De Morgan, besides contributions from John Rutter Chorley (the Spanish scholar), Howard Staunton, Henry Clarke Barlow (the Dante student), Professor Conington, James Cotter Morison, George Smith (the Assyriologist), H. T. Riley, John Bruce, G. W. Thornbury, and Christina Rossetti. From 1833 to 1868 the musical department of the journal was under the charge of Henry F. Chorley. More recent contributors include Austin Dobson,

1

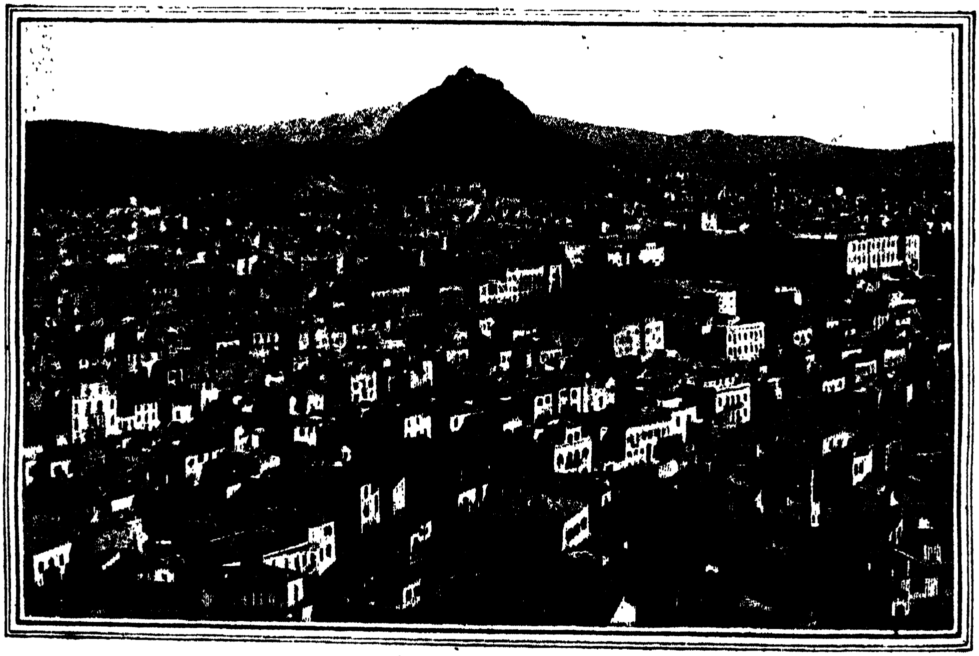


2



3

4

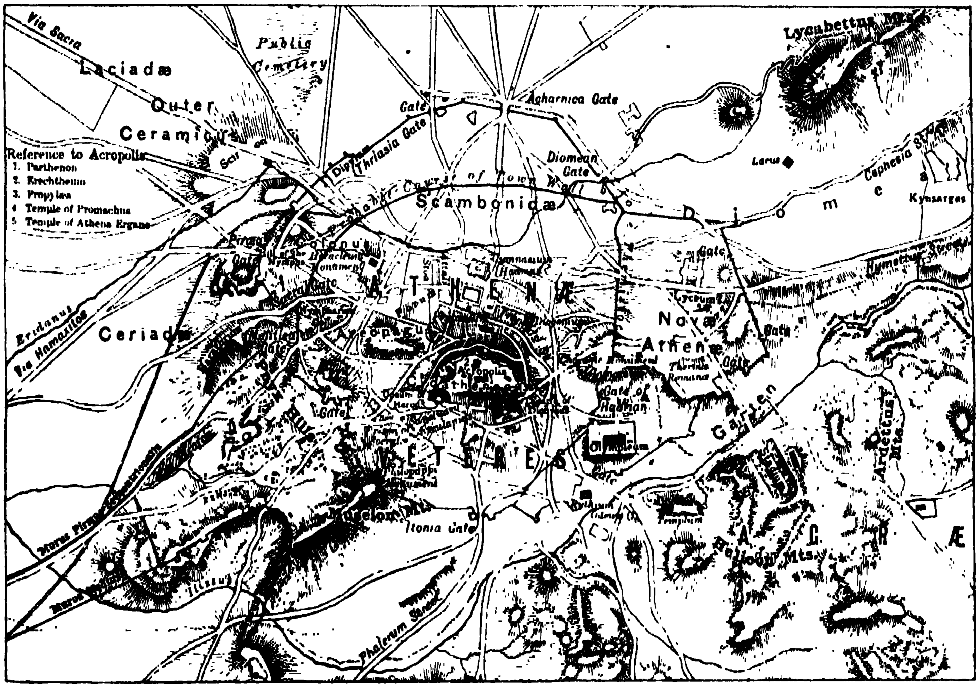


Scenes in Athens.

1. Zappeion (Exhibition Building). 2. The Academy. 3. The Palace. 4. General View of the City.

Algernon Charles Swinburne, Theodore Watts-Dunton, Francis Hindes Groome, and Henry Arthur Symons. Mr. MacColl retired from the editorship at the end of 1900, and was succeeded by Mr. Vernon Rendall. The history of the *Athenæum* up till 1882 is contained in *John Francis: a Literary Chronicle of Half a Century*, by his son, J. C. Francis (2 vols. 1888); also *Athenæum*, Jan. 1, 1898.

Athenæum Club was instituted in 1824 by J. W. Croker, Sir T. Lawrence, Sir Humphry Davy, and others, for the association of persons of scientific, literary, and artistic attainments, or liberal patrons of learning. The club-house, 107 Pall Mall, London, of Grecian design, was built in 1829-30, and has a frieze which is an exact copy of that of the Parthenon at Athens. It has the finest club library in Europe. There are 1,200 ordinary members. The entrance fee is thirty guineas, and the annual subscription eight guineas. The committee has the power of electing annually not more than nine persons of eminence in science, literature, or the arts, or for public services. See Waugh's *Athenæum Club and its Associations* (1900).



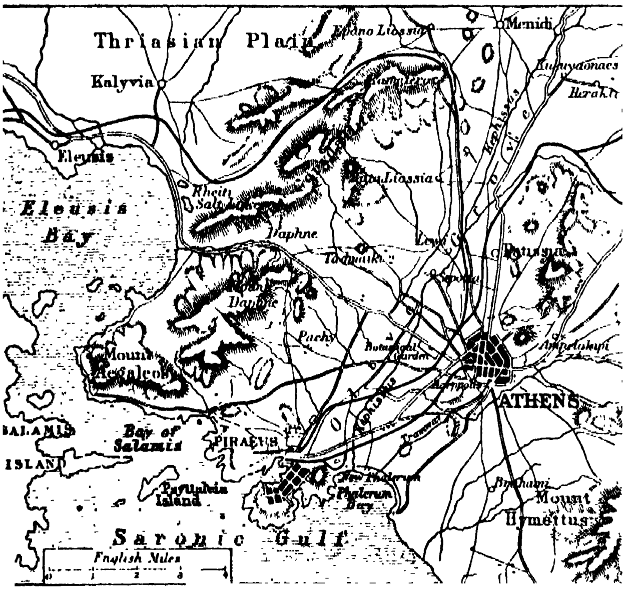
Plan of Ancient Athens.

Athenæus (*c.* 230 A.D.), a native of Naucratis, in Egypt, was a man of great learning, but is only known to us by his work, the *Deipnosophistæ*, or *Banquet of the Learned*. The work is clumsily arranged, but is of great interest, owing to its illustration of ancient manners, its collection of curious facts, and, above all, to its abundance of quotations from some 800 authors, of whose works these fragments are in many cases the sole examples extant. Editions, Schweighäuser (1801-7), W. Dindorf (1827), Kaibel (1887-90), G. Dindorff (1896); Eng. trans. 1854.

Athenagoras, an Athenian philosopher and Christian apologist. In his apology, *Legatio pro Christianis* (177), he refutes the accusations of atheism, cannibalism, and licentiousness brought against the Christians, and attacks pagan institutions. See Roberts and Donaldson's *Ante-Nicene Christian Library* (1867-72). The best edition of his works is in Von Otto's *Corpus Apologetarum Christianorum Sæculi II.*, vol. vii. (1857).

Athens (*Athēnai*), the most distinguished city of ancient Greece, and capital of the modern Greek kingdom, lies in the peninsula of Attica, about 4 m. from the S.W. coast, on a group of limestone hills between Cephissus and Ilissus valleys. The central hill (512 ft. high, 300 ft. above the town) forms a precipitous citadel, the Acropolis. Mars' Hill, or Areopagus (375 ft.), lies close below to the N.W., and Museion Hill, Pnyx, and Nymph Hill from W. to S.W., about ¼ m. away. North-eastward, the conical Lycabettus (910 ft.) has always lain outside the city, and has no part in its history.

The earliest settlements were on the Acropolis (traditionally founded by Cecrops), and close below it to the S. and W. (ascribed to Theseus, the unifier of Attica). Parts of the so-called Pelasgic Wall remain, and numerous relics of the Stone and Bronze Ages. To the period of the early Iron Age belong the Dipylon cemetery, the massive substructures of the Pnyx, and the early orchestra below the theatre. The economic reforms of Solon (594 B.C.) and the splendid tyranny of Pisistratus (560-527 B.C.) raised Athens to the first rank of culture, industry, and trade; large suburbs spread S.E. towards Ilissus, and N.W. beyond the market place (Agora) and public offices (Prytaneion), which lay N. of the Agora, to join the potters' quarter (Ceramicus), whose wares outsold those of Corinth and Ægina, from Cyprus to Etruria. New temples rose to Zeus Olympius near Ilissus, and to Athene on the Acropolis; a great conduit brought Ilissus water into the old town; and much gorgeously-painted sculpture of this era survives in the museums. The constitution of Clisthenes (506 B.C.) gave freedom at home, and the naval reform of Themistocles (483 B.C.) led to the establishment of an arsenal at Piræus and an efficient fleet.



Environs of Athens and Piræus.

After total destruction by Xerxes in 480 B.C., Athens was splendidly restored. The walls, hurriedly built by Themistocles (479-470 B.C.), still visible near the Dipylon Gate, enclosed a nearly circular area three-quarters of a mile across. The Acropolis was enlarged by embankments of débris, and wholly refortified by Cimon (470-460 B.C.), the organizer of the Delian League. Under Pericles's administration (460-429 B.C.) the Long Walls (458 B.C.) enclosed a new suburb, Coilé, s.w. of Pnyx, and united Athens securely with Piræus. On the Acropolis a new temple to Athene, the Parthenon, was begun by Ictinos and Callicrates (454), and completed (438); and a great gateway (Propylæa), begun by Mnesicles (437), was left unfinished (432). The so-called Theseion, near the Agora, the best-preserved temple in Greece, is of the same date and of Doric style. To the period of the Peloponnesian war (432-404) belong the Erechtheion, on the Acropolis, and the Niké Temple at its entrance, both in Ionic style. The capitulation of 404 and the dissolution of the Delian League affected only the political prestige of Athens; her supremacy in art and letters remained unquestioned, and her industry and trade increased. Even in 404 the city contained 10,000 houses, and an estimated population of 300,000. To the 4th century belong the completion of the great theatre, and the sanctuaries of Dionysus and Asclepius (all south of the Acropolis), together with the fine monument of Lysicrates (in Corinthian style, close by), and numerous sculptured tombs by the Dipylon Gate. From the time of Alexander (d. 322) to the Roman conquest (146) Athens was unimportant politically. But her population in 317 (21,000 citizens, 10,000 resident aliens, 400,000 slaves) indicates her material prosperity; and her pre-eminence as a centre of learning and culture is reflected in the monuments of her patrons—the college and library of Ptolemy II. of Egypt (287-47), the Stoai of Eumenes II. and Attalus II. of Pergamum (197-59-38), and the gigantic Olympian temple begun by Antiochus IV. of Syria (174). Her defection from Rome in the war with Mithridates led to a disastrous siege by Sulla in 86, and curtailed her political freedom; but the buildings of Roman date mark her still as the chief university of the empire—*e.g.* the Tower of the Winds, an observatory (100-35 B.C.); the Stoa of Hadrian, who lived much in Athens (120-128 A.D.), completed the Olympian temple (*v.* above), and laid out a new suburb round it, and the water supply which is still in use; and the Odeum and Stadium of Herodes Atticus (150-170, A.D.). In spite of the early introduction of Christianity by St. Paul, Athens remained a headquarters of the ancient beliefs and of Neo-Platonic philosophy. But the Gothic raid of 258 and consequent refortification, the spoliation of the temples by Constantine (330), and the invasion of Alaric (396) are landmarks of decline; and the suppression of the schools of law and philosophy by Justinian (529) completed the transformation. The Acropolis became a Byzantine fortress; the Parthenon was consecrated to St. Sophia, and the Theseion to St. George; and many churches—*e.g.* the Capnicarea (founded 444, actual buildings 9th century), St. Theodore (1049), and the old cathedral (13th century)—sprang up in the lower town, now mainly north of the Acropolis.

The Latin conquest of 1204 brought a disastrous siege, and established a Frankish dukedom. The temples were adapted to Western ritual; the Propylæa became the ducal palace, and Hadrian's Stoa the residence of the governor. Passing from one adventurer to another (Otho de la Roche, 1204; Walter de Brienne, 1308; the Grand Company, 1311; Manfred of Sicily, 1326; the Florentine Nerio Acciajuoli, 1386), the duchy fell under the protectorate of Venice in 1394; but being freed by Duke Antonio in 1403, it fell under Ottoman suzerainty in 1435, and was finally annexed by Mohammed II. in 1458. Under the Frankish dukes Athens regained prosperity and culture, but lay off the pilgrim routes, and was little known in the west. John of Basingstoke, however, had studied there in 1202, and in 1436-47 Cyriac of Ancona made invaluable sketches of the ruined monuments. Under Turkish rule the Greek Church was reinstated at first, but the Parthenon and other buildings were soon converted to Moslem uses. The best-preserved Turkish building is the 18th-century mosque adjoining Hadrian's Stoa, which remained the governor's palace. The introduction of artillery and the Venetian raid of 1464 brought fresh fortifications and more destruction. The Propylæa was blown up in 1636, and the Parthenon in 1687. The Niké Temple (reconstructed in 1836) was demolished soon after 1686, and thenceforward destruction was rapid. Western travellers, however, had already begun their studies (Babin, 1672; Vernon, 1675; Spon and Wheeler, 1676; Dalton, 1749; Stuart and Revett, 1751-5), and in 1801 Lord Elgin rescued the majority of the remaining sculptures. At the Greek revolt of 1822 Athens fell at once, but was recaptured by the Turks in 1827. Finally, in

1833, it became the capital of the new Greek kingdom.

Modern Athens lies almost wholly north of the Acropolis and mediæval bazaar quarter, and is laid out on a triangular plan; the base, Hermes Street, runs east and west from the Dipylon Gate and Theseion railway station to the palace and principal hotels round the Syntagma Square. From Dipylon and Syntagma respectively Piræus Street and Stadion Street converge northwards to Homonoia Square, near which are the Opera House, Polytechnic, National Museum, and railway stations for Laurion and Peloponnese. Near the palace are the Parliament (Boulè), Post Office, and Ministries; above Stadion Street, along the base of Lycabettus, the Academy, University (with nearly 3,000 students), Infirmary, and National Library, and residential quarter. Other institutions are the Evangelismos Hospital, Zappeion Exhibition, Observatory (on Nymph Hill); Greek Cathedral; Roman, Russian, and Anglican Churches; and Archæological Institutes of Germany, France, Britain, and America: Acropolis Museum; Academy coin collection; Karapanos collection (from Dodona); mediæval and modern relics at the Polytechnic; geology and natural history at the University; Library at the Boulè; Archæological Society; Parnassus Club.

Railways are open to Piræus, to Laurion, and to Peloponnese *viâ* Corinth; steam tramway to Phalerum (sea-bathing), and diligence daily to Eleusis and Thebes. Local industries: oil, boots, silks, and rugs. Pop. (1896) 111,486.

The French School of Archæology was founded in 1846, with a permanent director and six fellows. The latter are maintained for three years at the school—working in museums in winter, and carrying on exploration or excavation in summer; reporting their results to the Academy of Inscriptions in Paris; and proceeding to professorships at home at the end of their training. The school has an annual income of about £2,500. It has conducted excavations at Delos, Myrina, Thespiæ, Delphi, and elsewhere, and publishes its results in its *Bulletin des Correspondances Helléniques.*

The German Imperial Archæological Institute, founded in 1874, has two permanent secretaries, and a varying staff of assistants and students sent out from German universities, and a government grant of about £3,500. Its principal excavations have been at Olympia, Tiryns, Pergamum, Troy, and in Athens; and it publishes quarterly *Mittheilungen.*

The American School of Classical Studies was founded in 1882, with an income of about £2,000, a resident director, and a varying number of students (5-10). It has excavated at Platæa, Eretria, the Heræon, Corinth, and elsewhere, and publishes reports in *The American Journal of Archæology.*

The British School of Archæology was founded in 1883, and is maintained by private subscriptions, with a government grant (since 1895) of £500. It has a library (including the valuable collections of the historian Finlay), and offers two or more studentships of £50 annually, and the remainder of the five to ten students hold university scholarships or support themselves. It conducts excavations (as at Megalopolis, and in Cyprus, Melos, and Crete) when its funds allow, and publishes results in its *Annual,* and in the *Journal* of the Hellenic Society in London.

The Austrian government maintains a staff of expert archæologists in Athens, and sends out frequent students, who make use of the German Institute.

Bibliography (see also general treatises under GREECE): Middleton and Gardner's *Plans and Drawings of Athenian Buildings* (1900). General—Pausanias's *Itinerary of Greece: Book I., Attica* (written about 160 A.D.); *Commentaries,* by Jahn and Michaelis (1880), Hitzig and Blümner (1896), Frazer (1898); Stuart and Revett's *Antiquities of Athens,* revised ed., 4 vols. (1825-30); Leake's *Topography of Athens,* 2 vols. (2nd ed. 1841); Wordsworth's *Athens and Attica* (4th ed. 1869); Wachsmuth's *Die Stadt Athen im Alterthum* (1874-90); Harrison and Verrall's *Mythology and Monuments of Ancient Athens* (1890); Curtius's *Stadtgeschichte von Athen* (1891). Mediæval—De Laborde's *Athènes aux XV., XVI., XVII. Siècles* (1854); Gregorovius's *Geschichte der Stadt Athen im Mittelalter* (1889). Architecture—Penrose's *Principles of Athenian Architecture* (1851); Beule's *Acropole d'Athènes* (1854); Fergusson's *The Parthenon* (1883); Bohn's *Die Propyläen der Akropolis zu Athen* (1882); Boetticher's *Die Akropolis nach den neuesten Forschungen* (1888). Sculpture and Antiquities—A. H. Smith's *Catalogue of Greek Sculpture in the British Museum* (vol. i.: Elgin Marbles, etc., 1892); Kavvadias's *Catalogue of the Greek National Museum,* in Greek (1890 *ff.*).

Athens, city, Georgia, U.S.A., co. seat of Clarke co., 55 m. E. by N. of Atalanta; seat of the state College of Agriculture (1872) and of the University of Georgia (1800); has cotton manufactures. Pop. (1900) 10,245.

Atherfield Clay, beds of clay, resting upon the Weald clay, and underlying the Lower Greensand beds, exposed at Atherfield, on the S.W. coast of the Isle of Wight. Its best-known fossils are perhaps the crustaceans of the 'lobster bed,' *Meyeria vectensis;* also *Perna Mulleti, Ammonites Deshayesi,* and *Gryphæa sinuata.* The thickness is about 60 ft.

Atherina, a genus of small fishes, with two British species. They are carnivorous, and live in shoals, and, in spite of their small size, are valued as food.

Atheroma, inflammation followed by degeneration, and often by calcification, of the walls of arteries, thus weakening them and lessening their elasticity. It may give rise to aneurisms or cause embolism. Atheroma of the cerebral arteries is a common cause of cerebral degeneration. Overstrain of the vessels, gout, and excess in alcohol are predisposing conditions. Treatment is mainly preventive and palliative. See AORTA, ARTERIES.

Atherstone, mrkt. tn., Warwickshire, England, 8 m. S.E. of Tamworth. The church dates from 1148. Hats and tennis shoes are the principal manufactures. Atherstone Hall was built in 1620 from the ruins of an ancient priory. Pop. (1901) 16,356.

Atherton, or CHOWBENT, tnship, Lancashire, England, 5 m. S.W. of Bolton. Nails, spindles, etc., are manufactured, and there are extensive cotton mills and collieries. Pop. (1901) 16,211.

Atherton, CHARLES GORDON (1804-53), American politician, born at Amherst, New Hampshire. While a member of Congress (1837-43) he gained notoriety by moving the 'Atherton Gang Resolution,' which proposed that 'all petitions relating to slavery or to its abolition be laid on the table without debate.' Although met by the strenuous opposition of John Quincy Adams, the resolution was carried by a majority of forty-two. At the opening of each new Congress, Adams presented a petition against the objectionable rule, and it was ultimately rescinded in 1844. See Wilson's *Rise and Fall of the Slave Power in America* (1872-7).

Atherton, GERTRUDE FRANKLIN, *née* HORN, novelist, was born at San Francisco and educated at Benicia, California, and Lexington, Kentucky. Her first novel, *What Dreams May Come,* was published in New York in 1888. Her other works include *Los Cerritos* (1890); *Patience Sparhawk and her Times* (1897); *American Wives and English Husbands* (1898); *The Californians* (1898); *A Daughter of the Vine* (1899); *Senator North* (1900); *The Splendid Idle Forties* (1902).

Athletic Sports. *Historical Sketch.*—Beginning chiefly with the classes, the popularity of athletic sports, as we now understand them, slowly but surely spread among the masses, until, in the last decade of the 18th century, a class of professional pedestrians sprang up, composed of men who made their living by running for sums of money. A great number of gentlemen also ran or jumped for money stakes deposited by themselves or their backers. About the year 1825, however, the popularity of foot racing among amateurs declined, and until well into the 'forties the sport was almost entirely confined to the professional 'ped.' In that decade the various universities and schools began to evince greater interest in athletic sports, and the first regularly organized meeting on the principles practically adopted at the present day was held in 1849, at the Royal Military Academy at Woolwich. This example was followed the year after by Exeter College, Oxford. The Mincing Lane Athletic Club, open to all amateurs, was formed in 1864; and that year also saw the first 'inter-'varsity' meeting. In 1866 the title was changed to that of the London Athletic Club—the 'L.A.C.,' now so well known. In the same year the Amateur Athletic Club was formed. The first meeting was held in that year, and the Lillie Bridge ground was opened in 1868. Nine years later a rupture occurred between the A.A.C. and the L.A.C., and the latter took up its quarters at Stamford Bridge. In 1880, however, chiefly owing to the action of the two universities, differences were settled, and the famous Amateur Athletic Association came into being as a result of the conference which took place at Oxford. This association, which now occupies the same position with regard to athletics as the Jockey and Marylebone Clubs do to racing and cricket respectively, undertook the management of athletic meetings, the drafting of uniform rules, the repression of abuses, and the holding of an annua championship meeting.

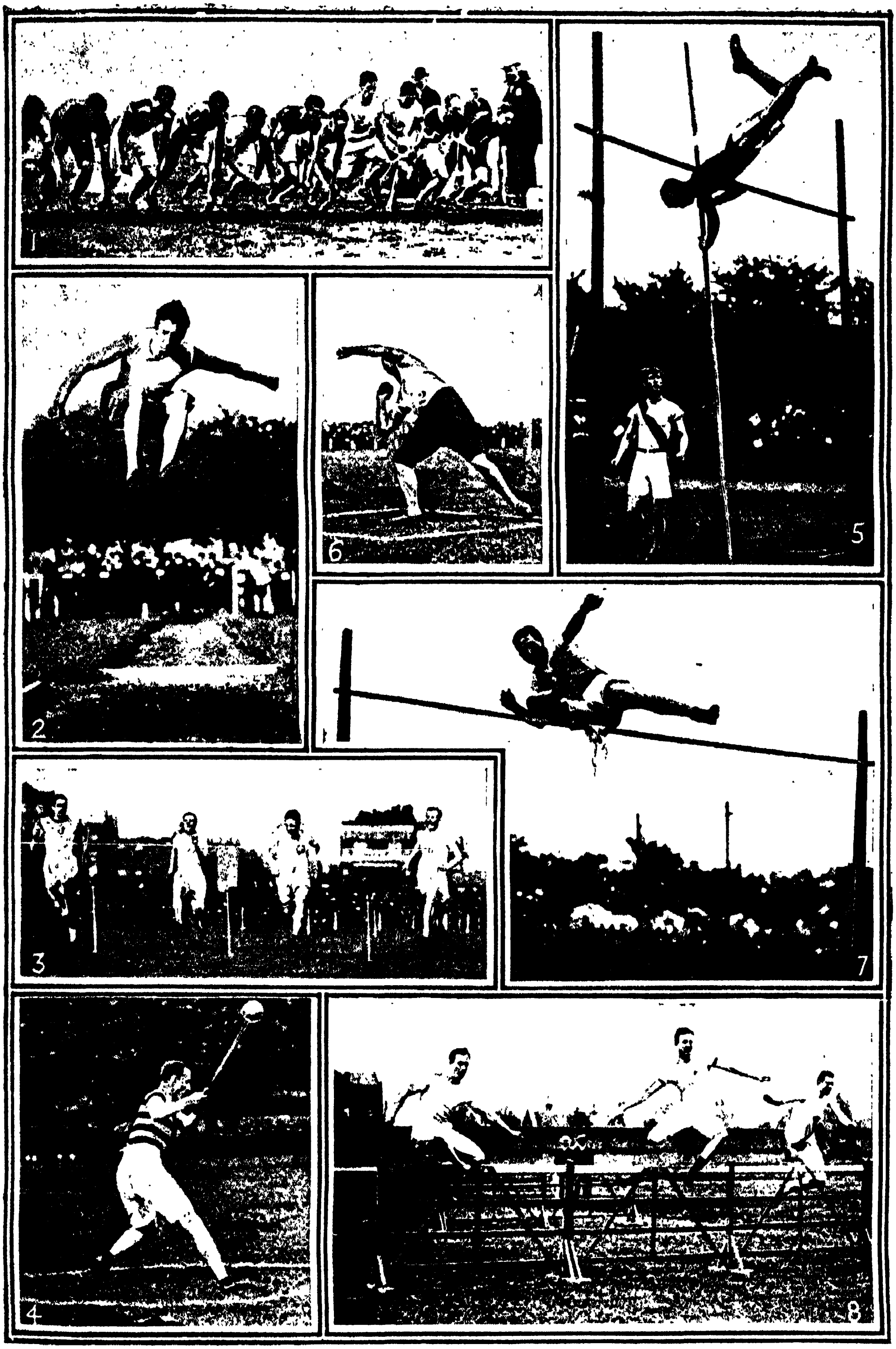
Athletic Meetings, Grounds, Amateurs.—All the most important athletic meetings, such as those of the L.A.C., Oxford, Cambridge, and the annual championship meeting, as well as many of the athletic sports of smaller clubs, take place on cinder tracks specially prepared for running. By far the majority of meetings, however, are held in places where no such track is available, and a course is marked out around an ordinary field, generally one used for cricket or football by the local club. The 'times' taken in running races on cinder are almost always superior to 'times on grass tracks, as the latter vary in quality, some—notably Catford Bridge and Trent Bridge, Nottingham—being practically equal to cinder tracks under favourable conditions of weather. Rain, of course, soon makes a grass track slippery or heavy running. Tracks should be made at least 20 ft. wide; and the circumference is usually a quarter-mile, although some of the best tracks are one-third of a mile. The best way to lay out a quarter-mile course is as follows. Peg down two parallel cords 227 ft. 1 in. apart, each 100 yds. long and describe a semicircle of 113 ft. 6½ in. radius at each end. This gives the inner edge of the track, which will be 1,313 ft. 8¼ in. in circumference; but as the A.A.A. rules ordain that all tracks are to be measured 1 ft. from the inner edge, the actual official length of the track as laid out will come to exactly a quarter of a mile.

The A.A.A., while leaving a fairly free hand to its affiliated clubs in the arrangement of their own sports, insists on certain rules being observed, including the prohibition of all open betting on the ground. All entries are limited to amateurs, an amateur being 'one who has never competed for a money or staked bet, or with or against a professional for any prize, or who has never taught, pursued, or assisted in the practice of athletic exercises as a means of obtaining a livelihood.' Owing to the enormous increase of athletic meetings during the last twenty years, and the consequent increase in the number of prizes, a certain class has sprung up the members of which are not only 'pot-hunters,' but unfair pot-hunters. 'Semi-amateurs' they may be called, who conceal their previous performances by giving false information as to 'times,' etc., with a view to deceiving the handicappers. By this means, if not found out, they receive favourable handicaps, and so obtain an unfair advantage. Many such men did and do not hesitate to sell their prizes; consequently the A.A.A. order that no handicap prize shall exceed the value of ten guineas, while they likewise punish with suspension, temporary or permanent, any offence against sport and fair play.

Hurdle Racing. Hurdle races are held on a straight, level grass course 120 yds. long, over 10 flights of hurdles 10 yds. apart, the first being placed 15 yds. from the starting line. The hurdles are 3½ ft. high and from 4 to 5 ft. long, each competitor having his own line, and keeping it throughout the race. In handicaps the worst man is generally placed on the starting line, so as not to reduce the distance from the first hurdle, thereby allowing him to get up a good pace before he takes his first jump. Some hurdle races are over quarter-mile courses, with 10 flights of hurdles 20 to 40 yds. apart

attractive races to watch, but very exhausting to the competitors. Hurdle racing is by far the prettiest, and at the same time most difficult to acquire, of all the athletic arts. This is especially the case in 'sprint' hurdling over the usual 120 yds. course. Constant practice under a good coach is necessary, and practically no hurdler can win fame unless he can manage to cover the distance between the flights in three strides. In actually taking the hurdle, strength and time are wasted by jumping too high. The good hurdler skims the top with but an inch or so to spare.

Flat Racing. Flat racing may be divided into three branches—*viz.* (*a*) sprint races, (*b*) middle-distance races, (*c*) long-distance races. (1.) 'Sprinting' signifies running at top speed, and the limit of sprinting distance was at one time, and by many still is, considered to be 300 yds. Modern training and tracks, however, have led to such good performances that the quarter-mile may now be said to be included in the category of sprint races, especially when we get such performances for the quarter as the 47 sec. of M. W. Long in America, the 48¼ sec. of R. Buttery, and the 48½ sec. of H. C. L. Tindall and E. C. Bredin. On the other hand, at ordinary local sports, with such times as 55 sec. the race is, perhaps, scarcely worthy to be called a sprint. As the distance run in sprint races is so short, especially in the 100 yds. race, which is seldom won by more than a yard, it is obvious that the aim of every runner should be to get sharply off the mark on the report of the starter's pistol. Most of the best men start on what almost seems 'all fours,' using what is known as the 'hand-spring' start. Leaning forward with the hands touching the ground, they take a good grip of the track (often making a small hole) with the spikes of the left foot just on or behind the 'scratch'—*i.e.* the starting line. The right foot is placed from 30 in. to a yard behind, also gripping the ground with the spikes. Practically all the weight of the body is on the hands and left foot, the right foot giving the propulsion when the pistol goes. In the 100 yds. the track should be divided by uprights about 2 ft. high, joined by cords, so that each man will have a path to himself from 3¼ to 4 ft. wide. The track is usually in the centre of the ground, the race being run on grass. Next to the hurdle race,



Snapshots of Athletic Events.

1. **Start of half-mile race**, A.A.A. championship. 2. Long jump (R. Sheehan, 20 ft. 2½ in.), L.A.C. meeting. 3. Finish of the 100 yards, South London Harriers, at the Oval. 4. Throwing the hammer (R. Garret, Princeton, U.S.A.), L.A.C. meeting. 5. Pole jump (D. S. Horton, Princeton, U.S.A., 10 ft. 6 in.), L.A.C. meeting. 6. Putting the weight (D. Horgan), A.A.A. championship, Rochdale. 7. High jump (W. Carroll, Princeton), L.A.C. meeting. 8. Hurdle race, King's College sports. (2, 4, 5, 7, and 8 at Stamford Bridge.)

the quarter-mile is perhaps the most attractive event for the spectator. The best way of developing and improving speed for the shorter races is to have plenty of short sharp bursts of from 30 to 40 yds., with an occasional full-speed run of from 60 to 70 yds. Very rarely, if at all, should the full distance be run. A sound rule to observe in sprints is seldom, if ever, to exceed two-thirds of the course at top speed in practice. In training for the quarter-mile, the men who would be 'nowhere' in that race owing to their lack of first-class sprinting power, but who, possessing great strength and staying power, can keep up a long stride over the whole distance, can do no harm by running the whole distance occasionally in practice.

(2.) Middle-distance races. These include all races longer than a quarter-mile and less than a mile, the most usual events being the half-mile, 1,000 yds., and three-quarter mile. In these races sprinting power takes second place, and 'condition' becomes the essential to success. Wind and muscles have to be brought to as high a state of perfection as possible, and this end is attained by gradually increasing the pace over about two-thirds of the course, say 600 yds., if practising for the half-mile. This increase in pace must not be forced day after day; on one the 600 yds. is traversed at a steady trot, on the next briskly, etc., varying the distance every day, so as not to overdo the training, but to gradually increase muscle and improve wind. Once a week the whole distance is covered, but not too fast, and on Sundays a good brisk walk is taken. No starvation is undergone in diet; plenty of good nourishing food is eaten, such as chicken, joints, fish, steaks, with vegetables and milk puddings. The food avoided is pastry, potatoes, and sweet puddings, all ruinous to wind and very fattening. After three weeks or a month's training, if undue exhaustion has been avoided, a man will be as fit as he ever will be for any race coming under the category of 'middle distances.'

(3.) Long-distance races are those of a mile and upwards. They are only suited to men possessed of a considerable amount of natural stamina, for they necessitate severer training than does middle-distance running. In practising, as in the shorter races, the full distance is seldom run over. From a month to six weeks is necessary for training, the work varying day by day, but gradually increasing in severity week by week, thus slowly bringing muscle and wind to a fit state to meet the effort called for in the actual race. The following method of training for a mile race is given in the Badminton Library, one week being taken as a sample of the sort of thing the athlete has to go through:—1st day, two-thirds of a mile at steady pace; 2nd day, half a mile; 3rd day, slow mile; 4th day, fast half-mile; 5th day, 600 yds. at steady fast pace; 6th day, a fast three-quarter mile; Sunday, a brisk walk of from 6 to 10 m., with a good rub down after the walk, as well as after the runs.

Walking. The art of walking has been for many years past, and still is, in great disfavour with the majority of the British public. The reason for this is chiefly the unfair style of walking adopted by most men, which, again, is due to the difficulty of defining 'fair walking.' Some judges contend that any walking is fair if the heel of one foot is on the ground before the toe of the other leaves it. Others hold that the foregoing is not a sufficiently complete definition of the art. The question is, What is fair 'toe-and-heel' walking? To begin with, before the toes of the back leg are lifted the heel of the front leg must be on the ground. The leg must be perfectly straight when the foot is down, not bent at the knee, which fault will tend to the lifting of both feet from the ground at the same moment. The body must be kept upright; if bent forward, the weight is thrown on the front foot. This leads, with increasing fatigue, to shortness of stride, to the toe instead of the heel of the front foot reaching the ground first, and eventually to a sort of jog-trot. The legs should be thrown out freely from the hips, which at each step should be given a sort of circular twist, producing a very slight outward sweep of the leg, which results in the front foot coming down almost exactly ahead of the other. In addition to the foregoing definition of style, the most important points for the novice to learn are to keep the weight of the body on the heels, to make the heel and not the toe reach the ground first, and to get a good action of the arms—utilizing them, as it were, as levers for lifting forward the body, and counteracting the unbalancing effect produced thereon by the sweeping strides of the legs. When fatigued, there is nothing easier and more resting than to break into a kind of half trot, half walk, and this tendency can only be resisted by keeping the body upright and the weight *off* the toes. 'Mixing,' 'lifting,' and 'shuffling' are the vices of the unfair walker. 'Mixing' is the worst. It is a more or less deliberate attempt to mix running with walking, and can be detected by the consequent rise and fall of the walker's (?) head and shoulders. 'Lifting' generally occurs from fatigue, although it may be deliberate, and consists in getting one foot off the ground before the other has reached it. The vice is detected by watching if daylight can be seen beneath both feet at once, by the body leaning forward, and by bent knees. 'Shuffling' is running on the heels, and is very difficult to detect. Short, springy strides, with the head bent forward, are symptoms of this particular unfairness for which the judge must watch. In training for walking races, practically the same rules are observed as for other races, but rather more of the course proportionately is gone over in practice. Among famous English walkers, the name of W. J. Sturgess, amateur champion from 1895 to 1900, and again in 1902, stands for all that is fair in style and fast in practice. His record performances will be found in the record table at the end of this article.

Jumping.—As an event in every athletic meeting jumping takes two forms the broad or long jump, and the high jump. A third form, which is dying out, but is still practised in many places, is the pole jump or vault. The long jump requires a straight, level piece of turf or circular track leading up to the 'take-off' line, which is marked by a piece of wood 4 to 5 ft. long, and about 12 in. by 2 in. This plank is let into the ground, with its top edge, painted white, flush with the surface. A pit about 1 ft. deep, 4 ft. wide, and 14 ft. long, is dug, commencing 12 ft. from the take-off line. It is filled with sawdust and sand mixed, and gives a soft place to alight on. It is raked over and smoothed down after each jump. The number of tries allowed to each competitor is the same as in throwing the hammer. A jump is not measured, although it counts as a try, if the competitor does any of the following things crosses the take-off with either foot, or passes it at one side; falls or steps back after jumping. The measurement of the jump is made from (and perpendicular to) the take-off line to the edge of the heel-mark nearest that line. A good style includes keeping the feet together when in the air and throwing them well to the front on landing. This, however, must not be overdone, or a back fall will result. The arms are kept straight and pointed towards the front, outwards and downwards. The jump must be made when travelling at full speed. Most men lose ground by taking off too soon—this requires plenty of practice—and by not jumping high enough.

The high jump. In high jumping, each competitor is allowed three jumps at each height, and all measurements of heights jumped are made from the ground to the centre of the cross-bar. Neither diving nor somersaulting over the bar is permitted. This last rule was introduced about 1890 in consequence of a weird method of jumping adopted by some Woolwich cadets in the inter-collegiate sports with Sandhurst a few years previously. The method consisted of diving over the bar head first, and landing on the hands. The high jump generally takes place on grass, though in wet weather a cinder track may be substituted with advantage. There is no athletic sport in which style differs so much as the high jump. Some men face the bar, and take it fair and square; others negotiate it from one side or the other. Some take a long run before jumping, others but a few paces. To run too fast at the jump is a fatal error. The most difficult thing to learn is the right place to take off from; this requires constant practice. Most jumpers take off at a distance from the bar equal to about half the height of the jump. Any exercises which develop the muscles of the leg make good training for high jumping.

Pole Jumping.—A pole jump is a combination of a jump and a vault. It consists of jumping over a horizontal bar with the help of a pole of hickory wood about 14 ft. long and 1½ in. diameter in the centre, tapering to 1¼ in. at each end. It is a very pretty sport to watch, an exhilarating one to the performer who can clear his 10 ft. odd, and a capital exercise for the muscles. The method of jumping is somewhat as follows:—The jumper takes hold of the pole with his right hand (with an under grip) at a point distant from the spiked end equal to the height of the jump *plus* about 6 in. With his left hand he takes an over-grip from 12 to 18 in. below the right. Holding the spiked end raised to the front, he runs about 20 yds. at full speed, plants the spike in the ground about 1½ ft. short of the jump, and springs up, still gripping the pole. As he swings towards the bar, he throws his feet forward and over it, releases the pole so that it falls back, and drops lightly over the bar on to his feet.

Throwing the Hammer is a sport which is greatly neglected in England, though in Scotland (especially) and in Ireland it is a great favourite. The head of the hammer is of iron or lead, or both, and with the handle—which must not be longer than 4 ft.—must not exceed a weight of 16 lbs. The competitors throw from within a circle of 9 ft. diameter, except at the universities, where the size of the circle is 30 ft., any step beyond the circumference disqualifying the throw. The usual method of throwing is as follows:—The thrower stands at the back of the circle, swings the hammer two or three times round his head, and, with a quick twisting run, travels to the front of the circle and lets his hammer fly at the proper moment. Each competitor is allowed three tries, and the best three competitors three more each. Distances are measured from the circumference of the circle on a line joining the centre to the point where the hammer drops. A good thrower must possess exceptional stature and strength. Dr. W. J. M. Barry, a noted hammer-thrower of the last thirty years, stood 6 ft. 4½ in., and weighed 234 lbs.

Event.	British Amateur Record	American Record.	World's Professional Record
100 Yards.	9⅘ sec. W. A. Schick, 1904. A. F. Duffey (grass), 1901.	9⅗ sec A. F. Duffey, 1902.	9¼ sec. E. Donovan, 1895.
120 Yards.	11⅘ sec. Various.	11⅗ sec. B J. Wefers, 1897.	11¼ sec. T. M. Malone, 1888.
120 Yards Hurdles.	15⅘ sec. A. C. Kraenzlein, 1900.	15⅕ sec. A. C. Kraenzlein, 1898.	.. ...
Quarter Mile.	48½ sec. H. C. L. Tindall, 1889. E. C. Bredin, 1895.	47 sec. M. W. Long, 1900	48¼ sec. R. Buttery, 1873.
Half-Mile.	1 min. 54⅗ sec. F.J.K. Cross, 1888.	1 min. 53⅖ sec. C. J Kilpatrick, 1895.	1 min 53½ sec. F. Hewitt, 1871.
One Mile.	4 min. 16⅘ sec. J. Binks, 1902.	4 min. 15⅗ sec. T. Conneff.	4 min 12¾ sec. W. G. George, 1886.
Four Miles.	19 min. 23⅖ sec. A. Shrubb, 1904.	20 min. 15⅘ sec. W. D. Day, 1889.	19 min. 25⅘ sec. P. Cannon, 1888.
Ten Miles.	50 min. 40⅗ sec. A. Shrubb, 1904.	... ..	51 min. 5¼ sec H. Watkins, 1899.
Putting the Weight.	48 ft. 2 in. D. Horgan, 1897.	48 ft. 7 in. R. Rose, 1904.	65 ft. 6 in A. A. Cameron, 1902.
Throwing the Hammer.	169 ft. 8 in. T. R. Nicholson, 1904.	173 ft. J. Flanagan.	165 ft. T Carrol, 1895.
Long Jump.	24 ft. 11¾ in. P. J. O'Connor, 1901.	24 ft. 7¼ in. M. Prinstein, 1900.	.
High Jump.	6 ft. 4½ in. P. Leahy, 1898.	6 ft. 5⅝ in. M. J. Sweeney, 1895.	6 ft. 8¼ in. R N B[illegible]ker, 1900 (doubtful).
Pole Jump.	11 ft. 9 in. R. D. Dickinson, 1891.	12 ft. 0¼ in. W. M. M'Lanahan, 1904.	10 ft. 10½ in. G. Musgrove, 1866.
One Mile Walk.	6 min. 32⅘ sec W. J. Sturgess, 1897.	6 min. 29⅗ sec. F. P. Murray, 1883.	6 min 23 sec W. Perkins, 1874
Two Miles Walk.	13 min. 24⅕ sec. W. J. Sturgess, 1897.	......	13 min 14 sec. J. W. Raby, 1883.

Tossing the Caber. This is essentially a Scotch sport, and demands both strength and skill. The caber usually consists of a beam or tree-trunk, tapering towards one end. It is held perpendicularly, resting on both hands and balancing against the body. It is then tossed so that it falls on its larger end, the competitor making the longest toss winning. As a rule, when first produced the caber is too heavy for any of the competitors to throw in the proper manner, and has to be sawn down. If only one man can toss it, he wins the event.

Putting the Weight.—This, a companion sport to throwing the hammer, also demands great muscular strength, and is a capital exercise for developing the back, loins, and shoulders. The 'weight' is a spherical iron shot of 16 lbs. It is 'put' from the shoulder with one hand, the competitor standing in a 7-foot square (the universities use a 10-foot square), beyond which he must not move. The number of puts allowed is the same as in throwing the hammer, and crossing the 'scratch' *i.e.* the edge of the square counts as a try, although the put itself is disqualified. There are many different styles of putting, but the most usual, and perhaps the best, is that adopted by Dr. Barry, already mentioned in connection with throwing the hammer. The putter stands sideways, with the right foot against the back edge of the square. His body rests on the right foot, while the left just taps the ground. He raises the shot once or twice above his head to get the balance, lowers it to his shoulder, gives two quick hops forward on his right foot, jumps on to the left foot, makes a sharp half-turn and a spring, and with body and arm launches the shot into space, coming down on the right foot just short of the 'scratch.'

Record Performances in Athletic Sports. The above table gives a complete list of those records which have been accepted as authentic by the A.A.A. An asterisk denotes a 'world's record.' The 100 yds. race was run in New Zealand in 9⅘ sec. by T. Macpherson in 1891, and J. H. Hempton in 1892. The records for the weight and hammer are for performances from the 7-ft. square and 9-ft. circle respectively. A. C. Kraenzlein's extraordinary time of 15⅕ sec. for the 'hurdles' was made on a cinder track in America. He won the A.A.A. championship hurdles in 1900 with 15⅖ sec., and again in 1901 with 15⅗ sec. The long jump of 24 ft. 11¾ in., made in 1901 by an Irish amateur O'Connor stands as the world's record. Besides holding the amateur record for the 2 m. walking race, W. J. Sturgess possesses the world's record for the 1 m. (6 min. 32⅗ sec.), the 3 m. (21 min. 14 sec.), and all races between 5 and 11 m. -doing the last mentioned in 1 hr 25 min. 53⅗ sec. He also holds the amateur record for the 4 m. -*viz.* 28 min. 24⅘ sec.

The best books on athletic sports are *Athletics*, by H. H. Griffin (1891); *Athletics and Football* (Badminton Library), by M. Shearman.

Athlone, mrkt. tn. of Ireland, Co. Westmeath (only since 1898), on both banks of the Shannon, 17 m. S.E. by S. of Roscommon. It has extensive barracks. Portions of the old walls still remain. Woollen goods are manufactured; there are sawmills and an excellent fishery. From its position at one of the chief fords of the Shannon, it was in early times a place of great strategic importance. A castle erected in John's reign became the residence of the Earl of Essex in Elizabeth's day. In 1641 the town sustained a protracted siege; later it was taken by Cromwell and burnt. De Ginkell, William III.'s general, took the castle by assault after two days' destructive cannonade (1691). In 1697 the powder magazine of the castle was struck by lightning, and the town was wrecked by the explosion. Down to 1885 Athlone returned one member to the House of Commons. Pop. (1901) 6,617.

Athlone, GODART DE GINKELL, FIRST EARL OF (1630-1703), military commander, born at Utrecht, and followed William of Orange to England in 1688. His capture of Ballymore, Athlone, and Limerick won for him the thanks of the House of Commons and the earldom of Athlone. In the wars of William III. with France, Ginkell distinguished himself at the recapture of Namur and in the surprise of Givet. In the war of the Spanish Succession (1702) he served under Marlborough, although continually at variance with him.

Athni, tn., Belgaum dist., Bombay, India, 44 m. S.W. of Bijapur. Coarse cotton cloth, blankets, and saltpetre are manufactured. Pop. (1901) 11,107.

Athole, or ATHOLL, DUKES OF, a noble Scots family, dating back to the reign of Alexander I., when Madach, a son of Donald Bane, was styled Earl of Athole. DAVID, 11th earl, forfeited the title by his connection with the Baliol party (1311). The estates were then granted to Sir Neil Campbell, whose son JOHN, created Duke of Athole, was killed at Halidon Hill (1333), leaving no issue. The title passed to SIR W. DOUGLAS, then to ROBERT STEWART, lord steward of Scotland, and became extinct (1625). It was revived and granted to JOHN MURRAY, Earl of Tullibardine (1628), descended, through his mother, from the Stewarts. JOHN, 3rd earl of this family, was created duke (1703).

Athor, AYTHOR, HETHER, or HATHOR, an Egyptian goddess, daughter of Ra, in whom the Greeks recognized their Aphrodite. The cow was her symbol.

Athos, a mountainous peninsula which projects from the S. coast of Macedonia into the Ægean Sea. It is the E. arm of the Chalcidice peninsula, is 30 m. long and 6 broad, and reaches a height of 6,350 ft. Its circumnavigation was so much dreaded by ancient mariners that Xerxes, when invading Greece in 480 B.C., cut a canal (traces of which are still visible) through the isthmus. Here, in 492 B.C., the Persian fleet under Mardonius had been completely wrecked. In ancient days the peninsula contained several prosperous towns. At the present time it is covered with a score of monasteries, besides other religious edifices, belonging to the Orthodox Greek Church, the monks forming a kind of republic, though under the suzerainty of the Sultan. The first Christian monasteries were built here in the 9th and 10th centuries. They possess some 13,000 MSS., many of great palæographic value. See Riley's *Athos, the Mountain of the Monks* (1887); Lambros's *Catalogue of Greek MSS. on Mount Athos* (Cambridge, 1895 1900).

Athrepsia, the wasting of infants, through insufficient or improper food or imperfect digestion. Wasting, or marasmus, may of course be due to definite disease, tuberculosis and syphilis being common causes; but in both there will be characteristic signs. In athrepsia the child is constantly uneasy, and in the early stages, while its strength is sufficient, its cries are almost incessant and piercing. The wailing of a tubercular child is not often as powerful. The athrepsic child cries because it suffers, not only from hunger, but also from flatulence, colic, and other discomforts of the alimentary tract, with frequent diarrhœa and rashes, especially if the trouble is due not so much to the quantity as the quality of food. In the child the nervous system is specially unstable, and therefore mistakes in feeding may even cause convulsions, which have before now been mistaken for signs of meningitis. In the later stages of athrepsia the child's face is characteristically sharp-featured and pinched, the body is cold, the temperature may be much below normal, and the child is consequently liable to the complications of all those common diseases which attack a weakened organism. The treatment consists in determining the faults in the diet, and altering it at once. More food may be all that is needed; but a child is often found to be starving because it gets too much of what it cannot digest. It must be remembered that the child lives only by what it can assimilate, and to give it food is not to feed it, if that food be not suited to the child's age and stage of development. See DIET.

Athy, mrkt. tn., Co. Kildare, Ireland, on the Barrow and the Grand Canal, 15 m. S.W. of Kildare; manufactures bricks and tiles, and was the scene of a great battle between Irish tribes in the 3rd century. The town which grew up around the monasteries of the Crutched Friars (founded 13th century), on W. side of the river, and of the Dominicans, on the E. side, was plundered by the Scots in 1315, after the victory of Ardscull (4 m. N.E. of town). White's Castle, now a police barrack, the 'moat of decapitation,' connected with a massacre in Elizabeth's reign, and Woodstock Castle (W. side of river), said to date from the 12th century, are the chief places of interest. Pop. 3,599.

Athyroidea, symptoms following defective production or absorption of the secretion from the thyroid gland.

Atitlan, tn., lake, and volcano in the dep. Solola, Guatemala, C. America, 50 m. W. of Guatemala. The lake is 24 m. long and 10 m. broad, and has no outlet. On the southern shore rises the volcanic peak Mt. Atitlan, 11,723 ft. The town Santiago de Atitlan is on the S. side of the lake. Pop. 9,000.

Atjeh, or ATCHIN, a residency of the Dutch E. Indies, embraces the N. portion of Sumatra—the boundary on the W. coast beginning at 2° 53′ N. lat., and on the E. coast at 4° 32′, and running over the interior, between these two points, in an irregular line. The interior forms a continuation of the highlands of the Batak region. (See SUMATRA.) This area is about 20,550 sq. m., and in 1898 the population, not counting the inhabitants of the unknown interior, was put down at 535,400; these figures include about 330 Europeans, 4,000 Chinese, and 400 Arabs and other Asiatics. The rest are Atchinese, who down to 1878 maintained themselves as an independent state, and who from 1873 to 1898-9 stubbornly withstood the efforts of the Dutch to subdue them, though in the latter year their power was finally broken, and Dutch rule firmly established, by General van Heutsz. The ethnological relations of the Atchinese are not conclusively established; as a race they are thick-set, and their skin is of a darker colour than the skin of the Malays. They work gold and iron (into weapons), manufacture silk and pottery, carry on fishing, and engage in trading. Pepper, rice, betel, and tobacco are exported. The principal towns are Kota Raja, or Atchin, with its port, Olehleh; Segli, on N. coast; Edi, on the E.; and Malabuh, or Analabu, on the W. coast.

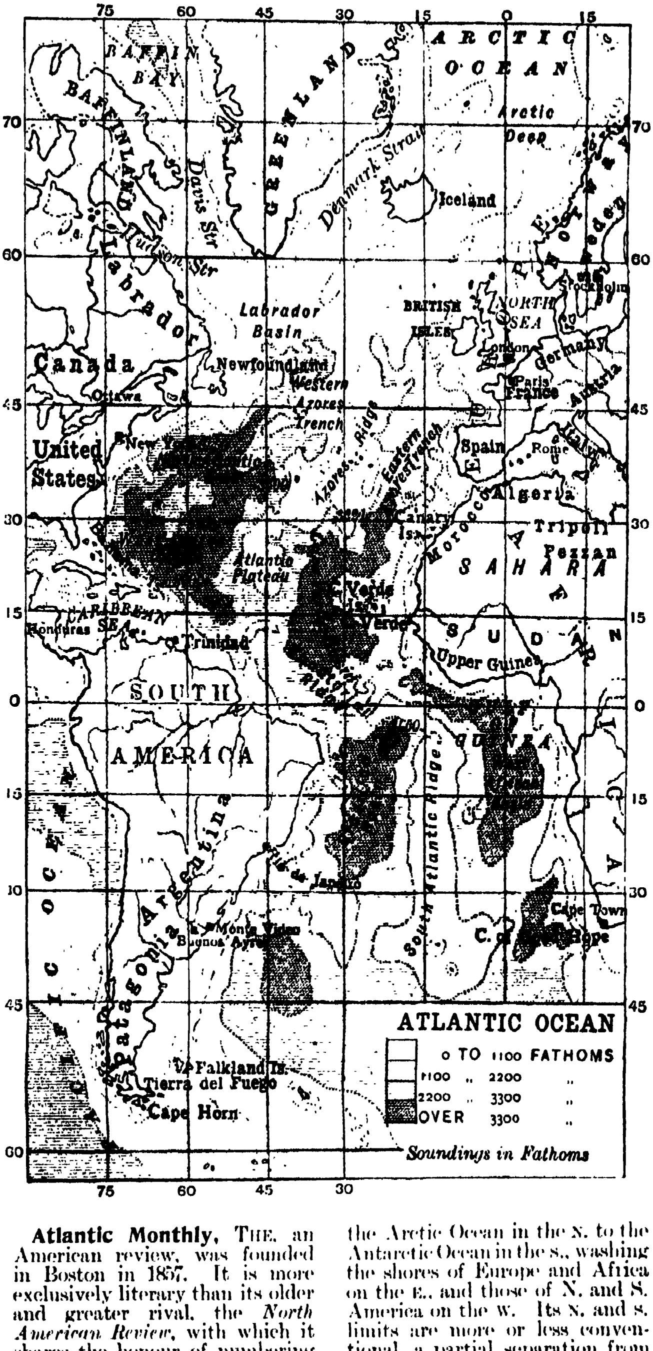
Atkins, TOMMY, the slang name for the British private soldier; more shortly referred to as 'a Tommy' (pl. 'the Tommies'). The term is used in a friendly rather than a derogatory sense, and figures prominently in Mr. Kipling's works. Its origin seems to have been similar to 'John Doe and Richard Roe' the name of a certain Thomas Atkins having headed a specimen form sent out by the War Office.

Atkinson, RIGHT HON. JOHN (1845), called to the Irish bar (1865) and the English bar (1890); took silk in 1880. Since 1895 he has represented Londonderry N. In 1889 he became solicitor-general for Ireland, and in 1892 attorney-general and privy councillor for Ireland, being reappointed attorney-general in 1895.

Atkyns, SIR ROBERT (1621-1709), English judge, assisted in the defence of Lord William Russell (1683), and of Sir William Williams, the Speaker of the House of Commons. He was made a judge in 1672; retired 1679. After the revolution he became Chief Baron of the Exchequer. He was Speaker of the House of Lords (1689-93). See Foss's *Judges* (1848-64), vol. vii.

Atlanta, city, Georgia, U.S.A., the cap. of the state and the co. seat of Fulton co.; situated in lat. 33° 45′ 19″ N., and long. 84° 23′ 29″ W. It exports tobacco and cotton. It is the seat of Clark University (1870), the Georgia School of Technology (1888), the Atlanta University (1869), for coloured persons, and Atlanta Baptist College (1867). Pop. (1900) 89,872.

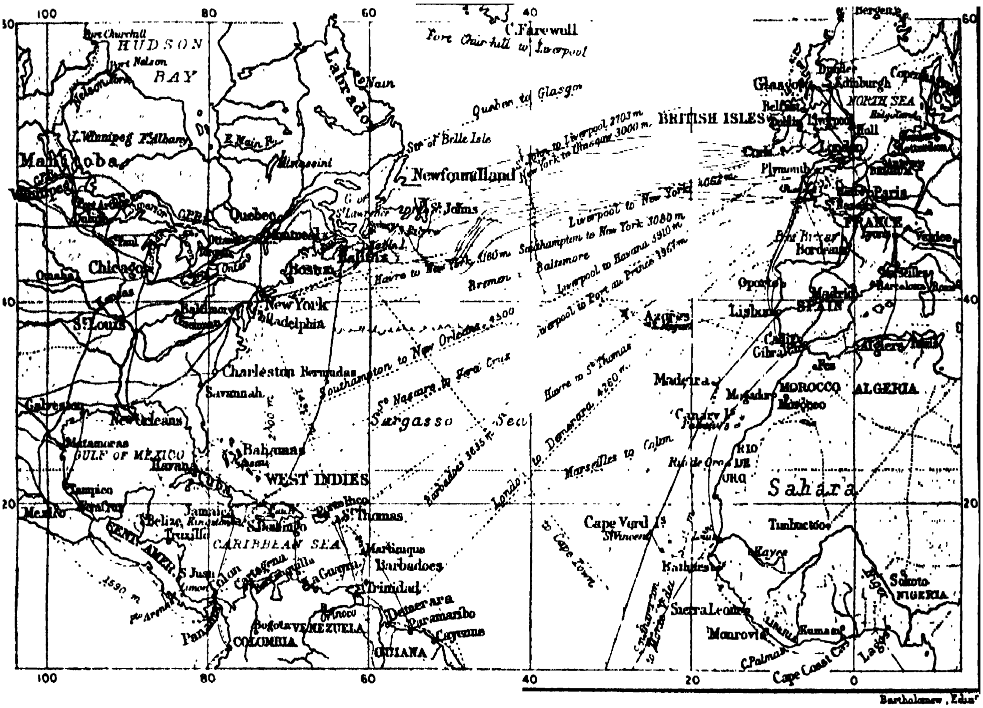
Atlantic City, city, Atlantic co., New Jersey, U.S.A., on the coast, on a long, narrow sand-bar, 60 m. S.E. of Philadelphia; is a popular health and pleasure resort. It suffered severely from a fire in 1902. Pop. (1900) 27,838.



Atlantic Monthly, THE, an American review, was founded in Boston in 1857. It is more exclusively literary than its older and greater rival, the *North American Review*, with which it shares the honour of numbering James Russell Lowell among its editors. Mr. William Dean Howells directed it from 1865 to 1881. The contributors to the *Atlantic Monthly* have included Longfellow, Oliver Wendell Holmes, and John Greenleaf Whittier.

Atlantic Ocean, stretches from the Arctic Ocean in the N. to the Antarctic Ocean in the S., washing the shores of Europe and Africa on the E., and those of N. and S. America on the W. Its N. and S. limits are more or less conventional, a partial separation from the Arctic being the Wyville

Thomson ridge, which stretches N.N.W. from the N. of Scotland towards the Faroes, and rises to within 250 fathoms of the surface. Length of ocean (N. to S.), 8,500 m.; breadth, from 1,800 m. (between Brazil and Guinea coast) to 4,500 m. (between Saharan coast and Florida); area estimated at 27 to 30 million sq. m. Directly and indirectly the Atlantic receives about one-half the entire rainfall of the globe. The floor is a gently undulating plain (average depth, 2,200 fathoms), with a narrow ridge, at less than 1,700 fathoms, along the centre, roughly parallel to the Europeo-African coasts, the volcanic peaks of the Azores being its greatest elevation. North and south of these islands the ridge widens out considerably, and farther to the N. stretches out arms eastward to Ireland and westward to Newfoundland. Along this E.-W. elevation the chief Atlantic cables have been laid. In at least fifteen places on both sides of this median ridge are the 'deeps' of the oceanographers, abysses of over 3,000 fathoms. The deepest sounding thus far is that of the Nares deep (70 m. N. from Porto Rico), 4,561 fathoms, or nearly 5¼ m. The continental shelf is relatively narrow all round the Atlantic, but at its outer edge the shelf drops sharply nearly everywhere. Sir John Murray estimates this continental shelf and slope as covering 17 per cent. of the horizontal area of the ocean. The surface temperature over the greater part of the N. Atlantic averages 40° F., increasing to 50° F. near the shores of Europe. The heat equator lies a little to the N. of the geographical, and the surface temperature there averages 80° to 90°. Between this central belt and the polar waters a band of ocean intervenes on each side, with a temperature of between 50° and 60°. Over the greater portion of the S. Atlantic the bottom water varies between 35° and 40°, but in the N. Atlantic the average temperature ranges 2° higher. Soundings made between Europe and N. America by way of the Azores, by Mr. Peake, in 1899, appear to indicate that the temperature of the water even at the lowest depths varies slightly according to the season. Despite its great tribute of river water and its semi-enclosed seas, the Atlantic is relatively salter than the other oceans, its salinity being greatest in the region of the trade winds, and least in the region of equatorial calms. The surface everywhere teems with pelagic life, animal and vegetable. 'Seaweed meadows' of gulf-weed form the Sargasso Sea. For the characteristics of the deposits on the Atlantic floor, see OCEANS; for the currents, see OCEAN CURRENTS and GULF STREAM; and for the winds, TRADE WINDS.



Chief Steamship Routes and Telegraph Cables of the North Atlantic.

Since the 16th century the Atlantic has been the chief commercial highway of the world. The progress made in its navigation may be illustrated by the following comparative statements. In the year 1620 the *Mayflower* took 106 days (Sept. 6 to Dec. 21) to cross from Plymouth to near Boston, though it should be noted that adverse winds and storms rendered the voyage exceptionally long. In 1819 the steamer *Savannah*, relying mainly on her sails, took 26 days to cross from New York to Liverpool. In 1840 the first regular steam liner, the *Britannia* (Cunard Line) crossed from Liverpool to Boston in 15 days, and in 1901 the voyage (New York to Southampton) was accomplished by a German liner in a little over five days. About a score of telegraph cables lie on the floor of the Atlantic, and since 1902 Signor Marconi has transmitted messages from Poldhu, Cornwall, to Nova Scotia, and between vessels at sea, by means of wireless telegraphy.

The foundation for our knowledge of this as of the other oceans was in great part laid by the *Reports on the Scientific Results of the Voyage of H.M.S. 'Challenger,'* edited by Sir Wyville Thomson and Dr. (Sir) John Murray, in 37 vols. (1880-9). See, further, a paper on the 'Annual Variations of Temperature in the Oceans,' by Dr. Gerhard Schott, in *Petermann's Mitteilungen*, 1895, No. 7; Dr. A. Supan, 'On the Rainfall of the North Atlantic,' in the same journal, 1898, No. 8; Dr. G. Schott, on the 'Voyage of the *Valdivia*,' in *Annalen der Hydrographie*, 1899; Dr. O. Pettersson, in *Petermann's Mitteilungen*, 1900; Sir John Murray's 'Address to the Geographical Section of the British Association, 1899,' printed in *Scot. Geog. Mag.*, 1899; the same writer's 'On the Height of the Land and the Depth of the Ocean,' in *Scot. Geog. Mag.*, 1888, pp. 1, etc., and 1890, p. 265; and other works quoted under OCEANS; also R. E. Peake and Sir John Murray, 'Results of a Deep-sea Sounding Expedition in the North Atlantic during the Summer of 1899' (*Royal Geog. Soc. Suppl. Papers*, 1901).

Atlantic Shipping Trust, THE, or alternatively 'The Morgan Combine,' is the popular way of speaking of the International Mercantile Marine Company, which represents the great combination for the control of the principal North Atlantic steamship companies, British and American, organized in 1902 by the energy and enterprise of Mr. J. Pierpont Morgan, the millionaire banker and financier of the United States. The combination was the outcome of the struggle between the great carrying companies for the North Atlantic passenger and freight trade. Provisional agreements, dated Feb. 4, 1902, were entered into, the object and purpose of which were 'the acquisition, on or before Dec. 31, 1902, of the maritime properties and businesses hereinafter described by a corporation, to be organized under the direction of the vendors to the satisfaction of the bankers (Messrs. J. S. Morgan and Co.), under the laws of the state of New York, or such other state as shall be selected by them, for and in consideration of the issue to the vendors, or to their representatives, of the total capital stock of the corporation, being $120,000,000, of which $60,000,000 shall be preferred stock, entitled and limited to cumulative dividends at the rate of 6 per cent. per annum, and $60,000,000 common stock, limited to dividends of 10 per cent. per annum so long as there shall be outstanding any of the debentures hereinafter mentioned, and also $50,000,000 of collateral trust debentures, paying interest at the rate of 4½ per cent. per annum.' The maritime properties and businesses 'hereinafter described' were the White Star Line, the Dominion Line, and the Leyland Line (British steamship companies), and the American Line and Atlantic Transport Line (American steamship companies). The agreements also provided that the ships of the British companies should sail with British registers, and be officered and manned by British crews; and that Messrs. Harland and Wolff, shipbuilders, of Belfast, should have the sole right to build vessels for the fleet of the 'combine' which sailed under the British flag. A satisfactory working arrangement was also entered into with the North German Lloyd and the Hamburg-American Lines, the two German steamship companies which were in a position to make a strong bid for the North Atlantic trade. The provisional agreements were, on different dates during 1902, ratified by the shareholders of the constituent British companies; and on Oct. 2, 1902, the great shipping combination was incorporated at Trenton, New Jersey, by filing papers amending the certificate of incorporation, changing the name from the International Navigation Company to the International Mercantile Marine Company, and increasing the capital from $15,000,000 to $120,000,000, half in 6 per cent. cumulative dividend preference stock and half in ordinary shares, with power to issue 4½ per cent. bonds to the amount of $75,000,000. Mr. C. A. Griscom, of the American Line, was appointed president of the company, but resigned early in 1904; and in March of that year Mr. Bruce Ismay, the head of the White Star Line, became president and general manager. A British committee for the management of the British lines, subject to the general control of the Anglo-American Board of the International Mercantile Marine Company, was also constituted.

In a speech at Sheffield on Sept. 30, 1902, Mr. Gerald Balfour announced that the government had entered into agreements both with the Cunard Company, which had resisted the invitation to join the combination, and with Mr. Pierpont Morgan, on behalf of the International Mercantile Marine Company. Under their agreement, the Cunard Company pledged themselves to remain in every respect a British company; that their ships should be officered by British officers; that they would construct two vessels, with a speed of from twenty-four to twenty-five knots an hour, and that these vessels, with the entire fleet of the company, should remain at the disposal of the Admiralty, who were to be at liberty to charter or purchase any of them at any time on terms fixed in the agreement. It was also provided that the capital necessary for the construction of these two vessels, amounting to £2,600,000, should be advanced to the Cunard Company at 2¾ per cent. interest; and that the company should receive from the government a subsidy, in lieu of the present Admiralty subvention, of £150,000 a year. The general effect of the agreement with Mr. Pierpont Morgan was to secure that the British companies in the combination should remain not merely nominally but in reality British, that these companies should be kept alive, and that the majority of their directors should always be British subjects. It further provided that every ship in the combination now flying the British flag, and half the ships hereafter to be built for the combination, should continue to be British ships and to fly the British flag, and that they should be officered by British officers and manned in reasonable proportion by British crews. The government, on their part, undertook that these ships should continue to be treated as heretofore on a footing of equality with other British companies in respect of any service, whether postal or military or naval, which H.M. government might require from the British mercantile marine. These agreements, which are to remain operative for a period of twenty years, were ratified by Parliament towards the close of the session of 1903.

Atlantic Telegraph. See TELEGRAPHY.

Atlantic Transport Company, formed in 1886, and running between London and Baltimore, Philadelphia, and New York, principally for the purpose of carrying cargoes of refrigerated meat and live stock. In 1889 the present company was formed, and took over the National Steamship Company in 1896, and in 1898 the fleet and American business of the Wilsons and Furness-Leyland Line. The company owns nineteen steamers, aggregating 138,100 tons, but has under construction several new steamers of over 13,000 tons each.

Atlantis, according to ancient tradition a great island W. of the Strait of Gibraltar, opposite Mt. Atlas, the inhabitants of which were very prosperous and powerful; they even invaded Africa and Europe, but were defeated by the Athenians and their allies. Afterwards, owing to their impiety, they and their island were swallowed up by the ocean. Plato tells the story in the *Timæus*. It originated probably in information obtained from Phœnician sailors about the Canary Is. or the Azores. It has been considered as indicating that the ancients had a vague belief in the existence of a W. Hemisphere. See Archer-Hind's and Th. H. Martin's editions of the *Timæus* of Plato; Clarke's 'Examination of the Legend of Atlantis,' in *Trans. Hist. Soc.*, 1886; and the curious speculations of the Swedish writer Rudbeck, *Atlantica sive Mannheim* (1675-8). For the *New Atlantis*, see BACON. Compare also ISLES OF THE BLEST.

Atlantosaurus, one of the group of Dinosaurs, the largest animal which is known to have at any time inhabited the globe. Its fossil remains are found in the Jurassic strata of Colorado, U.S.A. Its thigh bone was 6 ft. 2 in in length, and the limbs were small relatively to the large body they supported. It is supposed to have been herbivorous in habit. See Marsh's *Dinosaurs of N. America* (1896).

Atlas, one of the Titans in Greek legend, son of Iapetus and Clymene; said to have been the leader of the Titans in the war against the gods, and to have been condemned, as a punishment, to the task of bearing the heavens on his shoulders. In some stories Perseus is said to have turned him to stone with the Gorgon's head for refusing to give him shelter; he then became Mt. Atlas. He was the father of the Pleiades, the Hyades and Hesperides, Œnomaus and Maia, Dione and Calypso.

Atlas bearing the Heavens on his Shoulders.

The name Atlas (pl. Atlantes) is applied in architecture to statues of men, analogous to caryatides, set in the place of columns to bear the entablature, etc.

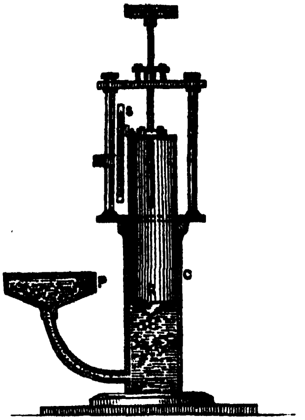
The name Atlas is given to the highest vertebra of the spinal column, which supports the skull.

Atlas, as a collection of maps, is a term first used by Mercator, evidently from the common decorative use of Atlas, bearing the heavens, as a symbol of earth.

Atlas Mountains, an extensive system of folded mountains in N. Africa, commencing on the shores of the Atlantic Ocean, to which it has given its name, and, after traversing Morocco, Algeria, and Tunis in a general W.S.W. to E.N.E. direction, terminating on the shores of the Gulf of Tunis. The system, which consists of broad ridges and rounded elevations, sometimes connected, sometimes isolated, with numberless offshoots, extends for some 1,500 m., and is unconnected with any other highlands of N. Africa. The Great Atlas is the highest part of the chain in Morocco, where several of the summits exceed 10,000 ft., and bear snow in winter, the loftiest peaks being situated S. of the city of Morocco, where Jebel Miltzin reaches 15,000 ft. This grand chain is snow-clad during the greater part of the year, and is accompanied on the N. by the Lesser Atlas, which in several parts also contains *massifs* of more than 10,000 ft., and on the S. by the Anti-Atlas and the Jebel Bane. The Atlas of Algeria and Tunis is divided into two series—the Tell Atlas, comprising the chains bordering the Mediterranean, and the Sahara Atlas, fronting the desert. In the Atlas of Morocco Primary rocks appear to occupy a more important place than in the Atlas of Algeria and Tunis, and the foldings also seem to be more ancient. The vegetation is Mediterranean on the lower slopes, and even in the most elevated regions the alpine character of the flora is only slight. The Atlas Mts., alike in Morocco and Algeria, have furnished a refuge to Berber peoples more or less allied to the Kabyles. See Joseph Thomson's *Travels in the Atlas* (1889); also articles ALGERIA and MOROCCO.

Atmolysis is the method of separating gases of different densities by means of porous tubes or other septa. By diffusion the gases pass through the porous septum at rates inversely proportional to the square roots of their densities.

Atmometer, an instrument for the determination of the amount of water passing into the air by evaporation. No quite satisfactory form has been invented. In Von Lamont's atmometer, which may serve as an example of smaller instruments, a pan, P, is connected by a pipe with a cylinder, C, in which a closely-fitting piston plunger, R, carrying a scale, S, is adjusted by means of a screw. The scale being set at zero, water is poured into the pan until it stands flush with the opening of the outflow pipe, O; the water is then driven by the piston to within a little of the top of the pan, and the evaporation is allowed to take place. When an observation is to be made, the piston is raised to such a height that the water sinks again from the pan to the same level as before, and the reading on the scale showing the change of level of the piston gives the amount of water evaporated.



Von Lamont's Atmometer.

Atmosphere (Gr. 'sphere of vapour'), a gaseous envelope surrounding a body in space. The atmospheres of the several planets differ greatly in quality. Those of Jupiter, Saturn, Uranus, and Neptune appear to be dense and cloud-laden; that of Mars, although much less dense than terrestrial air, almost certainly includes a considerable ingredient of water-vapour. Mercury is believed to be still more thinly covered; and refractive phenomena on Venus indicate her possession of an atmosphere fully comparable with our own. The airless condition of the moon is accounted for by its slight gravitative power; for the gases that may have primitively enwrapped it would, according to the kinetic theory, have gradually escaped into space, owing to the ineffective control exercised by the central body over the velocities of their particles. Even the earth is affirmed by some authorities to be incapable of retaining such volatile substances as hydrogen or helium, although heavier gases continue permanently subject to her attraction.

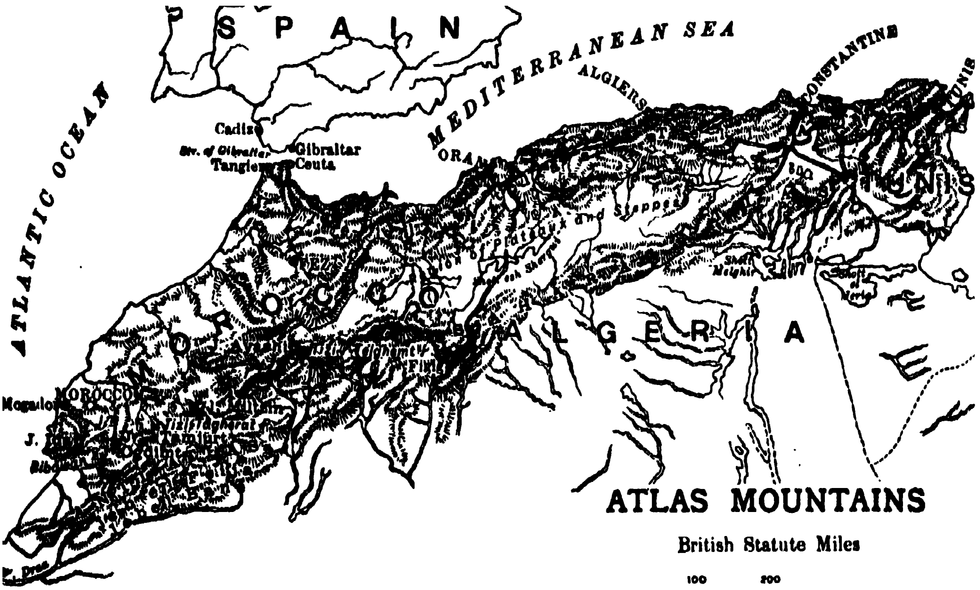
The atmospheres of massive globes condense rapidly downward, and are hence, other things being equal, less extensive proportionately than those of minor orbs. That of the earth may extend in a highly-rarefied state to a height of 200 m., and meteors give rise to conspicuous light at elevations up to 120 m. Above 45 m., however, the effects of refraction cease to be perceptible.

With each ascent of 3½ m. the density of the air is halved, and the steps shorten through the condensing power of cold at high altitudes. On the summit of the Misti, for instance (18,000 ft.), the barometer stands at about 15 in.; and at the highest point reached by aeronauts (37,000 ft.), the atmosphere is balanced by 7½ in. of mercury. The whole of the air, if concentrated into a shell of uniform sea-level density, would rise no higher than 5 m. (26,163 ft.), and this imaginary stratum is called the 'homogeneous atmosphere.' If reduced to a liquid by the cooling of the earth to −200° C., it would, as Professor Dewar has shown, form a universal ocean only 35 ft. in depth. See GASES AND VAPOURS.

Atmospheric air is a mechanical mixture of about 78 volumes of nitrogen with 21 of oxygen and 1 of argon; a small percentage (0·04) of carbon dioxide is also present, besides traces of free hydrogen and helium (probably supplied by mineral springs), of neon, krypton, and xenon. It also contains a variable but all-important proportion of water vapour. It is through the thermal opacity of this part of its atmosphere that the earth is rendered habitable, the heat received from the sun being, through its intervention, stored, distributed, and hindered from departing uselessly back into space. Water-vapour, too, is the mainspring of atmospheric circulation, as well as of all the actions and disturbances concerned in meteorological processes; and the amount suspended over a given area largely determines the type of prevalent weather. (See METEOROLOGY.) The total weight of the atmosphere, as computed by Sir John Herschel, amounts to 11⅔ trillion tons, or $\frac{1}{1200000}$ that of the solid globe itself. It exerts a pressure, when the barometer stands at 30 in., of 14·73 lbs. avoirdupois to the square inch, so that an average man sustains a constant weight of about 14 tons. The unit of pressure, called an 'atmosphere,' is defined at Paris as that of 760 millimetres (29·922 in.), in London as that of 30 in., of mercury at 0° C.

Atoll. See CORAL ISLAND.

Atom, etymologically and historically, the ultimate and indivisible part of matter. Atoms are, so to speak, the fundamental bricks of which the whole material universe is built. They were first imagined as small, hard, indestructible bodies scattered throughout space or void, Lucretius and the early atomists arguing that a *plenum* or space filled entirely with matter was impossible. Their argument is of doubtful validity. Nevertheless it is difficult to imagine a constitution of bodies which does not involve an atomic or molecular structure; and the evidence of the permanence of matter leads us to endow the ultimate parts with the same characteristic of permanency. There is not the least doubt, for example, that matter is of a grained structure; and it is possible in several ways to arrive at an approximate estimate of the size of the constituent grains or molecules, or rather, strictly speaking, of the range of their actions one upon another. Within this range the so-called molecular forces act: but as to the atomic structure of any given molecular sphere of action, all is pure hypothesis of a very speculative character. Following Boscovich, we may consider molecules and atoms to be centres of force—the force upon any other similar centre being attractive within a particular range of distance, but repulsive for distances smaller than the lower limit of this range. This repulsive force at very small distance is supposed to increase so rapidly as to make it impossible for the centres of force to come into coincidence. There is virtual impenetrability of the atomic centres of force. Or we may follow Lord Kelvin, and imagine the atoms to be vortex rings in a uniform continuous fluid filling all space. (See VORTEX.) It can be demonstrated that such a vortex motion, once existent, will persist. Neighbouring vortices will act upon it in various ways—accelerating its motion, setting it into vibration, and so on—but they can never destroy its identity. From this point of view, an atom is a state of motion in a continuous medium, and matter as we know it becomes a particular condition of this substantial continuum. Another view, elaborated by Larmor, is that the atom is a condition of strain in the fundamental medium. Osborne Reynolds, again, has imagined an ultimate corpuscular constitution for the ether, the atoms of matter being gases in this granular structure. What properties must be ascribed to



this medium, in order that in either view all the properties of matter may be deduced, is a problem which still awaits solution.

The atomic theory of matter has within the last decade entered upon a new phase. Clerk Maxwell first pointed out that many electrical phenomena suggested the existence of what he called an atomic charge—*i.e.* a definite charge of electricity associated with each of the parts into which a molecule was divided by electrolysis. These parts are called ions; and the act of electrical conduction in an electrolyte consists in the drift in opposite directions of the negatively charged and positively charged ions. Thus, conduction of electricity in this case is really convection of atomic charges. But the same theory of convection has, in a modified form, been applied to conduction in gaseous elements, such as hydrogen, oxygen, nitrogen, etc. The molecule of the gas is believed to be dissociated while the current is passing, the two parts with equal and opposite charges drifting in opposite directions. In the light of this theory, certain experimental results seem to imply that the mass associated with the negative charge is very much smaller than that associated with the positive charge, being about the thousandth part of the complete ultimate molecule of the gas. This gives a superior limit to the size of the atoms which build up a given molecule. (See ELECTRON, MOLECULE.)

Closely connected with the theory of the ultimate constitution of matter is the question as to the constitution of the ether, which is the necessary medium for the propagation of radiant energy in the form of waves from one portion of matter to another. This ether may be identified with the medium whose vorticity or strain gives us the material atom; or the ether may itself be a condition of this fundamental medium. All that can safely be said is that matter as we know it must be of a coarse-grained and ultimately atomic structure; and that in the interrelations of matter and ether all the phenomena of the physical universe must ultimately find their explanation. See Stewart and Tait's *Unseen Universe* (1876); Kelvin's *Constitution of Matter* (Nature Series); Larmor's *Matter and Æther* (1900).

Atomic Heat. Dulong and Petit of Paris were the first to show (1819) that a remarkable relation exists between the specific heat and the atomic weight of elements—*viz.* that the specific heat is inversely proportional to the atomic weight: the higher the specific heat, the lower the atomic weight. They concluded that 'all atoms of the solid elements have the same specific heat or thermal capacity,' and termed this the atomic heat. Expressed in another way, the same quantity of heat is required to raise an atom of mercury, an atom of iron, an atom of sulphur, and an atom of lithium, or an atom of any solid element, through 1° C. For example:—

Element.	Specific Heat.	Atomic Weight.	Atomic Heat.
Platinum.	·032	195	6·2
Iron . .	·112	56	6·3
Sulphur .	·178	32	5·7
Lithium .	·941	7	6·6

There are four well-marked exceptions to this law—*viz.* carbon, boron, beryllium, and silicon. The mean specific heat multiplied by the atomic weight of a great number of elements is approximately 6·4; the departure from this number more or less is small, and may be due to the fact that the specific heats are not strictly comparable or all accurate. The atomic heat (6·4) is of value in the determination of the atomic weight of an element, when there is any doubt as to the result by other methods.

Atomic Theory. The atomic theory is the foundation on which modern chemical science is built. John Dalton, in the first decade of the 19th century, revived the idea of atoms, which was first taught by the ancient Greek philosophers, 400 B.C.; and it is now generally agreed that all matter consists of atoms of elements united with each other by the force of chemical affinity. An atom is an indivisible (lit. 'uncuttable') particle, and is defined as the smallest part of an element which can take part in a chemical change. Each atom is considered to have a definite and unchangeable weight, but in the case of the recently-discovered element radium, and possibly in other cases as well, there appears to be going on something closely resembling atomic disintegration. Definite proof of this, however, is still wanting. We cannot isolate individual atoms, and by no conceivable method could they be weighed if isolated; but though unable to determine their *absolute* weights directly, we know the weights of the various atoms *relatively* to one another. The atom of hydrogen, being the lightest, is taken as unity; and compared with it the atom of oxygen weighs in round numbers 16, nitrogen 14, iron 56, and mercury 200. These numbers are known as 'atomic weights.' When a chemical change takes place, it is due to the union or separation of atoms, and it necessarily follows from the indivisibility of the atoms that this union or separation must occur in definite or fixed proportions by weight—*i.e.* the weights of the atoms themselves. For example, if the atoms of nitrogen and oxygen weigh respectively 14 and 16 times as heavy as a hydrogen atom, then, according to the theory, they can only unite 1 to 1, 2 to 1, 3 to 1, 3 to 2, etc.; and the proportion of nitrogen to oxygen in the compound formed will be that of 14 parts by weight of nitrogen to 16 of oxygen, 14 × 2 to 16, 14 × 3 to 16, 14 to 16 × 2, and so on. And this we know by experiment to be the case.

Carbon combines with oxygen to form two compounds—the monoxide and dioxide; and with hydrogen to form marsh gas and ethylene. An analysis of these compounds, stated in the usual way, shows them to contain the weights as follows:—

Carbon Monoxide.	Carbon Dioxide.	Marsh Gas.	Ethylene.
C = 42·8	C = 27·2	C = 75	C = 85·7
O = 57·2	O = 72·8	H = 25	H = 14·3
100·0	100·0	100	100·0

There is here no apparent relation between the weight of carbon in the four compounds to the oxygen and hydrogen; but if we calculate the weight of oxygen and hydrogen in each to unit weight of carbon, we obtain the following figures:—

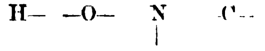
Monoxide.	Dioxide.	Marsh Gas.	Ethylene.
C = 1	C = 1	C = 1	C = 1
O = $1{\cdot}3\dot{3}$	O = $2{\cdot}6\dot{6}$	H = $\cdot 3\dot{3}$	H = $\cdot 16\dot{6}$

We thus learn that the dioxide contains twice as much oxygen as the monoxide, and that ethylene contains but half as much hydrogen as marsh gas relative to the weight of carbon. Though Dalton was unable to understand and explain all his facts, he laid down the following laws of definite (or constant) and multiple proportions:—1. The same compound always contains the same elements, combined in the same proportion by weight; or, in every chemical compound, however produced, the proportion by weight of the elements is always the same. 2. When two elements unite with each other in more than one proportion by weight, the quantity of one of these being constant, the weights of the others vary in simple ratio. Further advances were made by the investigations of Gay-Lussac and Avogadro. The researches of the former were chiefly confined to gases. He proved by experiment that 2 volumes of hydrogen (say 2 cub. in.) combine with 1 volume of oxygen (1 cub. in.), no more and no less, to produce 2 volumes of water vapour (2 cub. in.). He thus arrived at the following conclusions, known as 'Gay-Lussac's Laws:'—(1.) There is a simple ratio between the volumes of gases which combine. (2.) The volume of the resulting compound bears a simple ratio to the volumes of the original gaseous constituents. Avogadro was the first to suggest an explanation of these experimental facts. By the assumptions (*a*) that atoms combine to form molecules, (*b*) that atoms of the common elementary gases unite in pairs to form molecules (*e.g.* H_2 and O_2 represent molecules respectively of hydrogen and oxygen), and (*c*) that atoms of different elements unite to form compound molecules (HCl, H_2O, CH_4, and C_2H_4 represent molecules of hydrogen chloride, water, marsh gas, and ethylene respectively), he concluded that equal volumes of all gases at the same temperature and pressure contain the same number of molecules, independently of their size or the number of atoms in them, and thus laid the foundations of modern chemistry.

It is impossible to describe here how atomic weights are determined, or all that the atomic theory leads to, but one result is that we can employ symbols, formulæ, and equations. A *symbol* of an element indicates (1) its name, (2) one atom of the element, (3) the weight of the element compared with hydrogen or its atomic weight. A *formula* indicates (1) the name of the substance, (2) the number of atoms in the molecule, (3) the composition of the molecule (*i.e.* the elements which by combination produce it), and (4) the weight of the molecule (molecular weight) compared with the atom of hydrogen. *Equations* describe or express chemical changes. They indicate graphically the nature of the combinations or decompositions which take place, the relative weights of the substances involved, and, in the case of gases, their volumes.

A table of the atomic weights of the chemical elements, compiled by the International Committee of Atomic Weights (1904), will be found under the art. ELEMENTS. Certain important relations which atomic weights bear to one another, pointed out by Mendeléeff, are indicated in the article PERIODIC LAW. See CHEMISTRY, and for further information consult Ostwald's *Outlines of General Chemistry* (trans. Walker, 1890), Nernst's *Theoretical Chemistry* (trans. Palmer, 1895), and Clarke's *A Recalculation of the Atomic Weights* (1897).

Atomicity, or VALENCY, denotes the number of atoms of hydrogen which an element will unite with or displace; it is practically the atomic weight divided by the equivalent. All those elements which combine with hydrogen, atom for atom, are termed *monads*, the valency being 1. Those elements of which 1 atom can unite with or displace 2 atoms of hydrogen are termed *dyads*, their valency being 2; and so on: the remaining elements being *triads*, *tetrads*, or *pentads*, etc. An element may have, really or apparently, more than one atomicity (or valency)—*e.g.* nitrogen is a triad in ammonia, while it is a pentad in ammonium chloride. Atomicity is usually shown graphically by putting dashes or numerals over the symbol; but it is often useful to represent it by dashes (technically known as bonds) radiating from the symbol, thus:



Atonement is the name given in (English) Christian theology to the work of Jesus Christ as the Saviour of sinners. The word occurs only once in the New Testament (A.V.), Rom. 5:11, and there the more correct rendering is *reconciliation* (as in R.V.). Another important Biblical term is *propitiation*. It is common, however, in the sacrificial language of the Old Testament law; and the New Testament looks back to that language when it treats the death of Christ as a sacrifice—(it is disputed among modern exegetes whether or not this usage is found in the writings of St. Paul)—and an atoning sacrifice. Of the original meaning of sacrifice different views are held by scholars. Some regard atonement (removal of guilt) as one important *element* in primitive conceptions of sacrifice. But the *sin offering*, or atoning sacrifice, as such, is admittedly a late development. Men offered sacrifices before they realized the need of propitiating the Divine anger. Afterwards they employed the familiar rite for a new exigency. In any case, substitution is *not*, as it was formerly held to be, the primary meaning of sacrifice.

It does not follow that the New Testament writers thought of atoning sacrifice exactly as primitive men or Old Testament lawgivers had thought. They do not define its meaning; the 'altar forms' (Bushnell's phrase) were so familiar in New Testament times that they seemed to explain everything, and to need no explanation themselves. Christian thought is therefore largely thrown back on hypotheses as to the nature of the atonement. It takes shape somewhat as follows:—We cannot put right what our misconduct has put wrong; it is, perhaps, even immoral to try to do so, implying that we underestimate the gravity of our sin. But the belief—we might even say the experience—of Christians is that Jesus Christ does put believers and the world right with God, making full amends for sin by His death (and life).

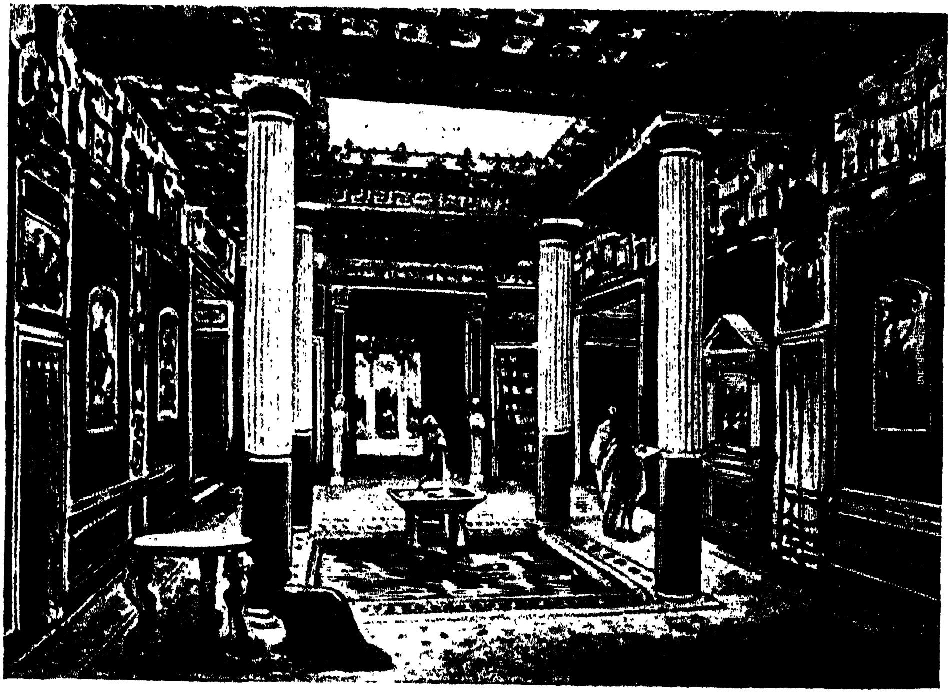
Early Christian thought, mainly preoccupied with the problem of incarnation, often held that the atonement was a price paid to the devil, the lawful owner of sinful souls (so even Origen). With Anselm's *Cur Deus Homo*, the atonement became the primary topic of theology, and was regarded as a tribute paid to the *honour* of God, violated by sin. Protestantism preferred to say the *justice* of God, and tended to explain Christ's death as a substitutionary punishment, a view (believed by some to be the teaching of St. Paul) which is superficially clear, but leads to insoluble difficulties. Bishop Butler held that *no* theory of atonement was competent. Recent thinkers try to construct a *moral* theory. F. D. Maurice (?), F. W. Robertson, and Ritschl exclude an objective propitiation or remedial aspect in the work of Christ; Bushnell offers many changing views, striking in themselves, but none of them exactly a doctrine of atonement; M'Leod Campbell's *Nature of the Atonement* (1853) unfolds a complex theory, not, perhaps, homogeneous throughout, but full of intellectual subtlety and spiritual tenderness. One very striking suggestion is that Christ's work consisted, not in bearing any punishment, but in offering to God a perfect repentance on behalf of sinful man, so that henceforth it is not merely *legally possible* but *morally right* that God should forgive sin. The old Protestant view will be found slightly modified in R. W. Dale's *Doctrine of the Atonement* (1885). Oxenham wrote on the *Catholic Doctrine* (1881). One of the most recent discussions is Mr. Scott Lidgett's *Spiritual Principle of the Atonement* (3rd ed. 1901). See also Ritschl's *History of the Doctrine of Justification and Atonement* (1874; Eng. trans. 1900), and *The Atonement in Modern Religious Thought* (1900).

Atony, a medical term, indicating a want of tone; weakness; debility.

Atossa, queen of Persia, was daughter of Cyrus the Great, and wife successively of her brother Cambyses, Smerdis the usurper, and Darius Hystaspis, to whom she bore Xerxes and three other sons. She possessed great influence over Darius, and is said to have urged him to the invasion of Greece. In Æschylus's play *The Persæ* she is a prominent character. See also Herodotus, bks. iii. and vii.

Atrak, or ATREK, riv. of Persia, rising in Khorassan, with course N.W., then W. (about 350 m. in all), between Khorassan and Transcaspian districts, and entering Caspian at S.E. corner.

Atrato, riv. in Colombia, rising on the W. flank of the W. Cordillera, and flowing N. to the Gulf of Darien. It is 410 m. long, drains a basin of 11,400 sq. m., and with its tributaries affords waterways of 680 m. in aggregate length. Small steamers can ascend to Lloro, 345 m. from its mouth. The watershed on the S. is only 360 ft. high, and a canal has been suggested to the San Juan, to connect the Atlantic and Pacific.



The Atrium of a House in Pompeii (restored).

Atrauli, tn., Aligarh dist., United Provinces, India, 60 m. N.E. of Agra. Centre of local disaffection during the mutiny. Pop. (1901) 16,561.

Atrebates, ancient Celtic people of Gallia Belgica, having as their capital *Nemetacum* or *Nemetocenna* (now Arras). A branch was also settled in England, in what is now Berkshire, their chief town being *Callera* or *Calleva Atrebatum* (*i.e.* Silchester). See Terninck's *Etude sur l'Atrébatie avant le VI^e Siècle* (1866 and 1874).

Atreus, son of Pelops and Hippodamia, grandson of Tantalus; he was the father of Pleisthenes, and grandfather of Agamemnon, Menelaus, and Anaxibia. He and his brother Thyestes murdered their half-brother Chrysippus, and, taking to flight, were entertained at Mycenæ by Eurystheus, whom Atreus afterwards succeeded as king. Thyestes seduced Aërope, the wife of Atreus, and was banished by his brother; he then sent Pleisthenes, whom he had brought up as his own son, to slay Atreus, but Atreus killed his son unwittingly. When he found what he had done, Atreus pretended to be reconciled to Thyestes; recalled him to Mycenæ, killed his two sons, and served them up to their father at a banquet. Thyestes fled in horror. It was this crime in particular which called down the curse of the gods on the house of the Atreidæ. Their misfortunes supply the theme for many of the plays of the great Greek tragedians, especially for the *Agamemnon*, *Choephoræ*, and *Eumenides* of Æschylus, the *Electra* of Sophocles, and the *Electra* and *Orestes* of Euripides. According to some accounts, Atreus was slain by Ægisthus, son of Thyestes. The so-called Treasury of Atreus is the largest of the ancient tombs at Mycenæ in Greece; it is also known as the Tomb of Agamemnon. See MYCENÆ.

Atri (anc. *Hatria*), tn. and episc. see, prov. Teramo, Italy, 8 m. from the Adriatic, and 87 m. by rail S. of Ancona. It has a fine Gothic cathedral. Pop. (1901) 13,569.

Atrium, the principal apartment of a Roman house; in the earliest times, no doubt, the only chamber. It had a hole in the roof, called the *compluvium*, which collected the rain and conducted it to a cistern in the floor. In later times other rooms were built on to the atrium, but, with Roman conservatism, it retained its original character as the chief room of the house. In it were placed the sacred fireplace, the household gods, the bed of master and mistress, and the statues of their ancestors; and it was used as the formal reception room. In early Christian churches the atrium was an open court in front of the basilica, a place of abode for penitents, sometimes also as an asylum for criminals. See Preston and Dodge's *Private Life of the Romans* (1893).

Atropatene, or MEDIA ATROPATIA, a mountainous region in the N.W. part of Media, near the Caspian Sea, corresponding to the existing Persian province of Azerbaijan. From 149 B.C. to 428 A.D. it formed part of Armenia, and subsequently became a Persian province.

Atrophy, a general or local wasting of the body. In children, general atrophy is most commonly due to unsuitable food (see Athrepsia), to catarrh of the digestive organs, to tubercle, or to worms in the alimentary canal. In adults it is generally the result of grave organic disease, such as gastric ulcer, tubercle, cancer, albuminuria, or long suppuration; it is occasionally due to nervous disorder, as in hysteria. Local atrophies of muscle and nerve may be caused by disuse, as in paralyzed limbs; more rarely by overwork. It is sometimes congenital, the normal growth of a part being arrested.

Atropia, or Atropine, an alkaloid which occurs along with hyoscyamine in all parts of the *Atropa belladonna* (deadly nightshade), and in the seeds of *Datura stramonium.* It is a powerful poison, but used medicinally it is valuable to dilate the pupil of the eye, quicken the heart's action, and relieve cardiac distress, and as an external application for the relief of pain. See Belladonna.

Atropos, the eldest of the three Fates. Her functions were to render the decisions immutable, according to Plato, and to sever the thread of life (spun by her sisters) with the scissors with which she is pictured, her features darkly veiled. Wyntoun's witches, in his story of *Macbeth,* and Gray's *Fatal Sisters,* doubtless owe their origin to Atropos and her sisters, Clotho and Lachesis.

At sight, a commercial term used upon bills of exchange, equivalent to 'on demand.'

Atsuta, tn. on the s. coast of Nippon, Japan, 70 m. e. of Kioto; has Shinto temples. Pop. (1898) 24,941.

Attacca (Ital.), in music a term signifying that a succeeding movement is to be begun without stopping for any intermediate pause.

Attaché, Military. To the embassy or legation representative of a nation at the seat of government of a foreign power there is usually appointed a military or naval attaché. The duties of these officers are to make themselves thoroughly acquainted with every change that takes place in military or naval matters, and to report from time to time on the mobilization, armament, and equipment of the power to whom they are accredited. The task is one of no little difficulty, as they must refrain from procuring information in an underhand manner. In time of war the privilege of being attached to the headquarter staff of an army is usually conceded to representatives of friendly nations.

Attachment. (1.) Of Persons. A writ of attachment is a writ of execution addressed to the sheriff, or in the case of a county court action to the bailiff, ordering him to attach or to arrest the person therein named and bring him before the court. A writ of attachment will only be granted by leave of the court, and is issued when the person whom it is sought to attach disobeys an order of the court—*e.g.* refuses to answer interrogatories or produce documents, refuses to deliver up property other than land or money, refuses to obey an order requiring an act to be done or not done, *e.g.* an injunction. An attachment will not be granted to enforce the payment of money except in certain cases under the Debtors Act, 1869. (See Debt.) A writ of attachment must take effect within one year from its date. The person attached will be released from imprisonment either (1) if he obeys the order for disobedience to which he is attached, or (2) at the expiration of the term for which he was attached, if a term was mentioned, or (3) on application to the court. Attachment is limited to one year in cases under the Debtors Act. (2.) Of Debts. An attachment, or 'garnishee order,' as it is called, is another method of obtaining execution of the order of a court. If A has obtained a judgment against B, and he hears that C owes a debt to B, he may obtain an order directing C to pay the debt to him (A), and not to B. But C may appear and dispute the debt. For Scots law, see Arrestment. See Cababé, *On Attachment of Debts* (1900).

Attainder. Attainder originally followed upon all judgments for treason or felony, and upon all judgments of outlawry. Its effect was that the blood of the person thus convicted was said to be corrupted, and his real property was forfeited to the crown for treason, and to the lord of the fee for felony, subject to certain rights of the crown. Attainder was abolished in 1870. (See Escheat.) In 1477, or thereabouts, arose a practice of introducing bills of attainder into Parliament, which were passed like any other Act of Parliament, and had against the persons or person mentioned therein the effect of a common law attainder. The last execution under an Act of Attainder was in 1797, and many Acts of Attainder have been reversed. In the United States a man may be attainted for treason, but the condemnation does not, and may not, involve corruption of blood—in other words, the attainted man cannot bequeath, and his heirs inherit at his death.

Attalus, the name of three kings of Pergamus. (1.) Surnamed Soter, reigned from 241 to 197 b.c.; defeated the Gauls near Sardis in 239 b.c.; waged frequent war against the Seleucids; and was allied with the Romans against Philip of Macedon and the Achæans. He was distinguished for his great wealth and his patronage of literature. (2.) A. Philadelphus, reigned from 159 to 138 b.c., second son of (1), and like him an ally of the Romans; he overthrew Prusias of Bithynia. (3.) A. Philometor, succeeded (2), who was his uncle; he reigned from 138 to 133 b.c., and by his will left his kingdom to the Romans; it formed their original province of Asia.

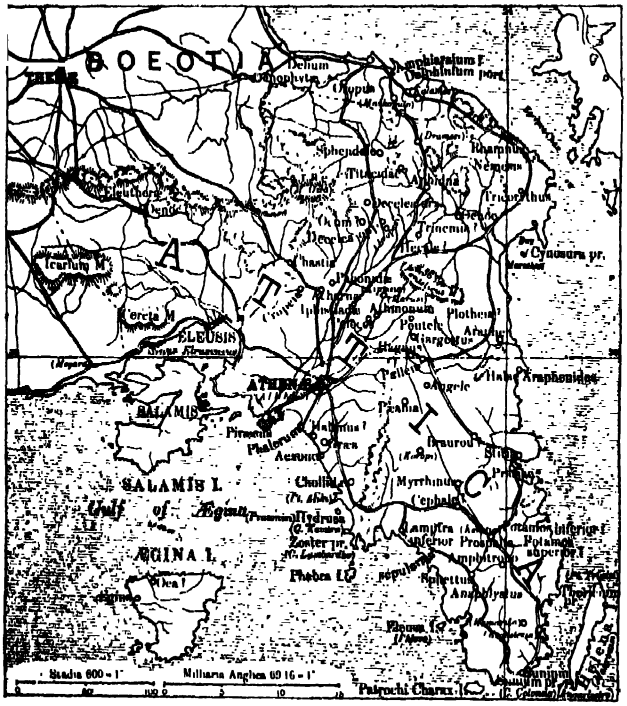
Attap, the native name of the *Nipa fruticans,* a nearly stemless palm indigenous to the forests of the E. Indian Archipelago. Its long, thick pinnate leaves are in common use for thatching.

Attar, or Otto, of Roses, a perfume which consists of the volatile or essential oil distilled from certain varieties of rose. The manufacture is carried on in India, Persia, and Bulgaria, the latter district producing the largest quantity and the best quality. The flowers are gathered in May and June, and at once placed in copper stills heated with a wood fire and partially filled with spring water. The distillate from the first operation is again distilled, and the distillate is received in narrow-necked bottles. This distillate contains a large proportion of the oil suspended in the water, and on allowing it to stand at a temperature not exceeding 60° f. the oil gradually rises to the top, and is skimmed off. It is largely adulterated.

Attar, or Athar, Ferid ud-Din (1119-1230), Persian poet of the mystic school, and author of the *Mantik ut-Tair,* or *Conversations of the Birds,* a series of thirty moral tales, describing, in terms of Sufic thought, the progress of the human soul to Nirvana. He also wrote the *Pandnama,* or *Book of Counsels,* and, in prose, a *Biography* of famous mystics. Ed. and Fr. trans. of the *Mantik* by Garcin de Tassy (1857-63); and ed. and Eng. trans. of the *Pandnama* by Hindley (1809).

Attention, the process in which, or activity by which, an object is brought from the *margin* to the *focus* of consciousness, and thus acquires additional clearness and distinctness. It has been a matter of controversy within recent years whether attention is to be conceived as a complex process explicable in more ultimate terms, or as a unique activity incapable of further analysis. See James's *Principles of Psychology* (1890), vol. i. ch. xi.

Atterbom, Peter Daniel Amadeus (1790-1855), the most distinguished poet of the romantic school in Sweden. When a student at Upsala he helped to found the Aurora League, and played an active part in the strife which the romanticists waged against the old 'classic' writers, first in the journal *Fosfor* (1810-13)—whence they were called Phosphorists—and afterwards in the periodicals *Poetisk Kalender* (1812-22), which Atterbom himself edited, and in the *Svensk Litteratur Tidning* (1813-24). Atterbom's own *chef-d'œuvre* is the dramatic poem *Lycksalighetens Ö* (1824-7), or *Isle of Happiness*, which contains some of the sweetest lyrics in the language. A fragment, *Fågel Blå*, is almost equally famous. Atterbom also wrote an important work on Swedish literary history entitled *Siare og Skalder* (1841-64). In 1828 he was appointed professor of philosophy, and in 1835 professor of æsthetics and literary history, at Upsala University. His collected works (*Samlede Skrifter*) appeared in 1854-70.



Ancient Attica.

Atterbury, Francis (1662-1732), bishop of Rochester, was born at Milton, in Buckinghamshire. He became lecturer of St. Bride's, a royal chaplain, and minister to Bridewell Hospital in 1691. He manifested his skill as a controversialist in a defence of Protestantism against Walker, master of University College (1687); in the *Examination of Dr. Bentley's Dissertations on the Epistles of Phalaris* (1698), though the book appeared with the name of Charles Boyle; and in 1700 he ably upheld, on the High Church side, the powers and privileges of Convocation in an argument with Dr. Wake. This service procured him the archdeaconry of Totnes and a canonry of Exeter. He became dean of Westminster and bishop of Rochester in 1713. Atterbury is credited with Dr. Sacheverell's defence (1710), and the authorship of the well-known treatise *Representation of the State of Religion.* After the accession of George I. he bitterly resented the Hanoverian rule, and in 1722 he was committed to the Tower, and finally deprived of all his ecclesiastical offices and banished from the kingdom. He died in Paris, and was buried obscurely in Westminster Abbey. Atterbury wrote four volumes of *Sermons*, a Latin translation of *Absalom and Achitophel*, and letters to Swift, Pope, Bolingbroke, and others, all of which were published between 1682 and 1723. His *Private Correspondence* was published by Lord Hailes in 1806, and his *Epistolary Correspondence* by Nichols in 1790. Curll published in 1727 *Atterburyana: being Miscellanies by the late Bishop of Rochester* (1727). See Atterbury's *Memoirs* (1723), his *Life* by Stackhouse (1727); and Williams's *Memoirs and Correspondence of Atterbury* (1869).

Attestation. It is customary, and often necessary, for the signature of deeds and important legal documents to be attested by a witness or witnesses, 'attestors,' who witnessed the signature. Wills and grants of land to charities must be attested by two witnesses. In the case of pauper apprentices to sea service, the indentures must be attested by two justices of the peace. Warrants of attorney and cognovits must be attested by a solicitor, and bills of sale by one witness. In Scotland all deeds require two witnesses, except where there are special statutory relaxations.

Attfield, John (1835), demonstrator of chemistry at St. Bartholomew's Hospital (1854-62); professor of practical chemistry, Pharmaceutical Society of Great Britain (1862-96); was a founder of the British Pharmaceutical Conference and of the Institute of Chemistry. He is an authority on pharmaceutical education; has published *A Manual of Chemistry* (1867; 17th ed. 1898); assisted to edit the *British Pharmacopœia* in 1885, and edited it as chief in 1898.

Attic, an architectural term, designating a low story surmounting the main cornice of a building. The term is also popularly applied to the tholobate or base on which a dome or cupola rests, as in St. Paul's Cathedral, London.

Attica, a division of ancient Greece, with the Ægean Sea to the E. and S.W., and Bœotia to the N. It was divided into several independent states, but before the dawn of history they were united into one polity (by Theseus, according to the legends); Athens was the capital city. Attica and Bœotia now form a nomarchy of Greece, extending from the Ægean Sea and the Egripos Channel W. to the Gulf of Corinth. Area, 2,472 sq. m. Pop. (1896) 313,069, being 125 to the sq. m. See Greece.

Atticism, a term used to denote a well-turned phrase, was, among the Athenians, applied to those grammarians (Atticists) who endeavoured to retain the pristine purity of the Attic dialect. *Attic wit* and *Attic salt* signify a poignant and delicate wit characteristic of the Athenians.

Atticus (*c.* 400 A.D.), patriarch of Constantinople and successor of Chrysostom. He wrote a treatise, *De Fide et Virginitate*, opposing Nestorian views.

Atticus Herodes, TIBERIUS CLAUDIUS (104-180 A.D.), celebrated Greek rhetorician of the 2nd century. He possessed great wealth, even after presenting five minæ—nearly £20—to every Athenian citizen in fulfilment of his father's will. He built a racecourse (ruins of which remain) and a theatre at Athens, erected a theatre at Corinth, an aqueduct at Olympia, a stadium at Delphi, and hot baths at Thermopylæ. He taught rhetoric both at Athens and Rome, having for pupils the Emperors Marcus Aurelius and Lucius Verus. In 143 A.D. he was made consul by Antoninus Pius, and at one time was administrator of the free towns in Asia. None of his works survive.

Atticus, TITUS POMPONIUS (109-32 B.C.), a Roman knight, whose full name was Quintus Cæcilius Pomponianus Atticus. The last name was given to him because of his residence in Athens (86-65 B.C.) and his skill in Greek literature and culture. Though distinguished for his ability among his contemporaries, he decided to stand aside from the politics of Rome, especially from the civil war of 87 to 81 B.C. He was on terms of intimate friendship with the younger Marius, Sulla, Pompey, Brutus, Cassius, Antony, and Augustus, and, above all, with Cicero, from whose correspondence with him, covering the years from 68 to 43 B.C., we gain a picture of him as the ideal classical man of culture. In philosophy he was an Epicurean. He wrote on Roman history, and also in Greek on Cicero's consulship; but none of his works survive. See Cicero's *Letters;* biography in Drumann's *Rome* (1834-44), vol. v.

Attila, or ETZEL, king of the Huns, succeeded to the kingship in A.D. 434. In the beginning of his reign his brother Bleda shared the kingship; but the overweening ambition of Attila speedily led him to deprive his brother of his sceptre, and even, according to some writers, of his life.

In the reign of Attila (434-453) the supremacy of the Huns is said to have extended from the Caspian Sea to the Rhine; and the commanding position then attained by this savage people was largely due to the resistless energy and masterfulness of their great leader. It is said that he styled himself the 'Scourge of God;' but Gibbon observes that 'the ancients, Jornandes, Priscus, etc., are ignorant of this epithet.'

In 441 Attila laid waste Thrace and Illyria, only withdrawing his forces on the receipt of a heavy fine. In 445 he founded the city of Buda as his capital. In 448 he extorted a heavy tribute from the Byzantine emperor, Theodosius; but in 450 again attacked the Eastern empire, until his attention was diverted to the Western empire, it is said by the offer of the hand of Princess Honoria. In the following year he marched on Gaul with an army nearly three-quarters of a million strong. Failing in his effort to detach Theodoric, king of the West Goths, from his alliance with the Romans under their general, Aëtius, Attila retired from Orleans to Chalons, where he gave battle to the allies on the Catalaunian Fields (451). The Huns were defeated; but the Romans did not follow up their victory, and in the following year Attila laid waste Northern Italy, and even threatened Rome. In 453 he died, on the night of his marriage with the Burgundian princess, Hilda or Ildiko. See Gibbon's *Decline and Fall,* and Thierry's *Attila* (ed. 1874).

Attleborough, mrkt. tn., Norfolk, England, 15 m. S.W. of Norwich, on ry. to Thetford. The town was in early times the capital of Norfolk, and a residence of the E. Anglian kings. Pop. (1901) 2,332.

Attock, small tn. and fort in Rawal Pindi dist., Punjab, India, on the l. bk. of the Indus, here crossed by a railway bridge (1883), and at its junction with the Kabul R. Its fortress was built by Akbar in 1583. Attock is 74 m. by rail and road from the mouth of the Khyber Pass. Pop. (1901) 2,822.

Attorney, legally any person appointed by another to act on his behalf. In a narrower sense, attorney, or more strictly attorney-at-law, formerly denoted a legal practitioner in the common law courts in England, as distinguished from a solicitor, who practised in the equity or chancery courts. Since the Judicature Acts this distinction has been abolished, and there are only solicitors. In the United States the term is wider in its extent, and embraces the barrister or advocate, as well as the solicitor. See POWER OF ATTORNEY.

Attorney-general, the principal law officer of the crown for England, and legal adviser of the government. He is always in Parliament, and is a member of the ministry, with which he goes out of office; but he is not in the cabinet, nor a Privy Councillor. He represents the crown in the courts, both in criminal prosecutions and in civil cases where the prerogative is affected or the revenue concerned. He can file an information for any misdemeanour, and does so when delay should be avoided on public grounds. The effect is that the accused is tried without a true bill of indictment being found by a grand jury. In any criminal case he can enter a *nolle prosequi,* and so stop the proceedings. He can maintain an action to prevent interference with a highway or a navigable river, or restrain any unauthorized act likely to be injurious to the public. His sanction is required under many statutes for the recovery of penalties by local authorities and others. He appears in all cases affecting public charities, and to protect the property of lunatics, and he has statutory duties with regard to patents. He is the head of the bar for the time, and decides questions of professional etiquette. He and the solicitor-general have a right of reply in criminal cases, even when no evidence has been called for the defence. He is paid a salary of £7,000, and fees for crown business, and may not now engage in private practice. The solicitor-general has power to act for the attorney-general during a vacancy in the office. There is also an attorney-general for Ireland, with an analogous position and duties; and there is an attorney-general of the queen-consort, and of the Prince of Wales as Duke of Cornwall, and of the county palatine of Lancaster. There is a similar officer in the United States, who is also a member of the president's cabinet.

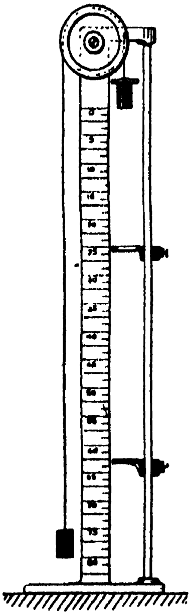
Attornment, an acknowledgment by one person that he is the tenant of another. Formerly, if A leased property to B for 100 years, and before the end of the time A sold the property to C, the relation of landlord and tenant between C and B was created by attornment in the form, 'I, B, attorn and become tenant to C;' but this is now unnecessary. In mortgages, the mortgagor often attorns tenant to the mortgagee, and this enables the mortgagee to distrain for rent; but such an attornment must now generally be registered as a BILL OF SALE.

Attraction, the tendency of bodies to approach each other and unite; the force which brings bodies together and resists their separation. The chief kinds of attraction are: the attraction of gravitation; capillary attraction, meaning the attraction excited by a hairlike tube on a liquid within it—a variety of adhesion; molecular attraction, which acts only at infinitely small distances; chemical attraction (or affinity); magnetic attraction—the power of a magnet or loadstone of drawing iron to itself; and electrical attraction—the power possessed by an electrified body of drawing certain other bodies to itself. These attractions are divisible into two classes: (1) those which act at sensible and measurable distances, as gravitation, magnetic and electrical attraction; and (2) those which extend only to extremely small and insensible distances, as capillary, molecular, and chemical attraction.

Attribute, in logic. See SUBSTANCE.

Atwood, GEORGE (1746-1807), English mathematician, educated at Westminster and Cambridge, where he was third wrangler, and afterwards excelled as a lecturer. In 1784, William Pitt, one of his pupils, bestowed on him a patent office—an indirect payment for his services in financial calculations. Atwood was the author of many mathematical works, one of which gives the first description of what is now called 'Atwood's machine.'

Atwood, THOMAS (1765-1838), musician and composer, was born in London. He was a favourite pupil of Mozart at Vienna, and an intimate friend of Mendelssohn. He became organist of St. Paul's (1795), and composer and organist to the Chapel Royal (1796). His works include many songs and glees, operas and anthems.



Atwood's Machine.

Atwood's Machine, a machine invented by George Atwood to demonstrate the laws of uniformly accelerated motion, and to illustrate the relations of time, space, and motion in the case of a body falling under the action of gravitation. This machine is so constructed, by means of pulleys and wheels which turn with the least possible friction, that a weight (or falling body) descends much more slowly than a body falling in free space, being made to raise a counterpoise by means of a cord passing over a pulley, yet increases in velocity in the same ratio as when falling at liberty.

Atys, or ATTIS, a beautiful Phrygian shepherd beloved by the goddess Cybele, who made him her priest, then changed him into a fir tree. (See Catullus's *Ode 63*, and Ovid's *Fasti*, bk. iv.) The versions of the story vary very widely.

Aubagne, dist. tn., dep. of Bouches-du-Rhône, France, 10 m. E. of Marseilles; manufactures cloth, silk, earthenware, leather, and wines. There are a ruined castle and a monument to the Abbé de Barthélemy, and the 'Grottes Gardelaban' are in the neighbourhood. Pop. 8,724.

Aubaine, DROIT D', an old French law (abolished in 1819) by which aliens were allowed to acquire property, even real estate, but could not inherit it, or bequeath it at their death, the king becoming heir to all such property.

Aubanel, THÉODORE (1829-86), poet and dramatist of the Provençal language, and one of the leaders of the development of Provençal poetry, was born at Avignon, where he carried on the hereditary business of publishing. His works are *La Miougrano Entreduberto* (1860) and *Li Fiho d'Avignoun* (1885), both collections of poetry. He also wrote the dramas *Lou Pan dou Pecat* (played at Montpellier in 1878 with great success), *Lou Pastre*, and *Lou Raubatori*. See Ludovic Legré's *Le Poète Théodore Aubanel* (1894).

Aube, river, France. See SEINE.

Aube, dep., Central France, consisting for the most part of the parallel valleys of the Seine and its r. bk. trib. the Aube, flowing N.W. Area, 2,317 sq. m. The lower part of the valleys of the Seine and Aube belongs to the chalky, barren Champagne Pouilleuse, which only grows a little oats, rye, and buckwheat, and is planted for its amelioration with pines. The hilly district on the l. bk. of the Seine (Pays d'Othe), and the Bassigny, between the Aube and the Seine on the S.E., yield good crops of wheat, contain market gardens, and have several large forests. Horses are reared for the army. There are some quarries, but minerals are insignificant. Cap. Troyes. Pop. (1901) 246,163.

Aubenas, tn., dep. Ardèche, France, on riv. Ardèche, 12 m. S.W. of Privas. The silk industry employs 3,000 workmen; there is a small coal field, and some iron ore. Pop. (1901) 8,362.

Auber, DANIEL FRANÇOIS ESPRIT (1782-1871), operatic composer, was born at Caen, France. His first compositions were concertos for the violoncello and for the violin. His first dramatic composition was the resetting of an operatic libretto called *Julie*, Cherubini, after this, became (1812) Auber's instructor. His next work was a mass, from which he afterwards took the 'Prayer' which appears in *Masaniello*. His first two operas were unsuccessful; but his third, *La Bergère Châtelaine* (1820), was well received. Auber's subsequent collaboration with Scribe, the most successful of librettists, did much to enhance his musical reputation. Auber wrote over forty operas, including *Le Maçon* (1825), *La Muette de Portici* or *Masaniello* (1828), *La Fiancée* (1829), *Fra Diavolo* (1830), *Le Cheval de Bronze* (1835), *Le Domino Noir* (1837), *Les Diamants de la Couronne* (1841), *Zerline* (1851), written for Madame Alboni, and *Le Rêve d'Amour* (1869). Auber was appointed by Louis Philippe director of the Conservatoire, and by Napoleon III. Maître de Chapelle. He died in Paris.

Aubergine, or BRINJAL, is the fruit of *Solanum esculentum*, which belongs to the potato order, Solanaceæ, and is cultivated in France, where it was introduced from Brazil; but the plant probably found its way to America from Africa. It is purple, about the size of a lemon, and is cooked like a vegetable. A white variety is known as the egg-apple.

Aubervilliers, tn., dep. Seine, France, forms a suburb of Paris to the N.N.W. It contains numerous factories, mainly engaged in chemical industries. Pop. (1901) 31,215.

Aubignac, Aubigne. See D'AUBIGNAC, etc.

Aubin, industrial tn., dep. Aveyron, France, 20 m. N.W. of Rodez, on a coal field (40 sq. m.) yielding from one million to one million and a quarter tons annually of easily-procured but not first-rate coal. Iron ore, clay, sulphur, and alum also occur. Pop. (1901) 9,973.

Aublet, JEAN BAPTISTE CHRISTOPHORE FUSÉE (1720-78), botanist; born at Salon, in the south of France; formed botanic gardens and pharmaceutical schools in Mauritius and French Guiana (1762), and in his expeditions made valuable collections of plants. He wrote *Hist. des Plantes de la Guyane Française* (1775).

Aubrey, JOHN (1626-97), antiquary, was born at Easton Pierse in Wiltshire. While at Trinity College, Oxford, he contributed to Dugdale's *Monasticon Anglicanum*, and in 1649 drew attention to the megalithic remains at Avebury, of which, in 1663, he wrote an account, by command of Charles II. In 1663 he was admitted a member of the Royal Society, and after 1670 worked on antiquarian subjects along with Hobbes and Ashmole. He died at Oxford. His *Miscellanies* (1696) is a complete storehouse of quaint anecdotes with reference to supernatural subjects. His 'Minutes of Lives,' given by him to Anthony à Wood, and printed in *Letters by Eminent Persons* (1813), show him as a kind of 'immature Boswell.' His antiquarian researches in Surrey were published in five volumes by Rawlinson (1718-19); a similar collection for Wilts was privately printed by Sir T. Phillips in 1821. But the Ashmolean Museum at Oxford contains much still unpublished MS.; a fragment, *Remains of Gentilism and Judaism*, was printed by the Folklore Society in 1880. There is a good *Life of Aubrey* by J. Britton (1845).

Aubry de Montdidier, courtier of Charles V. of France, was assassinated (1371) by Richard Macaire. The murderer was discovered by the animosity of the victim's dog to him. To decide the case, Macaire was commanded by the king to fight the dog, was beaten, and confessed. The popular drama, *Le Chien d'Aubry*, is founded on this tradition, which is also known as *The Dog of Montargis*.

Aubrietia, or PURPLE ROCK CRESS, wrongly named Purple Arabis, of the order Cruciferæ, produces masses of violet, lilac, and purple colours, in borders and rock gardens, in spring. There are many varieties, mainly derived from *A. deltoidea*, introduced from the Levant in 1710.

Auburn. (1.) City of New York, U.S.A., the co. seat of Cayuga co.; situated at the foot of Owasco Lake (which furnishes the city with water, and also supplies the power for extensive manufactures), 174 m. W. of Albany. It is the seat of the American Presbyterian Seminary (1819), and contains the state prison, which is widely known for the reformatory character of its discipline. Pop. (1900) 30,345. (2.) City of Maine, U.S.A., the co. seat of Androscoggin co., situated 34 m. N. of Portland and on the Androscoggin R., which furnishes power for extensive cotton manufactures. Pop. (1900) 12,951.

Auburn-Lissoy, vil., par. of Kilkenny West, Co. Westmeath, Ireland, 8 m. N.E. of Athlone. It is famous as the scene of Oliver Goldsmith's *Deserted Village*, and the place where his boyhood was spent.

Aubusson, tn., dep. Creuse, France, picturesquely situated on the Creuse, 34 m. S.W. of Montluçon; contains carpet and tapestry factories, one of them founded by Colbert (1665). This industry is said to have been introduced by the Saracens, who are supposed to have founded the town after their defeat at Tours (732 A.D.). Pop. (1901) 7,067.

Aubusson, PIERRE D' (1423-1503), was elected grand-master of the order of the Knights of St. John of Jerusalem (1476). He had previously distinguished himself against the Turks (1435), the English at Montereau (1437), and the Swiss at St. Jakob (1444). After his elevation to the grand-mastership he strove to create a confederation of the Christian powers against the Turks, and by his successful defence of Rhodes (May-July 1480) against an army of 100,000 Turks, checked their victorious course after the fall of Constantinople (1453). See Bouhours's *Histoire de Pierre Aubusson* (1676; abbreviated ed. 1887), and C. Torr's *Rhodes* (1887).

A.U.C. (Lat. *anno urbis conditæ*, 'in the year from the founding of the city.'). In Rome a particular year was usually described by the names of the consuls for that year; but later Roman writers reckoned from the year of the founding of Rome—according to Varro, B.C. 753. Hence, to bring a date A.U.C. in accordance with Christian chronology, the date A.U.C. must be subtracted from 754 if B.C., but if a given date A.U.C. be greater than 753, 753 must be deducted to give the year A.D.

Aucassin et Nicolette, a celebrated French romance of the 12th century, written in alternate prose and assonant verse of seven syllables. It recounts the love of Aucassin, son of the Count of Beaucaire, for Nicolette, the captive daughter of the king of Carthage. Published in the Barbazan collection, bk. i., and also by Legrand d'Aussy, *Fabliaux et Contes*, bk. iii.; English editions by Bourdillon (1758), A. Lang (new ed. 1898), and Laurence Housman (1902).

Auch (the *Augusta Auscorum* of the Romans), tn., formerly cap. of Gascony, now of dep. Gers, France, on r. bk. of Gers, 367 m. S. of Paris; is situated on a steep hill (540 ft.), approached from the river by a flight of 200 steps, and crowned by a Gothic cathedral; is the seat of an archbishop. There are manufactures of thread, cotton and woollen goods, and a trade in wines and brandy. Pop. (1901) 13,939.

Auchenia, the genus to which the llama, alpaca, guanaco, and vicuña all belong. Though the nearest allies of these animals are the Old World camels, they themselves are entirely confined to S. America, and even as fossils are not known outside the American continent. They differ from the Old World camels in the smaller size, the absence of any dorsal hump, the woolly coat, the narrow feet with distinctly separated toes, the short tail, long and pointed ears, and in the detailed characters of the teeth.

Auchinleck, vil., E. Ayrshire, Scotland, 1 m. N. of Old Cumnock. Auchinleck House ('Place Affleck'), the seat of the Boswells, is ¾ m. distant; Airdsmoss, of Covenanting fame, is 1¼ m. distant.

Auchinleck Press, a private printing-press established by Sir Alexander Boswell, son of Johnson's biographer, at Auchinleck, Ayrshire, in 1815. He possessed many rare and valuable MSS., and after issuing, in 1812, the *Disputation between John Knox and the Abbot of Crossraguel* in facsimile, he produced rare old chap ballads and scarce tractates bearing on history, etc.; reprinted the poems of Richard Barnfield (1816), and a series of valuable old poems issued under the title of *Frondes Caducæ* (1816). For a list of books printed at Auchinleck, see *Sir A. Boswell's Poetical Works*, ed. by R. H. Howie (1871), Appendix. Sir Alexander bequeathed to the Advocates' Library, Edinburgh, the famous Auchinleck MS. made use of by Scott for his *Minstrelsy of the Scottish Border*.

Auchmuty, SIR SAMUEL (1756-1822), English soldier, was the son of an Episcopalian clergyman in New York. He fought for the king in America, and after the declaration of peace went to England, and then to India, where he served against Hyder Ali, and also against Tippoo Sultan at Seringapatam (1792). He was also engaged in the capture of Monte Video (1807); appointed commander-in-chief at Madras (1810); captured Java (1811); but it was as adjutant-general to Sir David Baird in his march across the desert to the Nile (1801) that he became a popular hero. See Hook's *Life of Sir David Baird* (1832).

Auchterarder, mrkt. tn., Perthshire, Scotland, 7 m. S.E. of Crieff; manufactures tartans; has breweries, and wool, flour, and saw mills. The Earl of Mar burned the town in 1716. Here began the struggle which resulted in the disruption of the Church of Scotland in 1843. Pop. 2,276.

Auckland. (1.) Provincial dist., the N. division of New Zealand, comprising nearly half of North Island. Area, 16,477,700 acres; length, 365 m.; greatest breadth, 180 m. Hilly, well timbered, and well watered, and has an extensive seaboard, with many good harbours. Kauri timber and gum and sub-tropical fruits are peculiar to this district. In the Thames and Coromandel counties are large gold fields (quartz reefs). The Waikato basin is the most fertile region. In the S. are the Hot Lakes district (see ROTORUA) and Lake Taupo. Chief exports: wool, gold, kauri gum, timber, and flax. The district was the first settled, contains two-thirds of the Maoris, and was the scene of the war against Honi Heke and the Waikato war. White pop. (1901) 175,938. (**2.**) The largest and most picturesque city in New Zealand, on Waitemata Harbour, in the N. of North Island, with extensive shipping accommodation and two large graving docks, one of them, the Calliope Dock, the largest in Australasia. Standing on a volcanic isthmus 6 m. wide, the 'Corinth of the South,' with two harbours—Waitemata (E.) and Manukau (W.)—it is connected by rail with its W. port, Onehunga; and is built on undulating ground, with many handsome public buildings, including a free library and art gallery and museum. Among its chief industries are boiler works, sawmills, timber companies, shipbuilding yards, glass works, and a sugar refinery. Founded in 1840 by Governor Hobson, who named it after Lord Auckland, it was the colony's seat of government until 1865. Pop. (1901) 67,226.

Auckland, GEORGE EDEN, EARL OF (1784-1849). He supported the reform party; was President of the Board of Trade (1830), First Lord of the Admiralty (1834), and governor-general of India (1835-41), and was responsible for the first Afghan war. He was created Earl of Auckland in 1839.

Auckland, WILLIAM EDEN, BARON (1744-1814), English politician and diplomatist, son of Sir Robert Eden, Bart., of W. Auckland, Durham. Entering the House of Commons (for Woodstock), he joined Lord North's party; was a devoted follower of Pitt, who sent him as minister-plenipotentiary to France, where he negotiated a commercial treaty (1786); and was ambassador to Spain and then to Holland. Created an English peer (1793), he was Postmaster-General (1798-1801). He wrote *Principles of the Penal Law* (1772) and *History of New Holland* (1787). See his *Journals and Correspondence* (1860-2).

Auckland Islands, a group of uninhabited, mountainous, volcanic, peaty, wooded islands about 180 m. S. of New Zealand, to which they belong. Total area, about 350 sq. m. The largest, Auckland I., about 27 m. by 15, has two good harbours. Discovered in 1806 by Bristow, and annexed by Great Britain in 1886. See F. R. Chapman's 'The Outlying Islands south of N.Z.' (in *Trans. of N.Z. Inst.*, vol. xxiii., 1890, p. 491).

Auction, a mode of selling property by which the vendor agrees to sell to the highest bidder. An auction sale is nominally made subject to printed conditions of sale, which are distributed before the sale, together with particulars of sale, or an exact description of the property submitted to auction. The sale proceeds by increased biddings (hence the term auction) until no more offers are forthcoming, when the property is 'knocked down' to the highest bidder, unless a reserve price has been fixed by the vendor, when the property may be withdrawn if that price has not been reached. The vendor may expressly reserve a right to bid, but a conspiracy between the vendor and others to enhance the price by sham biddings would make the sale void; and, on the other hand, if there be any attempt by the highest bidder to prevent others from bidding, that would justify the vendor in declining to complete the sale. But there appears to be nothing to prevent two persons from agreeing not to bid against each other. In England a bid may be retracted at any time before the property is knocked down; but this is probably not the law in Scotland (except in the case of sales of goods under the Sale of Goods Act, 1893), because by Scots law consideration is not essential to a binding contract.

A DUTCH AUCTION is an auction in which the property is put up at the highest possible price, and the price is lowered till some one bids, when the property is at once knocked down.

In an AUCTION BY CANDLE the bids continue while a bit (generally an inch) of candle burns, and the last bidder before the light goes out is the purchaser. In Scotland an auction is called a 'roup,' and conditions of sale 'articles of roup.' The vendor is called the 'exposer.' Reserve prices are uncommon, but an upset price is general. See Bateman's *Law of Auctions* (7th ed. 1895).

Auctioneer, a person employed to sell property by public auction. He has no implied authority to sell by private contract. He is the agent both of the seller and the buyer, and his signature to the memorandum of sale will bind both parties. He can sue the purchaser in his own name. He should sell for ready money only. He has authority to receive the purchase money for goods, but in the case of land only the deposit, unless expressly authorized. He cannot buy the property himself. He is liable to an action for selling goods to which his employer had no title, except in cases where the latter is protected by the Factors Acts. By the Auctioneers Act, 1845, an auctioneer requires an annual licence costing £10; but no licence is required to sell under an order of the court, or under a distress for rent for any amount less than £20, or under the Small Debts Act in Scotland, or for selling fish when first landed on the seashore. The penalty for carrying on business without a licence is £100. He must produce his licence on demand by a revenue officer, and exhibit his name and address in a conspicuous part of the room during a sale. In Scotland, under the Taxes Management Act, 1880, an auctioneer must give three days' notice in writing to the collector of taxes of the district of the date of an auction, and the name and address of the person whose goods are to be sold. See Bateman's *Law of Auctions* (7th ed. 1895).

Aucuba Japonica, a Japanese shrub of the order Cornaceæ; grows to a height of a few feet, and bears large mottled evergreen leaves and red berries. The female plant was introduced to Britain in 1783, and the male in 1862.

Aude. (**1.**) Unnavigable riv. of France, rises in dep. of Pyrénées-Orientales, crosses the dep. of Aude N. and E., and falls into the Mediterranean after a course of 139 m. (**2.**) Maritime dep. of S. France, with a frontage of 32 m. on the Mediterranean. Area, 2,438 sq. m. The N. of the dep. lies on the S. slopes of the Montagne Noire (highest point Pic de Nore, 3,970 ft.); whereas between the Aude and the sea runs the Chaine des Corbières. The highest point is Pic de Madrès (8,100 ft.), in the extreme S. Along the shore are numerous lagoons in a malarial district, mentioned by Pliny. The rest of the department, however, enjoys a very healthy climate, especially agreeable in autumn. Several localities with mineral springs are much frequented. All sorts of fruit, from chestnut to grape and olive, ripen on the slopes of the hills, and the summits afford good pastures. The honey of Narbonne is famous. The working of wool and the making of wooden utensils, as barrels, etc., are the chief industries. The quarries yield some plaster, slate, and marble (used for the castle in Versailles), and there is some iron ore. Cap. Carcassonne, 390 m. S. of Paris. Pop. (1901) 313,531.

Audebert, JEAN BAPTISTE (1759-1800), naturalist and painter; born in Rochefort; studied in Paris; produced *Histoire Naturelle des Singes* (1800), with 62 plates, printed in oil colours by a process of his own invention; *Hist. des Colibris, des Oiseaux-Mouches, des Jacamares, et des Promcrops* (1802); *L'Histoire des Grimpereaux, et des Oiseaux de Paradis* (1803). He was the first to use gold leaf in illustrating the plumage of birds.

Audenarde, Belgium. See OUDENARDE.

Audh. See OUDH.

Audhumla, in Scandinavian mythology, was the cow whose milk nourished the giant Ymir, the first created being, and his race.

Audiffret-Pasquier, EDME ARMAND GASTON, DUC D' (1823), French statesman, was born in Paris. At first a supporter of the Orleanists, he subsequently supported the moderate Republicans. He was the first person elected life senator by the National Assembly, of which he became president in 1875, being appointed president of the Senate in 1876. He was elected to the Academy in 1879.

Audiometer, an instrument, invented by Professor Hughes in 1879, to measure with precision the sense of hearing. It consists of an adaptation of the telephone.

Audiphone, contrivance for improving the hearing of persons partially deaf. It consists of a thin fan-shaped sheet of ebonite or other suitable material pressed against the upper front teeth, and capable of being varied in convexity. Sound vibrations are conveyed through the bones of the head.

Audita Querela. See WRIT.

Auditor. An auditor is a person employed to examine and report upon the financial condition of a business, public office, or undertaking. Except in so far as they are regulated by statute, his duties rest on contract; but an auditor is liable for negligence, and as an expert he is expected to show the diligence and skill required of professional men generally. His examination of the books should not be perfunctory or merely arithmetical, but he should ascertain that they give a true account of the undertaking—*e.g.* that sufficient allowance is made for depreciation and bad debts, that profits have been properly earned, that the expenditure has been justifiable, and that the assets have not been overvalued. By the Companies Act, 1900, every company must appoint an auditor at the annual general meeting; and if none is appointed, the Board of Trade may appoint one on the application of any member. He is entitled to access to the books of the company, and must state in his certificate whether his requirements have been satisfied, and whether the balance-sheet gives a true account of the company's position as shown by the books. In the case of building, friendly, and industrial societies, and of public bodies—such as county councils, municipal corporations, school boards, and many others—one of the chief duties of an auditor is to see that the expenditure is authorized by the constitution of the spending authority. The public accounts are audited by the Exchequer and Audit Department at Somerset House, regulated by the Exchequer and Audit Act, 1866. The auditor of the court of session in Scotland is an officer appointed by the crown to audit the expenses of parties in cases before the court. His duties correspond to those of a taxing-master in England, but he is also allowed to audit any accounts between agents and their clients privately submitted to him. He also taxes accounts remitted to him by the accountant of the court, and the expenses of arbitrations under the Lands Clauses Acts. Auditors are also appointed in the sheriff courts by the sheriff. See Pixley's *Auditors, their Duties and Responsibilities* (1896).

Auditory Nerve, the special nerve for the sense of hearing. Two of them rise as the eighth pair of cranial nerves, or, as sometimes described, as the *portio mollis* ('soft part') of the seventh pair, from the medulla oblongata, and pass downward one to each ear. See BRAIN and EAR.

Audley, SIR JAMES (?1316-69), a 'first founder' of the Order of the Garter (1344), is famous as a brave companion of the Black Prince. His chief exploits were at Poitiers (1356). The Black Prince appointed him governor (1362) of Aquitaine.

Audley, THOMAS (1488-1544), lord chancellor of England; an Essex man; was a member of Wolsey's household; became Speaker of the House of Commons (1529), and in 1533 was elevated to the lord chancellorship through his subserviency to Henry VIII. He presided at the trials of More and Fisher. See Hall's *Chronicle* (1809); Campbell's *Lord Chancellors* (1856).

Audouin, JEAN VICTOR (1797-1841), naturalist, born at Paris; was appointed (1833) professor of entomology at the Paris Museum of Natural History. He investigated certain plant diseases affecting French industries, especially those of the silkworm and vine. He wrote, in conjunction with Milne-Edwards, *Histoire des Insectes nuisibles à la Vigne* (1842), and contributed the section on insects to Cuvier's *Règne Animal* (1817).

Audran, a family of French artists. The best known are: GÉRARD (*c.* 1640-1703), engraver; developed a system of engraving that reproduced the breadth and tone of the original picture. His best-known works are *Les Batailles d'Alexandre*, after Lebrun. JEAN (1667-1756), engraver; his masterpiece is *L'Enlèvement des Sabines*, after Poussin, and other works after Rubens, Veronese, and Lebrun. CLAUDE II. (1644-84), painter, pupil of Lebrun, whom he copied closely. He decorated with frescoes the gallery of the Tuileries and the grand staircase at Versailles. CLAUDE III. (1658-1734), known as a painter of the extreme grotesque and ornamental.

Audran, EDMOND (1842-1901), musical composer, born at Lyons; was originally intended for the church, but turned to music, and became choirmaster at Marseilles. His *Grand Mogul*, an operetta (1864), first brought him prominently into notice. It was followed by *Olivette*, *La Mascotte*, *La Cigale*, *La Poupée*, etc., all of them graceful, sparkling, and melodious light operas.

Audsley, GEORGE ASHDOWN (1838), architect and art writer, born at Elgin, Scotland; in practice in New York since 1892. His works include a *Handbook of Christian Symbolism* (1865), *The Art of Chromolithography*, and a number of sumptuous volumes on Japanese art, including *The Ornamental Arts of Japan* (1882-6) and (with J. L. Bowes) *Ceramic Art of Japan* (1875-80).

Audubon, JOHN JAMES (1780-1851), American ornithologist, born at Mandeville, Louisiana; educated at Paris, where he studied drawing under David. On his return (1798) he spent a good deal of his time exploring the American forests, making drawings of birds, and studying their habits. In 1826 he came to England, and exhibited to ornithologists the richness of American bird life. His *Birds of America* (1828-40) was characterized by Cuvier as 'the most magnificent monument that art has yet raised to ornithology.' His other works include *American Ornithological Biography* (5 vols. 1831-9); *Synopsis of the Birds of N. America* (8 vols. 1839). See *Life* by Buchanan, from materials supplied by his widow; Coues's *Audubon and his Journals* (1897); and see also the appendix to Coues's *Birds of the Colorado Valley* (1898).

Aue, tn., dist. Zwickau, Saxony, on the Mulde, 32 m. by rail S.W. of Chemnitz; manufactures machinery, lace, silver goods, furniture, linens, etc. Pop. (1900) 15,246.

Auenbrugger von Auenbrugg, LEOPOLD (1722-1809), Austrian physician, born at Graz; studied in Vienna, and practised in the Spanish hospital there (1751-68). He introduced the method of diagnosing chest and abdominal diseases by percussion. He published *Inventum novum ex Percussione Thoracis humani interni Pectoris Morbos detegendi* (1761).

Auer, ALOYS (1813-69), born at Wels, Upper Austria, director of the Imperial Printing Office in Vienna from 1841 to 1868; inventor of *Nature Printing by Photography*: issued (1844) the Lord's Prayer in over six hundred languages in Roman type, and the same in over two hundred languages with the national alphabets (1847).

Auer, Hans (1847), Swiss architect, worked and taught in Vienna; was chosen to design new federal administrative offices and house of parliament at Bern in 1885 (completed 1902); appointed professor of architecture at Bern in 1890.

Auer, Leopold (1845), Hungarian violinist, was born at Veszprim; studied music with Joachim. After being conductor in Düsseldorf (1863) and Hamburg (1866), he was engaged in 1868 as soloist for the imperial orchestra at St. Petersburg, and appointed professor at the conservatory of music; also conductor (1887–92) of the symphony concerts given by the Russian Musical Society.

Auerbach, Berthold (1812–82), German author, of Jewish descent, and a native of the (Würtemberg) Black Forest. He was an enthusiastic disciple of Spinoza, whose works he translated, and who appears as the hero of his novel *Spinoza* (1837). The work by which he achieved fame is his *Schwarzwälder Dorfgeschichten* (1843–54), chiefly sketches of life in the Black Forest. The most characteristic amongst these are *Die Frau Professorin*, *Der Lauterbacher*, *Ivo der Hajrle*; and, among other novels, he wrote *Barfüssle* (1856; 34th ed. 1902), *Edelweiss* (1861), *Joseph im Schnee* and *Der Landhaus am Rhein* (1861), and *Waldfried* (1874), some of them being heavily charged with philosophic disquisition. There is a new edition of his works (18 vols. 1893–5), and a new edition of the *Schwarzwälder Dorfgeschichten* alone (10 vols. 1900). See E. Lasker's *Berthold Auerbach* (1882) and Bettelheim's *Berthold Auerbach* (1904).

Auerbach's Keller, a scene in the legend of Faust, utilized by Goethe in the first part of his drama, is a wine cellar and restaurant in Leipzig (No. 1 Grimmaische Strasse).

Auersperg, Anton Alexander, Count von (1806–76), whose pen-name was Anastasius Grun, Austrian poet; one of the very few allowed to sing of liberty during the sway of Metternich. His principal works are *Spaziergänge eines Wiener Poeten* (1831; 7th ed. 1876), *Schutt* (1836; 14th ed. 1890), and *Gedichte* (1837; 18th ed. 1893). As a politician he played an active part in the provincial parliaments of Styria (1867, etc.) and Carniola (1861–7), and in the constitutional assemblies (Frankfort, etc.) of 1848. There is an edition of his *Gesammelte Werke* in 5 vols. (1877).

Auerstadt, vil., Prussia, 32 m. s.w. of Halle. Here, on Oct. 14, 1806, the French under Davoût defeated the Prussians with great slaughter. The Duke of Brunswick fell. Pop. (1900) 561.

Aufrecht, Theodor (1822), Sanskrit scholar, born at Leschnitz, in Upper Silesia; studied under Bopp, Böckh, and Lachmann at Berlin, and in 1852 went to Oxford, where he compiled a catalogue of the Sanskrit mss. (1859–64) in the Bodleian Library, and assisted Max Müller with his edition of the *Rigveda* (1877). He was professor of Sanskrit at Edinburgh (1862–75) and at Bonn (1875–89). He also issued two other important works—*Die umbrischen Sprachdenkmäler* (1849–51), dealing with the comparative philology of the old Italian tongues; and *Catalogus Catalogorum: an Alphabetical Register of Sanskrit Works and Authors* (1891–6)—and founded the *Zeitschrift der vergleichende Sprachforschung* (1852).

Augarten, beautiful park of Vienna, Austria, laid out in the French style; thrown open to the people by the Emperor Joseph II. in 1775.

Augean Stables. See Hercules.

Augereau, Pierre François Charles, Duke of Castiglione (1757–1816), French soldier; gained distinction in Napoleon's campaigns in N. Italy, especially at Lodi (1796), Castiglione, and Carmignano, and shared the honour of Arcola (1796). Made a marshal in 1804, he served in the battles of Jena (1806), Eylau (1807), and Leipzig. On the return of Louis XVIII. he made his submission and retained his rank, but refused to act as a member of the military tribunal on Marshal Ney. During the 'hundred days' he unsuccessfully endeavoured to conciliate and rejoin Napoleon, thus incurring the displeasure of the Bourbons.

Aughrim (anc. *Eachraim*), vil. and par., Co. Galway, Ireland, 3 m. w.s.w. of Ballinasloe station, on railway to Dublin; famous as the scene of the decisive battle (fought July 12, 1691, after the capture of Athlone) between the troops of William III., under the command of Ginkell, and those of James II., led by St. Ruth. The latter was killed, and about 7,000 of his army fell.

Augier, Guillaume Victor Emile (1820–89), French dramatist, born at Valence. His first success, *La Ciguë* (1844), dealt with classical times, *L'Aventurière* (1848) with the renaissance, but in *Gabrielle* (1849) he showed his real talent for present-day comedy. All these were written in verse, as were also *Diane* (1852), *Paul Forestier* (1868), and two or three others. In 1854 he produced *Le Gendre de M. Poirier*, written in collaboration with Jules Sandeau, in which the modern French drama broke away from the artificiality of Scribe and his imitators. Augier's dramatic history after this was a series of triumphs, especially with *La Pierre de Touche* (written with Sandeau, 1853), *Le Mariage d'Olympe* (1855), *Ceinture dorée* (1855), *Les Lionnes Pauvres* (with E. Foussier, 1858), *Les Effrontés* (1861), *Le Fils de Giboyer* (1862), *Maître Guérin* (1864), *Jean de Thommeray* (1873), *Madame Caverlet* (1876), *Les Fourchambault* (1879). Several of these are sharp satires upon contemporary manners and ideas. His collected dramatic works appeared in 1890. There are biographies by 'un Valentinois' (1896) and Morillot (1901).

Augite, a common rock-forming mineral, most abundant in the crystalline igneous rocks, and often an essential ingredient in basalt, andesite, and picrite. It is usually black, occurring in small crystals of the monoclinic system, as well as in irregular grains. It may be distinguished from amphibole or hornblende by the shorter, stouter crystals and less perfect cleavage. The hardness is 5½, and sp. gr. 3·3. Augite decomposes into chlorite, uralite, and serpentine, and these secondary products, being usually green, have given the name 'greenstones' to decomposed crystalline rocks in which augite is present.

Augmentation. See Benefice, Teinds.

Augmentation, in music, is the reproduction or imitation of a theme or subject by doubling the time value of the notes in which it was first introduced.

Augmentation, Honourable, in heraldry an addition to a coat-of-arms granted by the sovereign for distinguished service.

Augsburg, tn., dist. Swabia, Bavaria, on the l. bk. of the Lech, a trib. of the Danube, 39 m. by rail n.w. of Munich. Many of its houses were built in the 16th and 17th centuries, and its mediæval walls were not taken down until the end of the 19th century. Its prominent edifices include the cathedral (begun in 995, but reconstructed in 1321–1431), the 17th century town hall, with a magnificent so-called Golden Hall (108 ft. long, 56 ft. wide, 46 ft. high), the Maximilian Museum, the Royal Picture Gallery, St. Ulrich's and other churches, the picture gallery, and the palace and 'bathrooms' of the Fugger family, former merchant princes of the town. Having abundant water-power, Augsburg is the seat of large cotton, machinery, thread, woollen, and paper factories, of breweries, and calico-printing and dye works. Pop. (1900) 89,170. Augsburg, which was founded by Drusus in 15 B.C., was in the 15th and 16th centuries an emporium of the trade between N. Europe, Venice, and the Levant.

Diet and Confession of Augsburg. In June 1530 the Diet of Augsburg met, Charles v. being present in person. Charles, in alliance with the Pope, was prepared to attempt a settlement of the religious difficulties in Germany. The Protestants were anxious for reconciliation, and this desire was expressed in the 'Confession of Augsburg,' which was presented to the Diet. The aim of the Confession, composed for the greater part by Melanchthon, was to show that Luther's opinions were not heretical.

Augsburg Interim, The. In Sept. 1547 a Diet met at Augsburg, and Charles v. was present. He had every hope of re-establishing the unity of the church, and therefore had the *Interim* drawn up by theologians from both sides; and on May 19, 1548, it was accepted by the Diet, but neither by the Romanists nor by the Protestants.

Augur and **Auspex** were the names given at Rome to the diviners, and mean primarily 'diviners by birds.' Yet there were several kinds of portents from which auspices could be taken—*e.g.* celestial signs, particularly thunder and lightning; the flight of birds; the feeding of the sacred chickens; the behaviour of four-footed animals; various unlucky events (*signa ex diris*). The college of augurs originally consisted of three patricians; but, by the Ogulnian law of 300 B.C., it consisted of five plebeian augurs and four patricians; and in later times the number was increased to fifteen, all of whom were appointed for life. Roman augury did not profess to tell the future, but merely to decide on the advisability of a given line of action. Strictly, the right of taking auspices belonged to the chief magistrates, the augurs being only their assistants; but the augurs formed a permanent guild. See Divination; also Rubino's *Römische Verfassung* (1839), and Bouché-Leclercq's *Hist. de la Divination dans l'Antiquité* (1879).

August, Month of. See Year.

Augusta, name of several ancient cities built by or called after Augustus and other Roman emperors: *Augusta Allobrogum*, now Geneva; *Augusta Cæsarea*, now Saragossa; *Augusta* or *Julia Gaditana*, now Cadiz; *Augusta Taurinorum*, now Turin; and *Augusta Vindelicorum*, now Augsburg.

Augusta (Ital. *Agosta*), fort. seapt. tn., prov. Syracuse, Sicily, on a small island close to the E. coast, 19 m. by rail N. of Syracuse. Vines and olives are grown, salt is prepared, and fishing is carried on. Pop. (1901) 16,770.

Augusta. (1.) City, Georgia, U.S.A., co. seat of Richmond co., situated on Savannah R., at the Falls; one of the principal cotton centres of the south. It is a growing health resort. It was captured by the British in 1779, and again in 1780. Pop. (1880) 21,891; (1900) 39,441. (2.) City, Maine, U.S.A., the co. seat of Kennebec co. and the capital of the state, situated on the Kennebec R., at the head of navigation, 45 m. from the mouth. Pop. (1900) 11,683.

Augusta, Marie Luise Katharina (1811-90), German empress, daughter of Charles Frederick, Grand-Duke of Saxe-Weimar. On June 11, 1829, she married William, Crown-Prince of Prussia, afterwards the Emperor William I.

Augustales. (1.) Games in honour of Augustus held at Rome and in other parts of the empire. After B.C. 11 the senate decreed their celebration annually on the birthday of Augustus. (2.) Two classes of priests, one at Rome (*sodales augustales*) and the other in the municipia, instituted by Tiberius to attend the worship of Augustus and the Julia gens. They numbered twenty-one, together with certain members of the imperial family, and were selected from the principal persons in Rome. In the municipia they are supposed to have been wealthy *libertini*. They formed a collegium, and were appointed by the *decuriones*, or senate of the municipia. The six chief members were called *seviri*.

Augustan Age, a term applied to the period of the Roman emperor Augustus (31 B.C. to 14 A.D.). The great names of the Augustan age were Ovid, Horace, Livy, Virgil, and Catullus. The expression is also associated with the age of Queen Anne and the early Georges in English literature, and with the reign of Louis XIV. in French history.

Augusta Prætoria, Italy. See Aosta.

Augusta Victoria (1858), German Empress and Queen of Prussia, daughter of Frederick, Duke of Schleswig-Holstein. In 1881 she married Prince William of Prussia, now William II.

Augustenburg, seaside resort on the Baltic, in the Prussian prov. of Schleswig-Holstein, at the head of a bay of Alsen I., 20 m. N.E. of Flensburg. Pop. (1900) 663.

Augusti, Johann Christian Wilhelm (1772-1841), Protestant theologian, born at Eschenberga, near Gotha, Germany. His chief works are *Lehrbuch der christlichen Dogmengeschichte* (1805; new ed. 1835); *Denkwürdigkeiten aus der christlichen Archäologie* (12 vols. 1817-31); *Handbuch der christlichen Archäologie* (1836-7); *Kritik der neuen Preussischen Kirchenagende* (1823).

Augustine (Aurelius Augustinus), the greatest of the Latin fathers of the Christian church, was born on Nov. 13, 354 A.D., at Tagaste, a small Numidian country town. Monica, Augustine's mother, was a woman of deep Christian piety. At the age of sixteen he was enabled to proceed to the University of Carthage. During his residence at Carthage Augustine lived a life of gaiety and dissipation; but not, apparently, to the neglect of his studies, for he gained the first place in the school of rhetoric—the most coveted distinction in those days. In Carthage, while a youth of eighteen, he contracted an alliance with a young woman, with whom he lived in a state of unmarried fidelity for fourteen years.

When in his twentieth year Augustine began, as he says, to desire 'with an incredible ardour the immortality of wisdom.' The book that awakened him to this serious state of mind was Cicero's *Hortensius*. Turning to the Scriptures to satisfy his new hunger, he was disappointed, for they seemed to him 'unworthy of being brought into comparison with the majesty of Cicero.' In this condition of mental fermentation Augustine fell in with professors of Manichæism, and for more than nine years he remained a professed Manichæan.

With a 'mind darkened by error and a heart led astray by passion,' Augustine, at the age of twenty, opened a school for instruction in grammar and rhetoric in his native town. Though not unsuccessful, the young lecturer ere long resolved to seek fame in Carthage. There pupils gathered around him in large numbers, and Augustine further increased his fame by winning a high prize in a public rhetorical contest. But, owing to the lack of discipline among the students, he resolved to seek his fortune in Rome. His mother opposed the idea; but finally (383 A.D.) he eluded her vigilance and escaped. 'I lied to my mother, and to such a mother.' On his arrival at Rome the fugitive fell into a dangerous illness, but recovered. He set about opening a school, and numbers came to listen to his teaching. Unlike the students at Carthage, they behaved well; but they invariably failed to pay their fees. As a consequence Augustine applied for and obtained a post as teacher of rhetoric in Milan, where he drew a salary from the government.

Before leaving Carthage his enthusiasm for the teaching of the Manichæans had considerably abated. In Milan various influences operated on him which tended to lead him to accept Christianity. The study of Plato completely undermined his old faith, and the preaching of Ambrose, bishop of Milan, completed the process. It was about this crisis in his history that his mother arrived from Africa. As a result of her influence and that of others, and of the study of the New Testament, Augustine was convinced of the truth of Christianity. The moment of awakening, so graphically described at the close of the eighth book of the *Confessions*, was the result of a conversation in which Pontitianus, a fellow-countryman of his own and a Christian, told him how the *Life of Anthony the Hermit* had so deeply impressed two members of the imperial service as to induce them to retire to a monastery.

This great change in Augustine's life took place in August 386. On Easter eve, April 387, he, along with his son Adeodatus and his friend Alypius, was baptized in Milan by Ambrose. Tradition associates with this memorable occasion the composition of the great Christian hymn the *Te Deum*. Shortly afterwards, at Ostia, when about to return to Africa, Augustine experienced a great sorrow through the death of his saintly mother; and he had not long settled in his native town, Tagaste, when his son also was taken away. In 391 the Christian community of Hippo Regius, a town close to the borders of Algeria and Tunis, compelled him to accept ordination. Within five years, Valerius, the bishop, secured him as his colleague; and after the death of the former, Augustine remained in possession of the see till the end of his life. The year 429 saw the Vandals in Africa, and in 430 they besieged Hippo. Three months later, on Aug. 28, 430, the famous divine breathed his last.

No theologian has produced a larger and deeper impress on the mind of Christendom than the bishop of Hippo. This he has achieved not only by his writings, but by the exhibition of Christian fervour and devotion which is given in the story of his inner life. As a philosopher and a moralist he anticipated many of the problems of modern times. As a stylist he is often prolix, but sooner or later he strikes off a sentence of immortal brilliance. Three great controversies called forth his immense mental resources. As against the Manichæans, he maintained the doctrine that evil was not a nature Everything that God made was good. Evil was a defect or corruption of nature, brought about by the exercise of the human will. In opposition to the Donatists, who claimed that the Catholics had ceased to be a holy church by admitting those who had been unfaithful, Augustine denied that the church now existing was intended to be coextensive with the final and glorious church, and referred his opponents to the parables of the 'Tares' and the 'Drag-net.' But Augustinianism — the doctrines with which the name of Augustine is universally identified—was developed by its author in controversy with Pelagius, a British monk, and others who more or less entirely supported his views. The point of conflict was the relation between truth and individuals—the conditions and process of salvation. Augustine employed all his energies to establish the position that man is unable of himself to will anything good. There is no power either of choosing or of realizing the good in man; grace must do all. Starting from this, which he regarded as a fact of consciousness and as the teaching of Scripture, Augustine built up that elaborate system of theology which took shape in later days as Calvinism.

Embracing expositions of Scripture, letters, philosophical and strictly theological works, Augustine's writings are voluminous. But the two best-known compositions are undoubtedly the *De Civitate Dei*, or 'City of God' (413–426) and the *Confessions* (397). The former appeared after the fall of Rome (410), and if much of it lacks weight because of Augustine's slight acquaintance with Greek and ignorance of Hebrew, it is a stupendous attempt to create a philosophy of history. In the midst of grave political disasters it brought before men's minds the conception of that spiritual city of God which had been slowly rising in the past, and which was destined to include all the kingdoms of the earth. The *Confessions* is the history of Augustine's thoughts and emotions, his sins and his struggles, his defeats and delays, and ultimate triumph. It was written, as he says, 'to praise the just and good God, and stimulate the heart and mind of man to approach unto Him.' And, with Bunyan's *Pilgrim's Progress*, Pascal's *Pensées*, and à Kempis's *De Imitatione*, it has fulfilled, and still fulfils, its author's design. Many English editions of these two works have appeared. In the original, the best editions of Augustine's writings are the Benedictine (8 vols. folio, published at Paris, 1679–1700, and republished in 22 vols., 1836–40) and Migne's (16 vols.). An English edition, including most of the important works, except the *Retractationes* (428), was published at Edinburgh (T. and T. Clark) in 1872–80, under the editorship of Professor Marcus Dods. See Milman's *Latin Christianity; Mozley's Augustinianism;* Cunningham's *St. Austin*, etc. (Hulsean Lecture, 1885); Harnack's *Hist. of Dogma* (1898) and *Monasticism and Confessions of Augustine* (1901); Hatzfeld's *St. Augustine* (1898); Rainy's *Catholic Church* (1902); Schaff's *Life and Labours of St. Augustine* (1854); Baillie's *St. Augustine* (1859); Maccabe's *St. Augustine and his Age* (1902); also works in German by Cloth (1840), Reuter (1887), Bindemann (1844–69), Dorner (1873), Ribbeck (1858), Böhringer (1877–8), and Von Hertling, and in French by Poujoulat (1886) and L'Abbé Flottes (1861).

Augustine, or AUSTIN, ST., first Archbishop of Canterbury, originally a monk of the Benedictine convent at Rome, was sent by Pope Gregory to convert Britain to Christianity. Accompanied by forty monks, Augustine landed on the Isle of Thanet (596). Through the intercession of Bertha, wife of Ethelbert, king of Kent, he was permitted to preach, and succeeded in making the king himself a convert to his cause. He was consecrated Archbishop of Canterbury, and, following Gregory's advice, conciliated native feeling, and made the change of religion as gradual as possible. Augustine ranks high for his monastic zeal, and as a capable bishop of the Roman Church. He died *c.* 607, and was buried at Canterbury. See A. J. Mason's *The Mission of St. Augustine to England* (1897), and books by E. W. Benson, G. F. Browne, and W. E. Collins (all in 1897). The chief source is Bede's *Eccles. Hist.* (ed. Gidley, 1870).

Augustinians, fraternities in the Roman Catholic Church who follow the rules referred to St. Augustine; but the origin of the order is in dispute. The principal congregations are the Canons Regular, the Hermits, the Special Congregations (of which Luther was a member), and the Barefooted Augustinians. The Canons Regular, or Austin Canons, founded at Avignon about 1061, made their first appearance in Britain about 1100. At the reformation they owned two hundred houses, the chief being at Pontefract, Scone, and Holyrood, and from their habit they were sometimes called the Black Friars. The Hermits, or Austin Friars, were under a rule much more severe, and were one of the four great mendicant orders of the church, whence the name 'Begging Friars.' The Special Congregations and Barefooted Augustinians were even more rigorous in their discipline. The Augustinian nuns are said to have founded their first convent at Hippo, under Perpetua, the sister of Augustine. See Speakman's *Rule of St. Augustine* (1902), and Dugdale's *Monasticon*, vi. 37.

Augustovo, or AUGUSTWO, tn., Poland, Russia, 50 m. N.W. of Grodno, on river Netta, which is connected by canal with the Niemen. Noted for its cattle and horse fairs. Pop. (1897) 12,700.

Augustulus, ROMULUS, the last Roman emperor of the West, was the son of Orestes, a Pannonian, who, with the assistance of the barbarian troops, dethroned Julius Nepos, and placed Augustulus (the diminutive was added in derision of his youth and his weak intellect) as a puppet upon the throne (476). Dissatisfied with their reward, the barbarians, under Odoacer, overcame and slew Orestes. Augustulus, deprived of his sovereignty, retired to Naples.

Augustus (63 B.C.-14 A.D.), the first and greatest—unless Julius Cæsar is reckoned—of the emperors of Rome, was the son of C. Octavius, by Atia, daughter of Julia, the sister of Julius Cæsar, who adopted him. His name before adoption was C. Octavius; afterwards it was Gaius Julius Cæsar Octavianus, the title Augustus ('the revered') being added by the senate and people in 27 B.C. Augustus was studying at Apollonia, in 44 B.C., when the news of the murder of Cæsar reached him. Proceeding to Rome, at first he professed adherence to the republican party, and fought against Antony at Mutina, along with the consuls Hirtius and Pansa. Antony fled across the Alps, and both the consuls fell in the battle. Augustus, on his return to Rome, compelled the senate to support his election to the consulship. He then proceeded against Antony, but was reconciled to him by Lepidus; and the three formed the second triumvirate, which was to last for five years. They proscribed all their enemies, massacring them and confiscating their property, to the number of over 2,000 knights and 300 senators, including Cicero. In 42 B.C. Augustus and Antony defeated Brutus and Cassius at Philippi, thus destroying the hopes of the republican party. Returning to Italy (B.C. 41), Augustus had to wage war with L. Antonius, brother, and Fulvia, wife, of the triumvir. The capture of Perusia decided the contest favourably for him. Antony now threatened him, but, thanks to Fulvia's death, a reconciliation was effected between them at Brundusium. Antony then took the east, Augustus the west of the empire, and Lepidus Africa. In 36 B.C. Augustus put down the power of Sextus Pompeius, son of Pompey the Great, who had for years held Sicily with a powerful fleet, and deposed Lepidus, whom he allowed to live at Rome as *pontifex maximus* ('chief priest'). Meanwhile Antony's repudiation of Octavia his wife, Augustus's sister, led to the decisive struggle for supreme power, which was ended by Augustus's victory at Actium (Sept. 31). Next year he went to Egypt, and the death of Antony and Cleopatra left him undisputed master of the Roman world. In 29 B.C. he returned to Rome, and held a triple triumph. He proposed, in 27, to lay down his extraordinary powers; but the senate prevailed on him to accept them for ten years longer, and this plan was repeated more than once. His last years were clouded by the defeat of Varus in Germany in 9 A.D.

Though Augustus was really an absolute monarch, he appeared to preserve the republican constitution. In the *Monumentum Ancyranum*—his own record of his achievements—he claims to have held extraordinary power only by will of the people until the empire was reduced to order, and then (in 27) to have restored the old constitution. And this claim was justified; for though he held the consulship eleven times, his authority really depended on wider powers conferred on him without a definite office—the *imperium proconsulare* ('command of a proconsul'), unlimited in time or place, which made him supreme over all other provincial governors; and the *tribunitia potestas* ('power of a tribune'), which, given for life, enabled him to call the senate, initiate legislation, and control politics in Rome. His reform of provincial government was his best title to fame: he regulated taxation, restored justice, and gave peace and order to the Roman world. Augustus did not aim to extend the empire, but to secure it within its natural boundaries—the Atlantic on the west, the Sahara on the south, the Euphrates on the east, the Danube and Rhine on the north. Rome was greatly embellished under his rule: he boasted that he found Rome made of brick, and left it built of marble. Literature was much encouraged by his patronage: Horace, Virgil, Livy, and other writers of the 'Augustan age,' were assisted by the emperor's advice and reward. He owed much to his assistants, Agrippa in action, Mæcenas in counsel. The dominant note of his character is a studied moderation.

Ancient authorities: Cicero's *Letters and Philippics;* Tacitus's *Annals*, bk. i.; Suetonius's *Augustus;* Plutarch's *Antonius; Dion Cassius*, bks. xlv.-lvi.; *Velleius Paterculus*, bk. ii. See Beulé's and Gardthausen's *Life of Augustus*, Baring-Gould's *Tragedy of the Cæsars*, and Shuckburgh's *Life of Augustus.*

Augustus, elector of Saxony (1526-86), born at Freiburg, was brought up at Prague a Calvinist, in intimate friendship with Maximilian, afterwards emperor of Germany. Having married the Lutheran Anna of Denmark (1548), he became a staunch Lutheran, and on succeeding his brother Maurice (1553) he persecuted the Calvinists. He was mainly instrumental in negotiating the peace of Augsburg (1555), and showed great and enduring activity as an organizer of the legal institutions of his country.

Augustus II., FREDERICK, THE STRONG, elector of Saxony and king of Poland (1670-1733), second son of John George III. of Saxony, was born at Dresden, and succeeded his brother, John George IV., as elector in 1694. He was elected king of Poland in 1697, becoming a convert to Roman Catholicism in order to obtain election. Joining Peter the Great and Denmark against Charles XII. of Sweden, he invaded Livonia (1699), but suffered defeat at Riga (1701) and Klissow (1702). He was deposed by Charles XII. from the Polish throne in favour of Stanislaus Leszcynski, but after the defeat of Charles at Pultowa (1709) was reinstated, and renewed the war (1710-19) with Sweden. He had various mistresses, among them Aurora von Königsmarck; and among his many illegitimate children was Marshal Saxe.

Augustus III., FREDERICK, elector of Saxony (1696-1763), son of the preceding, was born at Dresden. Succeeding his father (1733), he was chosen king of Poland (1734) by a party of the Diet, prevailing over Stanislaus. He was embroiled in the three Silesian wars, siding in the first with Prussia; in the second and third, through jealousy of the power of Prussia, with Austria. In the second (1745) Dresden was occupied by Frederick the Great, through the defeat of Augustus and his ally Maria Theresa; in the third (the Seven Years' war, 1756-63) he escaped to Poland, returning after the peace of Hubertsburg in 1763. He was a patron of music and painting.

Auks, or ALCIDÆ, a family of marine birds with heavy bodies, large heads, and compact plumage. The wings are always short, and the great auk, or garefowl, now extinct, was flightless. From the position of the feet, the gait on land is clumsy; but the auks are expert at swimming and diving, rarely leaving the sea except for breeding purposes. See GAREFOWL.

Aulapolai. See ALLEPPI.

Aula Regia, or REGIS, a court instituted by William the Conqueror, formed of the great officers of state, and afterwards regulated by Magna Charta.

'Auld Lichts.' See PRESBYTERIAN CHURCH.

Aulic Council. The Emperor Maximilian, in 1501, set up in Vienna the Aulic Council. Though at first it dealt only with Austrian business, the Aulic Council gradually encroached upon the Imperial Chamber and usurped many of its functions. With the dissolution of the empire in 1806, the term Aulic Council was applied to the emperor of Austria's council of state.

Aulie-Ata ('Holy Father'), tn. on r. bk. of the Syr Daria, Russian Turkestan; pop. (1897) 12,006, mostly Kirghiz. It was taken by the Russians, July 3, 1864.

Aulis, seapt. in Bœotia, Greece, on the Euripus.

Aullagas, LAKE. See TITICACA.

Aulnoy. See D'AULNOY.

Aumale. (**1.**) The anc. *Albemarle*, dist. tn. of France, dep. of Seine-Inférieure, on the Bresle, 37 m. N.E. of Rouen. Cloth, leather, and steel; mineral spring. Pop. (1901) 2,383. (**2.**) The anc. *Auzia*, military post, Algeria, 80 m. S.E. of Algiers; has many Roman remains. Pop. (1901) 5,203.

Aumale, COUNT AND DUKE OF. The former title was granted by William the Conqueror to Eudes, son of Henri Etienne, count of Troyes and Meaux, in the 11th century. The male line of this family terminated with the third generation, when the title passed by marriage to the family of Castille. Confiscated by Philippe Auguste (1194), it was granted in the 13th century to Simon de Dammartin, count of Ponthieu, and passed by marriage to the house of Lorraine (1417). The countship was made into a duchy (1547) by Henry II. in favour of François de Lorraine, who ceded it to his brother, Claude de Lorraine. In 1618 it passed to the house of Savoy by the marriage of Anne de Lorraine with Henry of Savoy, and in 1675 was bought by Louis XIV. and given to Louis Auguste de Bourbon. In 1679 it passed by marriage to the house of Orleans, the fourth son of Louis Philippe bearing the title.

Aumale. (**1.**) CHARLES DE LORRAINE, DUC D'AUMALE (1554-1631), the last of the old dukes, was a prominent member of the Holy League, instituted by the Duke of Guise (1576). Defeated at Senlis by the Duc de Longueville, and at Arques (1589) and Ivry (1590) by Henry IV., he fled to Spain, was condemned to death in absence, and lived abroad till his death at Brussels. (**2.**) HENRI EUGÈNE PHILIPPE LOUIS D'ORLEANS, DUC D' (1822-97), fourth son of Louis Philippe, was born in Paris. He served in the army of Algeria (1840-7), of which province he became governor-general in 1847. After a year in office he retired, as the result of the revolution of 1848, and lived in England. He devoted himself to literature, mainly military and historical, his chief works being *Les Institutions militaires de la France* (1867) and the *Histoire des Princes de Condé* (1869). In 1871 he returned to France, and became a member of the Assembly and of the Academy (1871). Expelled in 1886, he was permitted to return in 1889, having in 1886 handed over his château at Chantilly to the Institut de France. See E. Daudet's *Le Duc d'Aumale* (1898).

Aune, an old European cloth measure corresponding to the English ell, varying between 27 and 54 in. It survives in Switzerland, where the aune is 47¼ in.

Aungerville, RICHARD (1281-1345), called also RICHARD DE BURY, from his birthplace, Bury St. Edmunds; tutor to the Prince of Wales, afterwards Edward III.; became bishop of Durham (1333), lord high chancellor (1334), and treasurer (1337). Having acted as ambassador to France, Germany, Hainault, and to the Pope, he gained a wide knowledge of European literature, and corresponded with Petrarch. He was an ardent book collector, and founded a library in connection with Durham College, Oxford. *Philobiblon* is his chief work (1473); ed. by E. C. Thomas, 1902.

Aura, any strange sensation which gives warning of the approach of an epileptic or a hysterical fit. It often resembles a breath of cold air moving up the body to the head; whence the name.

Aural Diseases. See EAR.

Aurantiaceæ, a family of plants classed by Lindley in his Rutales, or Rutal Alliance; mostly semi-tropical trees and shrubs, in number ninety-five, nearly all from India. The typical genus is Citrus, the species including orange, lemon, lime, citron, bael-fruit, wampee, and shaddock.

Auray, tn., dep. Morbihan, France, 3 m. from the sea (Bay of Morbihan), 11 m. W. of Vannes; corn, butter, honey, cloth, cattle. '*Le Pardon d'Auray*' gathers yearly thousands of Bretons round the Chapel of St. Anne. In 1364 the Anglo-Breton army defeated the French under Duguesclin, who was taken prisoner. Pop. (1901) 6,485.

Aurelianu, PETRU, Roumanian statesman, born in 1833; entered public life (1876), in which he has taken a leading part; prime minister (1896-7). Is also a notable economist. Chief work, *Tara Noastra* (1876; new ed. 1888). In 1868 he founded the journal *Economia rurala la Romanii*.

Aurelianus, emperor of Rome from 270 to 275 A.D., was born of humble parents, probably at Sirmium, in Pannonia, c. 212. Elected by the army to succeed Claudius II., he defeated the Goths and Vandals, who had crossed the Danube, and repelled a German invasion of Italy. In the east he overcame (271) Zenobia, queen of Palmyra, and brought her captive to Rome. Next he recovered Gaul, Spain, and Britain from the usurper Tetricus. He fortified Rome with a new line of walls, and, abandoning Dacia, made the Danube the frontier of the empire. He was murdered by his officers while preparing an expedition against Persia.

Aurelian Wall, the wall which the Emperor Aurelian built round Rome in 271 A.D., though it was completed by Probus in 280. It had a circuit of over 12 m., and was pierced by fourteen gates. It was built of concrete, with brick facing, and was 12 ft. thick. Its height varied according to the contour of the ground, but in some places it was as much as 60 ft. high, and was provided at regular intervals of 45 ft. with massive square towers. A great part of it still exists in a more or less perfect state—*e.g.* near the Porta Appia. See J. H. Middleton's *Remains of Ancient Rome* (1892); Burn's *Rome and the Campagna* (1870); Quarenghi's *Le Mura di Roma* (1880).

Aurelian Way (*Aurelia Via*), one of the principal ancient roads of Italy, which, starting from Rome near the Janiculan gate, ran northwards along the west coast, passing through Centumcellæ (Civita Vecchia), Pisa, Genoa, to Antipolis (Antibes) in Gallia. The part north of Pisa was constructed by Augustus.

Aurelius, MARCUS (121-180 A.D.), Stoic and Roman emperor, whose birth-name was M. Annius Verus, was born at Rome. His father's sister, Faustina, married T. Antoninus Pius, the successor of Hadrian in the empire; and it was to Antoninus, 'that true unconscious humanist,' that he owed his highest example in rectitude and the duties of sovereignty. But the bent of his mind towards Stoic principles seems to have been fostered most by Junius Rusticus, to whom he owed his reading of Epictetus. In 138 he was adopted by his uncle, the Emperor Antoninus, taking on himself the new name of Marcus Aurelius Antoninus. With his deepening conversion to philosophy came also a growing Stoic abnegation of the pleasures of literature, although his connection with men of letters never entirely ceased. He succeeded to the throne in the year

161. The influence of the emperor's philosophy became apparent in the broader and more beneficent interpretation of Roman law: the rights of slaves were extended even to a share in an intestate master's property; the 'tutelary prætor' was created to safeguard orphans; and humanitarian foresight touched even the circus and the gladiatorial shows. In 166 the frontiers of Italy were menaced by northern barbarians. Aurelius first took the field in person in 167, and the uncongenial business of war occupied him almost continuously until the year 175. In 173 the Marcomanni were overwhelmed in their passage of the Danube. In the previous year Aurelius had won the title of 'Germanicus; in the succeeding one he added to it that of 'Sarmaticus.' Avidius Cassius, an able commander in the East, declared himself *imperator* in 175, but was murdered before the arrival of Aurelius. In Dec. 176 the emperor returned to Rome, where he was accorded a triumph. But the Marcomannic troubles breaking out afresh, he left again for the field in Aug. 178. The campaign was successful; but Aurelius died, either at Vienna or Sirmium, Mar. 17, 180. In the Piazza Colonna, on the Corso at Rome, stands a fine ancient monument (95 ft. high) to his memory. The emperor's twelve books, or rather short chapters, *τῶν εἰς ἑαυτὸν*, form one of the famous books of the world. They are the jottings of his lonely reflections in the moments snatched from rest or action during his campaigns—*Among the Quadi*, *At Carnutum*, etc. The *Thoughts* unite high nobility with complete sincerity and tenderness. The premises of stoicism M. Aurelius accepts more faithfully than was general among his contemporaries, and it is possible to trace in his *Thoughts* all its main doctrines—life according to nature, mastery of the inner self, God immanent in the cosmos, and the insignificance of the individual. But the enduring qualities of the book are owing rather to its human feeling—its wistfulness, its courage, and its call to duty.

M. Aurelius wrote in Greek—the accepted philosophical speech of his age—but hardly with perfect ease. The *Thoughts* were not pub[illegible] till 1558, when Xylander [illegible] at Zürich the first edition, [illegible] a MS. since lost. Some time previously (in 1529) the Spanish euphuist, Antonio de Guevara, had written his *Libro de Marco Aurelio*, a work based on the emperor's teaching; and Sir Thomas North's version of this, entitled *The Dial of Princes*, had a considerable vogue in England. But the first translation of Aurelius's own book into English was that of Meric Casaubon (1634); recent edition (1900) by W. H. D. Rousse. Jeremy Collier (1702) published a version, not without some merits; but the two standard modern translations are Long's (2nd ed. 1880) and G. H. Rendall's (1898), both with introductions, and the latter with a very careful study of Stoicism. Walter Pater has introduced M. Aurelius into his romance of *Marius the Epicurean*, and the book is valuable as an attempt to give the atmosphere of the time. See also Renan's *Marcus Aurelius* (*Origins of Christianity*, bk. vii.), Eng. trans. (1888), and M. Arnold's *Essays in Criticism*.

Aureole, a radiance or luminous cloud surrounding the body of Christ, the Virgin Mary, or the saints, in sacred art, emblematic of the influence of the Holy Spirit. When merely a luminous circle surrounds the head, it is termed a *nimbus;* the combination of both is termed a *glory*. A symbol of Egyptian origin adopted by the Christians of the 5th century.

Aures Mountains (the *Mons Aurasius* of Procope), a range in S. Algeria, about 75 m. in length, overhanging the Sahara, and enclosing fertile valleys and plains. Its inhabitants, the Shawia, are Berbers; their customs betray a Christian ancestry. The highest peaks in the range are Shelia (7,600 ft.) and Mahmel, which is nearly as high. The moufflon is still hunted. See Masquéray's *De Aurasio Monte* (1886); Fallot's '*Etude sur les Monts Aurès*' (in *Bull. Soc. Geogr. Marseilles*, 1886).

Aureus (Lat. *aurum*, 'gold'), the first and standard Roman gold coin, issued tentatively about B.C. 217, and afterwards permanently by Julius Cæsar and the Roman emperors, until Constantine substituted for it the *solidus* = 100 sesterces or 25 denarii.

Aurich, tn., dist. Aurich, prov. Hanover, Prussia, 18 m. by rail N.E. of Emden, the capital of E. Friesland, having in the vicinity the Upstallsboom, or 'judgment tree' and 'tree of assembly' of the ancient Frisians. Here an important horse fair is held in February. Pop. (1900) 6,013.

Auricle. See HEART and EAR.

Auricula. See PRIMULACEÆ.

Auriga (Lat. 'the Charioteer'), an ancient constellation, situated between Perseus and Taurus, the principal stars of which never set to the British Isles. (See CAPELLA.) There is little doubt of its Euphratean origin. About five degrees south-west of Capella are ζ and η Aurigæ, known to Hipparchus and Ptolemy as the 'Kids.' Their heliacal rising in October was supposed by the Romans to portend stormy weather. Virgil mentions them (*Æneid*, ix. 668) as *pluviales Hœdi*, and Horace (*Od.*, vii. v. 6) as *insana sidera*. A white star of the second magnitude, β Aurigæ, marking the right shoulder of the Charioteer, was discovered by Miss Maury, in 1889, to be a spectroscopic binary revolving in four days. Similar evidence of circulatory motion was derived by Professor Vogel, in 1902, from spectrographs of ε Aurigæ, a star varying irregularly from 3·0 to 4·5 magnitude. A temporary star near χ Aurigæ, which rose to 4·4 magnitude in December 1891, gave a remarkable spectrum of bright and dark lines, indicative of violent disturbance. Nova Aurigæ is still discernible with powerful telescopes. It is situated in the Milky Way. Three clusters, Messier 36, 37, and 38, are collected in the same neighbourhood, the last resembling in shape an oblique cross, while Messier 37 is Admiral Smyth's 'gold-dust' cluster.

Aurigny, the French name of Alderney, used by Macaulay in his *Armada*.

Aurillac, tn., cap. of dep. Cantal, France, on the S.W. slopes of Mt. Cantal, at alt. of 2,040 ft., 270 m. S.W. of Paris. The church of St. Géraud, partly 15th century, and an old castle, now normal school, are the chief buildings. There are some printing, silversmith, and coppersmith industries. An abbey was founded here in 900. Birthplace of Pope Sylvester II. Pop. (1901) 17,459.

Aurispa, GIOVANNI (c. 1369-1459), Italian scholar who visited Constantinople to study Greek; returned with a large collection of manuscripts of ancient Greek writers, most of which he translated.

Aurlandsfjord. See SOGNEFJORD.

Aurochs (Lat. *urus*, 'wild ox'), the German name for a common species of European wild ox still existing in Lithuania, where it is strictly protected by law. See BISON.

Aurora (Gr. *Eos*), goddess of the dawn, daughter of Hyperion and Thia. Every morning she rose from her couch to announce the coming of the sun, in a chariot drawn by swift horses. She loved several mortals, among others Cephalus, Orion, and Tithonus. Memnon was her son by Tithonus.

Aurora, city, Kane co., Illinois, U.S.A., on the Fox R., 40 m. W. of Chicago. Pop. (1900) 24,147.

Aurora Borealis, or NORTHERN LIGHTS, is a luminous meteor of great beauty which is seen in the northern sky, taking the form of streamers, arches, or patches, which vary in shade considerably, being sometimes smoky black or steel gray, and at others brilliant yellow, green, violet, or fiery red. As usually seen, the aurora commences with the formation of an arch with its apex to the magnetic meridian, the arch being usually better defined on the lower than on the upper side. Underneath the arch the sky is apparently darker than the rest of the heavens, this gloomy portion being known as 'the dark segment;' stars are visible through this part of the sky as well as through the aurora itself. Slender streamers of well-defined bright light extend up from the arch usually to a distance of from 20 to 30 degrees, towards the magnetic zenith. In width they vary from half a degree to three degrees, and move a degree from one side to another. To the Shetlanders they are known as the merry-dancers. The arch is sometimes evenly illuminated, but is at times convoluted like a folded curtain. Sometimes the sky is entirely covered with brilliant coruscations shooting up from the horizon, converging in a quivering blaze of feathery flame high in the sky, nearly in the direction shown by the south end of a magnetic dipping-needle. This is known as the corona. The arch has been observed after formation to move slowly away from the direction of the belt of greatest frequency. Its apparent breadth diminishes on approaching the coronal point, the streamers making a more and more acute angle with the arch until they unite with it where it meets the coronal point. The arch is supposed to be like a sheet suspended nearly vertically, the rays and streamers being parallel, their apparent divergence from the coronal point being due to perspective. Auroral displays are most frequent and brilliant in relatively high latitudes. In America, according to Professor Loomis, the zone of maximum frequency is between lat. 50° and 60° N.; but in Europe and Asia the region of greatest frequency lies between the parallels of 66° and 75°. The aurora is most common in an oval belt which surrounds the pole, closely coinciding with the line of equal dip. The belt of greatest frequency begins close to the shores of the Arctic Ocean, from the North Cape east to Point Barrow, thence south, passing through Hudson Bay in lat. 60°, then south of Greenland, and obliquely north again between the Faroe Is. and Iceland. In the zone of maximum frequency over eighty auroras are seen annually. In America there are visible in a year, at lat. 40°, ten auroras; at lat. 42°, twenty; at lat. 45°, forty; and at lat. 50°, eighty. Betwixt lat. 50° and 60° they are visible almost every clear night. North and south of these latitudes the aurora is less common. In the torrid zone it is rarely observed, not more than six auroras in a century being seen as far south as lat. 20°. In London two auroras are seen annually; in Edinburgh, four—displays being much more frequent, latitude for latitude, in America than in Europe. Auroras are at times seen simultaneously over large tracts of the world, from Russia to California, and from Jamaica to Labrador, such a display being that of October 1870. Professor Loomis is of opinion that a display of aurora in the vicinity of the north magnetic pole is regularly attended by a simultaneous display round the south magnetic pole. Messrs. De la Rue and Müller have established the connection between the colour of electrical discharges and the potential, from which the height of the aurora may be approximately determined. Using a battery of 11,000 cells, they find that the colour of the discharge with the same potential varies greatly with the tenuity of the gas or air. At a pressure corresponding to 11·6 m. the discharge is of a full red colour; at a pressure corresponding to a height of 12·4 m. the discharge assumes the carmine tint so frequently observed; at a pressure corresponding to 30·9 m. the discharge becomes salmon-coloured, which at a height of 34 m. becomes of a paler hue, changing as pressure is lowered to a pale milky white. The roseate and the salmon-coloured tints are always close to the positive source of the electric current. At the magnetic terminal in air the discharge is always of a violet hue, and this colour in the aurora is due to the proximity of the negative source. From those researches the authors concluded that the aurora may appear at altitudes as low as a few thousand feet, or as high as 80 or 100 m. (See *Proc. Roy. Soc.*, vol. xxx. p. 382.) From observations taken in the Arctic regions during the long polar nights, it has been found that the aurora is more frequent in the nocturnal than in the diurnal hours, but in middle latitudes the maximum is reached earlier in the evening. The annual period is well marked, there being two maxima and two minima, which vary slightly in different localities. Auroras are of frequent occurrence in October and April, and rare in December and June. From observations made in London for 189 years, in Edinburgh for 81 years, and in the north-east of Scotland for 122 years, it is found that the primary maximum occurs in October at all three places. The time of the secondary maximum, on the other hand, does not coincide in the three localities, but occurs in the north-east of Scotland in February, in Edinburgh in March, while in London and Paris the spring maximum is retarded until April. In Sweden the maximum occurs in March, while in the Polar regions January is the time of greatest auroral activity. The following table shows the monthly percentage frequency of auroras for three places in the British Isles where observations have been taken for a long period. The returns from the north-east of Scotland are from Culloden, Aberdeen, and Gordon Castle.

	N.E. of Scotland. 122 Years.	Edinburgh. 81 Years.	London. 189 Years.	Mean. 131 Years.
Jan.	10·9	10·0	8·6	9·8
Feb.	12·7	12·3	10·5	11·8
Mar.	12·0	13·9	10·2	12·0
Apr.	7·1	9·0	10·7	8·9
May.	2·2	3·6	4·0	3·3
June.	0·0	0·3	1·1	0·5
July.	0·4	1·8	1·9	1·4
Aug.	4·4	6·4	5·6	5·5
Sept.	12·9	12·3	14·5	13·2
Oct.	15·8	13·9	16·9	15·5
Nov.	12·0	11·7	9·6	11·1
Dec.	9·6	4·8	6·4	6·9

The diminished frequency of auroral displays from October to December is well marked at all the stations, as is the effect of the longer night in the south at the time of the summer solstice—the percentage frequency for May, June, and July rising from 2·6 in the north-east of Scotland to 5·7 in Edinburgh, 7·0 in London, and to 15 per cent. in Paris. (See Mossman on the 'Aurora Borealis in London from 1707 to 1895,' in *Jour. Scot. Met. Soc.*, vol. xi. p. 59.)

The generally received theory is that the aurora is due to the ascent of positive electricity from the intertropical water surfaces, which flows towards the poles, wafted by the higher aerial currents. In the region of the poles it descends towards the earth, and comes in contact, in a highly-rarefied atmosphere, with the terrestrial negative electricity, which results in luminous discharges of great brilliancy. Intimate relations exist between sun spots, magnetic storms, and auroras, the appearance of a large spot on the solar disc being almost invariably accompanied by a magnetic storm in all parts of the globe. During magnetic storms auroral displays usually take place, but not all auroras are coincident with magnetic disturbances. The principal feature of the spectrum of the aurora is a yellow line close to the sodium line, similar to the air line seen in the spectrum of sunlight when the sun is close to the horizon.

The **Aurora Australis**, which is the name applied to auroral displays seen in the southern hemisphere, differs in no striking feature from the Northern Lights. See text-books of meteorology, and *The Polar Aurora*, by M. Angot (Inter. Scientific Series, 1896).

Aurungabad, tn. in the state of Haidarabad (Deccan), India, 67 m. N.E. of Ahmednagar. Contains the ruins of a palace built by Aurungzebe, and the mausoleum of a favourite daughter. There are caves, partly Buddhist, 1 m. W. of the town.

Aurungzebe, Mohammed Muhi ed-Din Aurungzeb Alamgir (1618-1707), ascended the throne of Delhi in 1658, when he put to death his two brothers, Dara and Murad Baksh, drove his third brother, Shuja, into exile, and imprisoned his father, the Emperor Shah Jehan, for the rest of his life. Once firmly seated on the throne, Aurungzebe, under the cloak of piety, as a strict Mohammedan, persecuted the Hindus, and alienated his non-Moslem subjects. His reign has been regarded as the most brilliant period of the Mogul domination; but the animosity aroused by his persecutions, and the successful raids of Sevaji, the Mahratta chief, sapped the foundations of the empire. Nevertheless he subdued Bijapur and Golconda. See Dryden's *Aurungzebe* (1876); S. L. Poole's *Aurangzib* (1893).

Auscultation, in medical practice listening to the sounds (especially respiratory and cardiac) of the body, with a view to diagnosis. It was introduced regularly into practice by Laënnec in 1816.

Ausgleich, or compromise between Austria and Hungary, is the name of the agreement which regulates and governs the financial relations between the two. It determines the contribution of each to the common expenditure of the empire, the quota of the national debt which falls to each, and the fiscal and commercial relations between them. It was first concluded in 1867 for a period of ten years, and was afterwards renewed in 1878, 1887, and 1902.

Ausonius, called Decimus Magnus, one of the latest Latin poets; born after 300 A.D., and died after 388 A.D. He was born at Bordeaux, where he practised at the bar until he reached the age of thirty, when he became a teacher of rhetoric, and was tutor to Gratian, son of Valentinian. From the latter he received the title of count and the quæstorship, and after his death Gratian made him prefect of Latium, Libya, and Gaul, and finally consul in 379 A.D. A number of his works survive, of which the *Mosella*, on the river of that name, is the most interesting. Eds.: Text—Peiper (1886), Scheubl (1883); the *Mosella* only, with notes and Fr. trans. De la Ville de Mirmont (1889).

Auspex, See Augur.

Aussee, tn. and summer resort in N.W. of Styria, Austria, beautifully situated on the Traun; has saline waters, a hydropathic, and salt works. Pop. (1900) 1,566.

Aussig, tn., Bohemia, Austria, on the Elbe, 66 m. by rail N. by W. of Prague; dress stuffs, chemicals, glass, machinery, oils. There are large lignite mines in the vicinity. Aussig is the birthplace of the painter Raphael Mengs. Pop. (1900) 37,255.

Austen, Charles John, British rear-admiral (1779-1852), brother of the two following, was present at the capture of the *Komeet*, *Tribune*, and *Ville de Lorient*. In the *Endymion* he assisted in the capture of the *Scipio*. In 1816 he was wrecked in the *Phœnix*. Between 1826 and 1828 he commanded the *Aurora* in the W. Indies, suppressing the slave trade. In the *Bellerophon* he took part in the bombardment of St. Jean d'Acre (1840). Promoted rear-admiral in 1844.

Austen, Sir Francis William (1774-1865), British admiral of the fleet, in the *Petrel* captured the *Ligurienne* and drove ashore two other vessels in 1800, and afterwards served in the Egyptian operations of 1801. He commanded the *Canopus* at the battle of San Domingo in 1806. In the American war, while commanding the *Elephant* in the Baltic, he captured the privateer *Swordfish*. He was made admiral (1848), and admiral of the fleet (1863). He was brother of Jane Austen, the novelist.

Jane Austen.

Austen, Jane (1775-1817), English novelist, was born at Steventon in Hampshire. The Austens remained at Steventon until 1801, when Jane was twenty-five. Jane acted as housekeeper for the family. Her favourite reading was in Richardson, Cowper, *The Spectator*, and Crabbe. Her first serious literary exercise began when she was about seventeen. It took the form of a story in letters, called *Elinor and Marianne*. This, when finished, she put away for a while. Her next effort was a story, to which she gave the title *First Impressions*; but meeting, it is conjectured, the phrase 'pride and prejudice' in Fanny Burney's *Cecilia*, she altered it to that. The novel was finished in 1797, having taken ten months; was offered to Cadell, and rejected. *Elinor and Marianne* was then taken in hand again, rewritten, and renamed *Sense and Sensibility*. This was again put away, and *Northanger Abbey* (usually pronounced Northhanger) was begun, in 1798. The new work was a departure, being at first frankly a travesty of the school of Mrs. Radcliffe, whose *Mysteries of Udolpho* was in every one's hands, and also of a certain type of sentimental love story then prevalent; but as the story proceeded the human interest deepened, and fortunately elbowed out the original ironical purpose. *Northanger Abbey* was sold to a Bath bookseller for £10 in 1803, but was not published. Thus ended the first period of Miss Austen's literary career. The family lived at Bath from 1801 till 1805, when Mr. Austen died; they then moved to Southampton until 1809, and then to Chawton, near Alton. During this period Miss Austen seems to have written only the fragment known as *The Watsons*; but at Chawton the second writing period of her life began. Her first care was to revise *Sense and Sensibility* and *Pride and Prejudice* (which were published, anonymously, in 1811 and 1813 respectively), and to get back *Northanger Abbey* from its purchaser, and to revise that. She also wrote three new novels—*Mansfield Park*, published in 1814; *Emma*, 1816; and *Persuasion*, published posthumously, with *Northanger Abbey*, in 1818, with a memoir prefixed, and the author's name for the first time on a title-page. These six stories, with a shorter tale in letters, called *Lady Susan*, and the fragment already referred to, constitute Jane Austen's entire contribution to English literature. Macaulay said that in the minute delineation of shades of character she came nigh Shakespeare; and Tennyson made a similar criticism. Scott said, 'That young lady had a talent for describing the involvements, and feelings, and characters of ordinary life which is to me the most wonderful I ever met with;' and he referred to her possession of 'the exquisite touch which renders ordinary commonplace things and characters interesting.' These encomiums omit reference to Miss Austen's humour, which lends to her stories a subacid flavour for which, by many readers, they are as much valued as for their analysis of the tender passion and emotion. Of all Jane Austen's novels, the earliest, *Pride and Prejudice*, is at once the most popular and the best. It has not the maturity of *Emma*, which vies with it for first place; but in steadiness of progress, in directness of purpose, in intensity of interest and quiet mischief, it excels. Jane Austen was buried in Winchester Cathedral. Good editions of her works were published in 1896 (ed. by Austin Dobson), 1898, 1899, and 1902. In addition to the memoir by Austen Leigh (2nd ed. 1871), and the *Letters*, ed. by Lord Brabourne (1884), there are monographs by Goldwin Smith (1890), Mrs. Ch. Malden (1889), Sarah Tytler (1880), Walter Herries Pollock (1900), Constance Hill (1900), H. C. Beeching (1903); and see Howell's *Heroines of Fiction* (1902).

Auster, called *Notus* by the Greeks, the south or rather southwest wind, which was usually wet, but at certain seasons dry and unhealthy; the modern Italian sirocco.

Austerlitz, tn., Moravia, Austria, 13 m. by rail S.E. of Brünn; the scene of the great battle in which Napoleon defeated the Austrians and Russians on Dec. 2, 1805, and concluded the armistice of Austerlitz on Dec. 6. Pop. (1900) 3,145.

Austin, city, Texas, U.S.A., the co. seat of Travis co. and cap. of the state, on the E. bk. of the Colorado R. The capitol is one of the finest state buildings in the country. It was built at a cost of over three million dollars, in exchange for three million acres of state land. Austin is the seat of the state university. Pop. (1900) 22,258.

Austin, ALFRED (1835), poet laureate of England, was born at Headingley, near Leeds, and was called to the bar in 1857. On the death of his father (1861) he abandoned law for journalism and literature. His first publication was *Randolph: a Tale of Polish Grief* (1854), followed by the much-criticised volume, *The Season: a Satire* (1861), and its sequel, entitled *My Satire and its Censors*, in the same year. Since that date he has written—in addition to several novels—numerous volumes of verse, including *The Human Tragedy* (1862; new ed. 1889), *Savonarola* (1881), *Soliloquies* (1882), *English Lyrics* (1890), *Prince Lucifer* (1887), *England's Darling* (1896), *The Conversion of Winckelmann, and other Poems* (1897), *Songs of England* (new ed. 1900). Among his prose works are *The Garden that I Love* (1894), *In Veronica's Garden* (1895), and *Lamia's Winter Quarters* (1898). As a journalist he has contributed to the Conservative press, notably the *Standard* newspaper (which he represented at Rome, and as correspondent during the Franco-German war), the *Quarterly Review*, and the *National Review*, of which he was for a time editor. In 1896 he was appointed poet laureate, in succession to Tennyson. A collected edition of his *Poems* appeared in 6 vols. (1892).

Alfred Austin, Poet Laureate.
(Photo by Elliot & Fry.)

Austin, CHARLES (1799-1874), English lawyer, younger brother of John (*q.v.*), was called to the bar (1827) and made Q.C. (1841). His career as a parliamentary lawyer was unprecedented. His income during the year of the railway mania was estimated at from £40,000 to £100,000. A brilliant conversationist, he exerted great influence over a brilliant group, which included Macaulay, Romilly, and Cockburn, at Cambridge. See *Fortnightly Review*, March 1895.

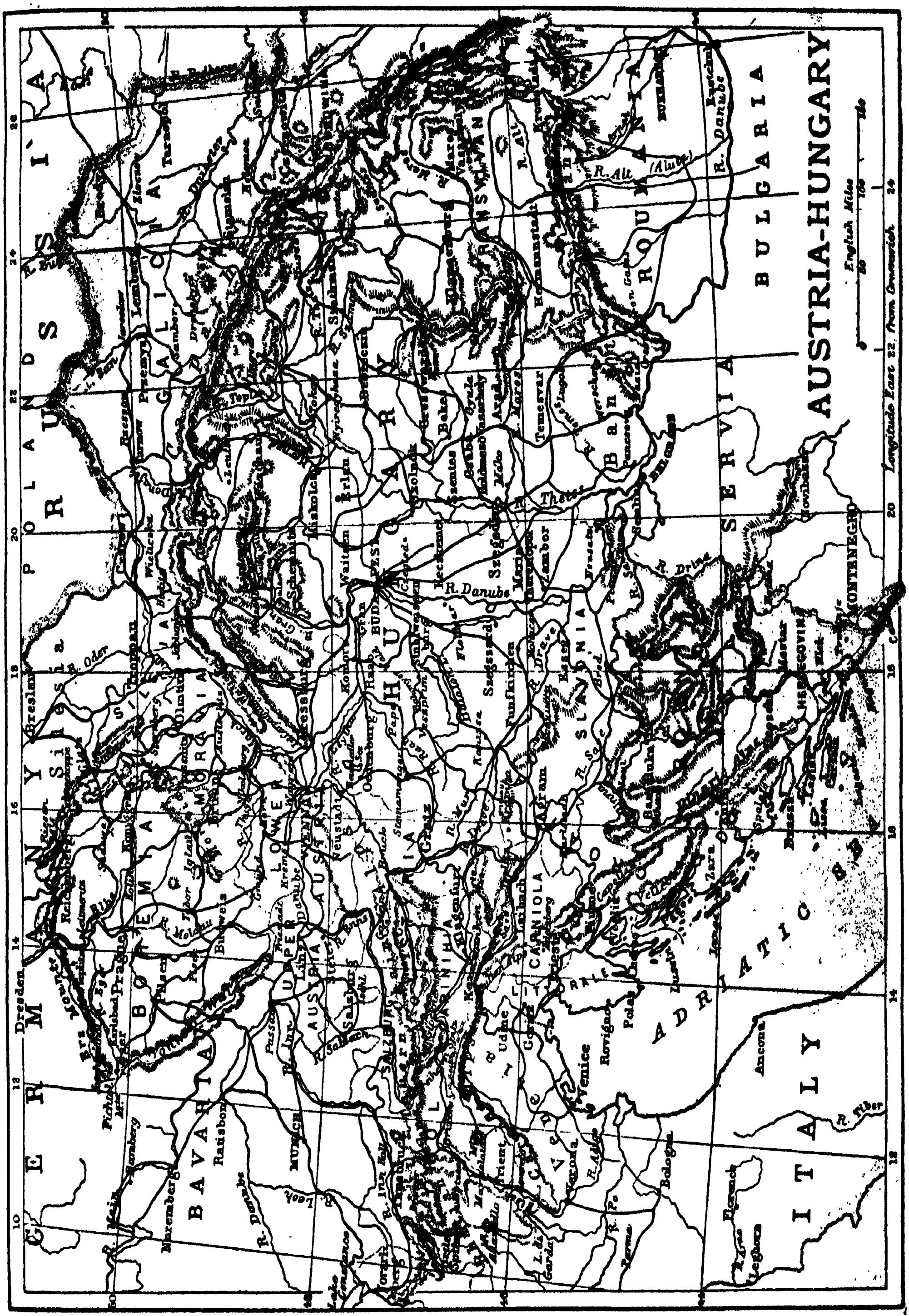
Austin, HORATIO THOMAS (1801-65), English explorer, accompanied Parry in his second expedition in search of a northwest passage. In 1850 he received command of four vessels dispatched in search of Franklin, when he explored from 800 to 900 miles of hitherto unknown coast. On his return he was made a vice-admiral.

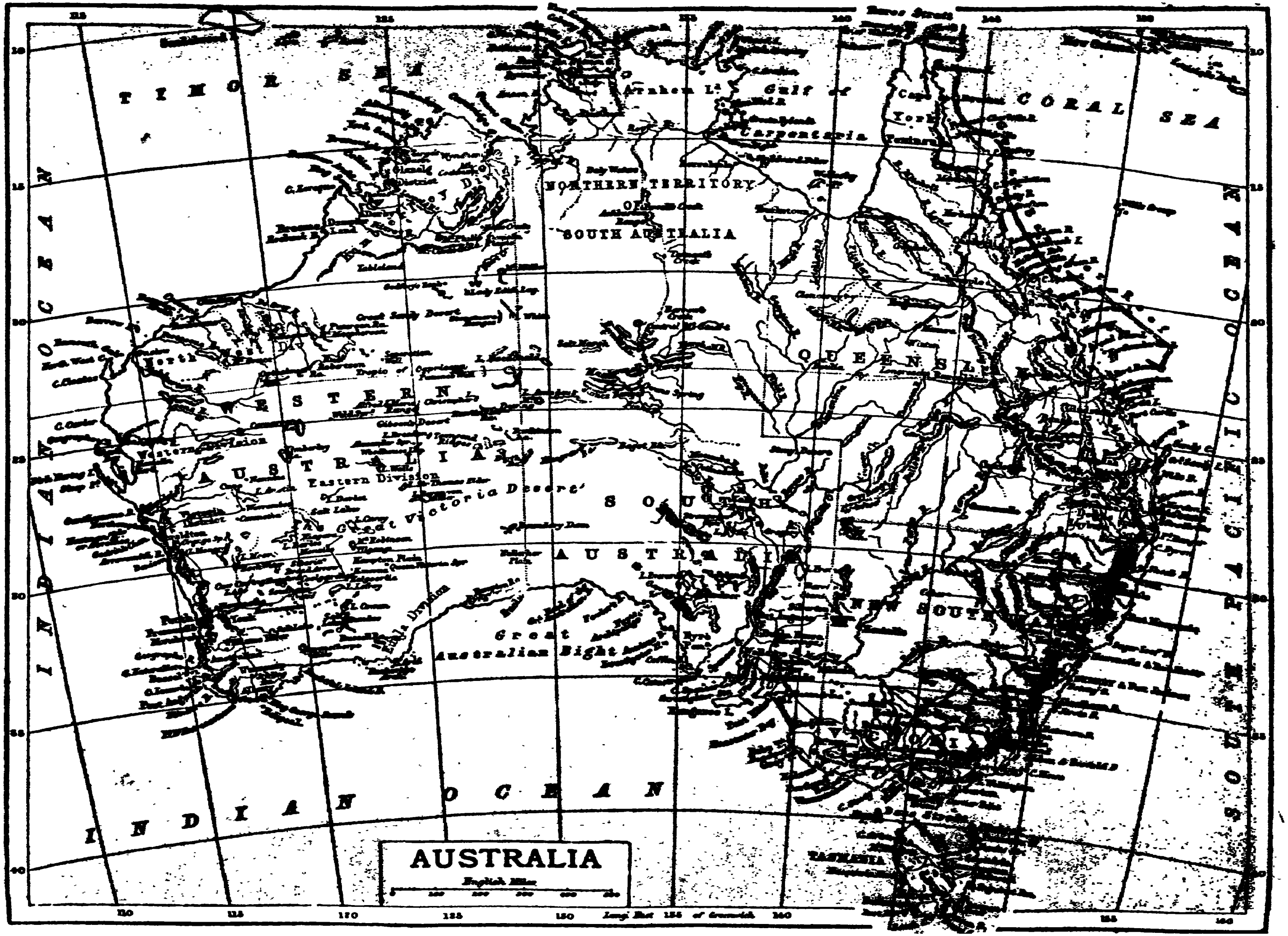
Austin, JOHN (1790-1859), the friend of Jeremy Bentham and John Stuart Mill, was the founder of the modern English school of analytical jurisprudence. He was appointed professor of jurisprudence (1826) in the newly-founded University of London, but in 1832 resigned his chair. He served on two royal commissions—one for the reform of the criminal law (in 1833), the other to examine the condition of Malta (in 1836). The latter may be regarded as his one practical success. But the real work of his life was the summary of his lectures on jurisprudence, the first part of which was published in 1832, and re-edited by his widow in 1861. Additions subsequently appeared, under the editorship of Austin's son-in-law, Mr. Robert Campbell; and the whole work now contains three parts—*The Province of Jurisprudence Determined*, *The Analysis of Pervading Notions*, and *The Arrangement of Law according to its Sources and Modes*. The first part expounds his much-debated philosophy of law, founded mainly on Hobbes and Locke, and reminiscent of Bentham, but without the depth of the older philosophers or the fecundity of the later. Essentially a Tory and a soldier, Austin bases the whole authority of law on physical force expressed in definite orders. His language is profuse and involved, but his ideas are simple, and therefore acceptable to ordinary minds, provided only that they can get through the shell of the language. The second part of the work is admirable and original, showing great acuteness and power of expression. The third part, despite certain obvious mistakes, is likewise suggestive and original. In a word, Austin was a jurist pure and simple, neither a politician nor a philosopher. His liberalism was an accident, and disappeared before the wild French revolution of 1849. His work was for at least two generations a standard textbook in the English universities, and still retains great traditional influence. See Sarah Austin's Preface to *The Province of Jurisprudence* (1861); J. S. Mill's *Autobiography* (1873-4).

Austin, JONATHAN LORING (1748-1826), born at Boston, Massachusetts. Entering the revolutionary army in 1775, he became secretary of the Massachusetts Board of War. After the British surrender at Saratoga he was sent to France (1777) as diplomatic agent of the United States, and afterwards to England on a secret service mission. In 1780 he again visited Europe, to secure loans for the state of Massachusetts.

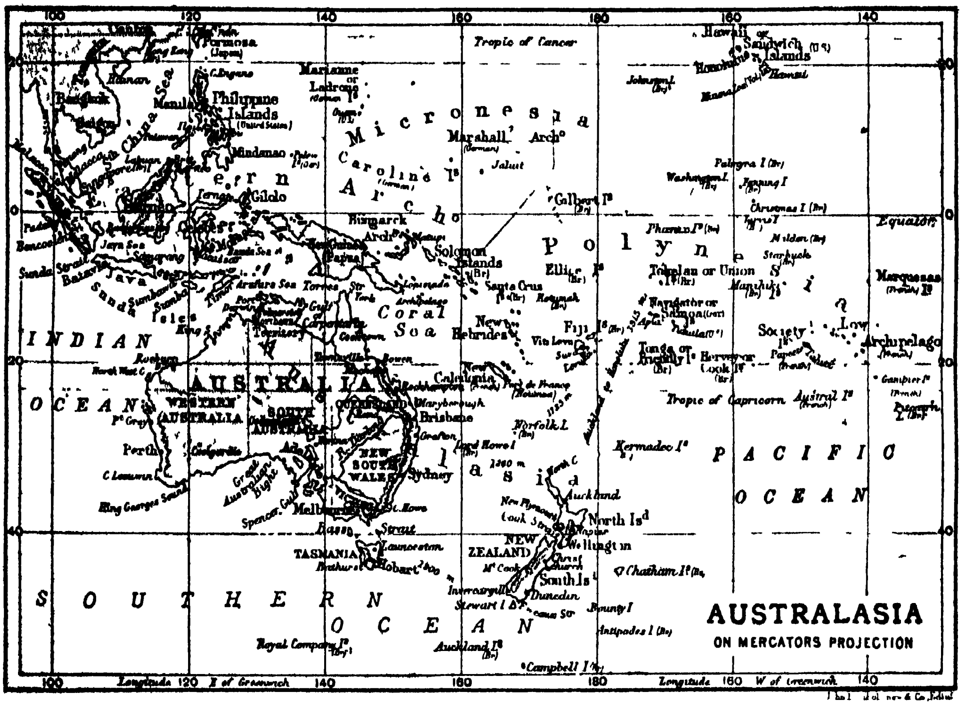
Austin, STEPHEN FULLER (1790-1836), the founder of Texas, was born in Virginia. He founded the city of Austin in 1821; and for his efforts to obtain the recognition of Texas as a separate state he was imprisoned for four months in Mexico in 1834. In 1835 he assisted General Houston in expelling the Mexicans from Texas.

Austin Friars, a monastery of Augustinians, on the north side of Broad Street, London, founded by the Earl of Hereford in 1253. The site is now occupied by a Dutch church.


AUSTRIA-HUNGARY
English Miles
Longitude East 22 from Greenwich
GERMANY
RUSSIA
POLAND
BAVARIA
BOHEMIA
MORAVIA
SILESIA
GALICIA
HUNGARY
TRANSYLVANIA
ROUMANIA
BULGARIA
SERVIA
SLAVONIA
CROATIA
CARNIOLA
CARINTHIA
TYROL
SALZBURG
UPPER AUSTRIA
LOWER AUSTRIA
STYRIA
BOSNIA
HERZEGOVINA
MONTENEGRO
DALMATIA
ADRIATIC
ITALY
VENICE
Dresden
Prague
Breslau
Vienna
Buda Pest
Munich
Ratisbon
Nuremberg
Lemberg
Cracow
Przemysl
Temesvar
Szegedin
Debreczin
Kaschau
Miskolcz
Agram
Laibach
Gratz
Linz
Trieste
Pola
Fiume
Zara
Udine
Verona
Trient
Bologna
Florence
Leghorn
Ancona
Rovigno
Innsbruck
Belgrade
Budweis
Olmutz
Iglau
Brunn
Pressburg
Komorn
Raab
Oedenburg
Kecskemet
Czernowitz
Hermannstadt
Kronstadt
Klausenburg
R. Danube
R. Oder
R. Elbe
R. Moldau
R. Drave
R. Save
R. Theiss
R. Maros
R. Alt (Aluta)
R. Drina
R. Inn
R. Po
R. Tiber
R. Dniester
R. Vistula
L. Balaton
L. di Garda
Lake Constance


AUSTRALIA
English Miles
TIMOR SEA
Arnhem Ld.
Gulf of Carpentaria
CORAL SEA
NORTHERN TERRITORY
OF SOUTH AUSTRALIA
QUEENSLAND
WESTERN AUSTRALIA
Western Division
Eastern Division
Great Victoria Desert
Great Sandy Desert
SOUTH AUSTRALIA
NEW SOUTH
VICTORIA
TASMANIA
Bass Strait
Great Australian Bight
Eucla Division
INDIAN OCEAN
SOUTH PACIFIC OCEAN
Long. East 135 of Greenwich
110
115
120
125
130
140
145
150
155
160
10
15
20
25
30
35
40

Australasia ('Southern Asia'), popular term, sometimes used to comprehend the Malay Archipelago, the Philippines, Australia, and all the islands of the Pacific; at others confined to the British possessions of Australia, Tasmania, and New Zealand, to which New Guinea and Fiji are sometimes added. As a geographical term it is best applied to the greater Australian region, which includes the islands of Australia, Tasmania, New Guinea, the Bismarck, Solomon, and New Hebrides archipelagoes, New Caledonia, and New Zealand. If all this region were above the sea-level, it would form a continent as large as N. America.



the E. by the Pacific. The coast-line is nearly 12,000 m. in length.

Configuration.—The western half of the continent is a table-land with a mean elevation of between 1,000 and 1,500 ft., culminating in heights which rise from 2,000 to over 3,000 ft., the highest being Mt. Bruce (3,800 ft.). In the S.W. are the Stirling Mts. (3,600 ft.). The western escarpment rises above a narrow coastal plain, and is known under various names—*e.g.* Darling Range. The central lowlands lie to the E. of the western table-lands. Few rivers cross these to the sea, except the Flinders in the N., and the Darling-Murray system in the S. Most of the rivers flow only after rain, and even then either feed vast shallow salt lakes or disappear in the desert. The largest of these rivers are the Diamentina and Barcoo or Cooper's Creek, from the eastern highlands, and the Finke, from the Macdonnell plateau, flowing into Lake Eyre. This lake consists of two parts, a larger N. sheet of water and a smaller S. one, both nearly 40 ft. below sea-level. Lakes Frome, Torrens, and Gairdner, similarly, are huge depressions filled with salt water after rains. The eastern highlands form undulating grassy downs in the W., gradually rising E. Three sections may be distinguished in them: the N., with Mt. Bartle Frere (5,440 ft.), near Cape Grafton, in N. Queensland; S. of the cape, with Mt. Lindsay (5,700 ft.) and Mt. Seaview (6,000 ft.); and beyond the S., comprising the Blue Mts., Australian Alps, Dividing Range, and Tasmanian Alps—Mt. Townsend (7,350 ft.), in the Kosciusko mass, being the culminating point, and also the highest peak in the continent. The Tasmanian plateau averages from 3,000 to 4,000 ft., and rises to 5,100 ft. in Ben Lomond, and 5,070 ft. in Cradle Mt.

Hydrography.—Short torrential rivers rush down the steep slopes of the eastern highlands and cross the flat eastern plain, where they become navigable. They are liable to sudden floods, the Brisbane R. having been known to rise 80 ft. The longest rivers flow to the Indian Ocean, the chief being the Darling-Murray, from the gentler W. slope of the eastern highlands. The Murray is navigable to the foot of the highlands for eight months in the year, and the Darling for 500 m. after the rains. The N. rivers—*e.g.* the Roper, Flinders, and Victoria—also flow in regions of a similar character, and are navigable some distance from the coast. The Fitzroy and Ashburton traverse much drier regions with summer rains, while the Murchison and Swan flow W., where winter rains prevail.

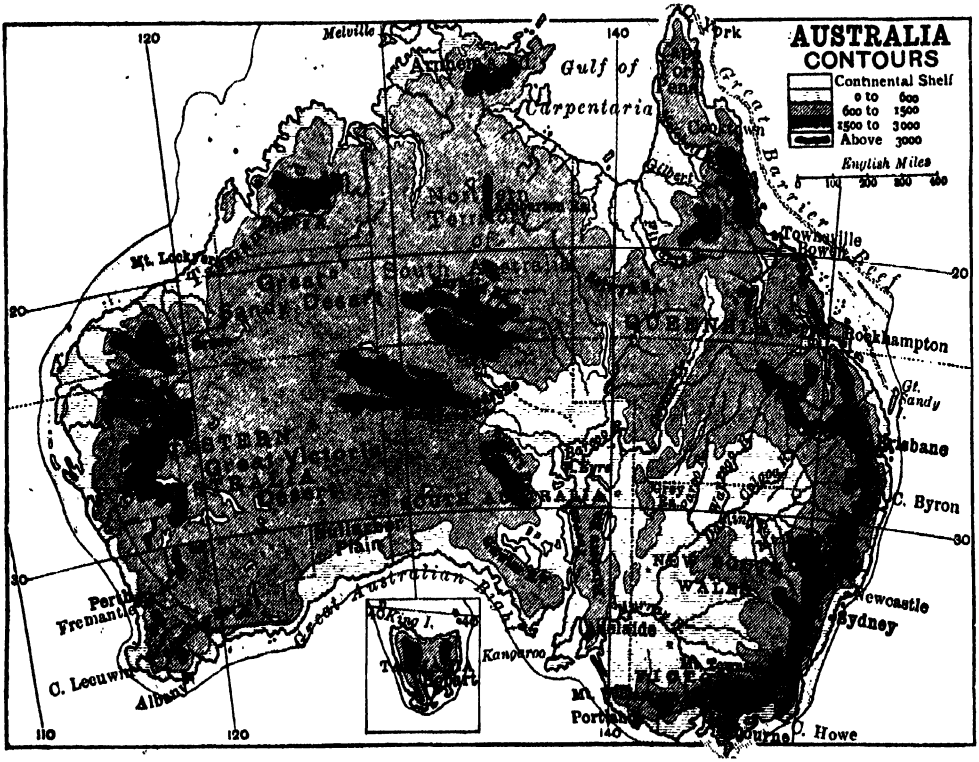
Climate.—The tropic of Capricorn crosses Australia midway between N. and S., and the tem-

Australia is the name applied, at the suggestion of Captain Flinders, to the third largest known island of the globe, which lies between 10° 39′ and 39° 11½′ S. and 113° 5′ and 153° 16′ E. It properly includes the islands of Tasmania and New Guinea, which are physically continuations of it. Area: Island, 2,946,691; Commonwealth, 2,972,906; Continent, 3,284,000 sq. m. Pop. Commonwealth (1901), 3,782,943. From Steep Point, in the W., to Cape Byron, in the E., is a distance of 2,500 m.; and from Cape York, in the N., to Wilson promontory, in the S., nearly 2,000 m. Australia is bounded on the N. by the Timor and Arafura Seas and Torres Str., on the W. and S. by the Indian Ocean, and on perature is never low except on the mountains of the S. Extremes of heat and drought, but not of cold and snow, are the climatic defects. The mean annual temperature varies from 85° F. in the N. to 60° F. in the S. In winter the temperature falls steadily from N. to S., and in summer the hottest region lies in the interior N. of the tropic, and differs little on the N. and S. coasts. In January the average is 84·7° F. at Palmerston, on the N. coast; 85·4° F. at Alice Springs, in the centre (2,100 ft. above the sea); and 79·7° F. at Port Augusta, on the S. coast. In the interior the range of temperature is considerable (30° F.). The sub-tropical high-pressure band which girdles the southern hemisphere crosses Australia, its centre being near the tropic in winter, and near the N. coast in summer. The S.E. trade winds prevail at most seasons over the greater part of the continent. In winter V-shaped low-pressure systems reach the S. shores; in summer the N.W. monsoon blows over the N. ones. In spring, summer, and autumn only the N. margins of the S. storm systems reach S. Australia, drawing hot, dry winds from the interior in front of the centre; but after the centre has passed, strong, cool S. winds ('southerly bursters') bring relief. Most rain falls on the E. coast in summer, and at the same time the interior, N. of a line between Cape Howe and N.W. Cape, has a scanty rainfall. In Tasmania rain falls at all seasons, but is most abundant in winter.

Vegetation. — Mangroves and pandanus predominate in the N. wet jungles, eucalyptus (300–400 ft.) flourish in the eastern forest region, and tree ferns form part of the undergrowth in the Australian Alps. Jarrah, karri, and other valuable timber trees flourish in S.W. Australia. The downs, subject to occasional destructive droughts, lie W. of the eastern escarpment. In the interior are found dwarf eucalyptus, acacias, and porcupine grass (spinifex scrub).

Animals.—Australia has a fauna remarkable for its primitive mammals, and the absence of all higher forms, except species of rodents and bats, and the dingo or wild dog, most probably introduced by man, but now almost exterminated. The Tasmanian devil (confined to that island), the pouched kangaroos, opossums, wombats, bandicoots, the egg-laying duck-mole (*Ornithorhynchus*), and echidna are among the distinctive mammals. Birds are numerous, and among them are running emus and cassowaries, laughing kingfishers, black swans, lyre birds, bower birds, as well as the more familiar pigeons, ducks, geese, and innumerable sea birds. Lung-breathing fish (*Ceratodus*), fresh-water herring (*Diplomystus*), tailless amphibia, whistling spiders, tank-making crayfish, and worms as long as a man, are peculiar to the continent.

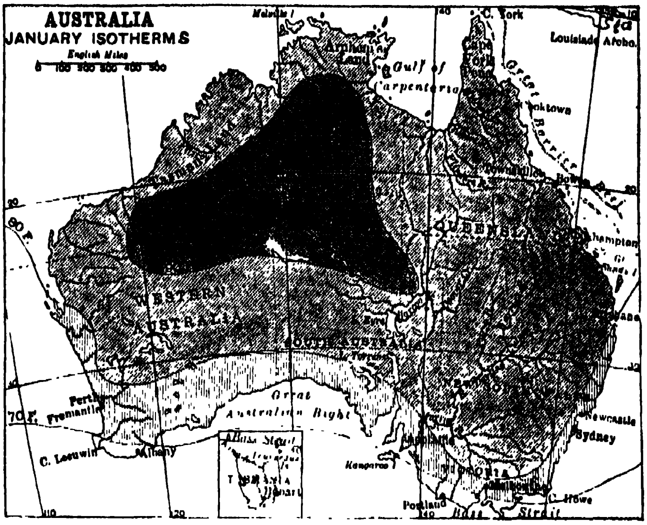
Economic Productions. — The natural wealth of Australia is its grassy downs, its vast forests of the N., E., and S.W., and its rich mineral deposits, especially of gold. The downs give pasture to millions of sheep, whose wool and flesh are exported. Cattle and horses are kept in the moister regions, and, by tramping down the loose, easily-blown soil, prepare the ground for sheep. Dairy-farming is important in the S.E., and much of the produce is exported. Wheat is the cereal of the S., and maize of the N. Grapes, figs, oranges, etc., grow in the S.; and sugar, cotton, tobacco, rice, and arrowroot, together with all kinds of semi-tropical and British fruits, are cultivated in Queensland. Irrigation has enormously raised the economic value of the continent. Gold is found in most parts, especially in the eastern highlands and the western plateau. Diamonds occur in the E. and S. Silver is mined in the eastern highlands and in Stanley Range (Broken Hill), copper in the

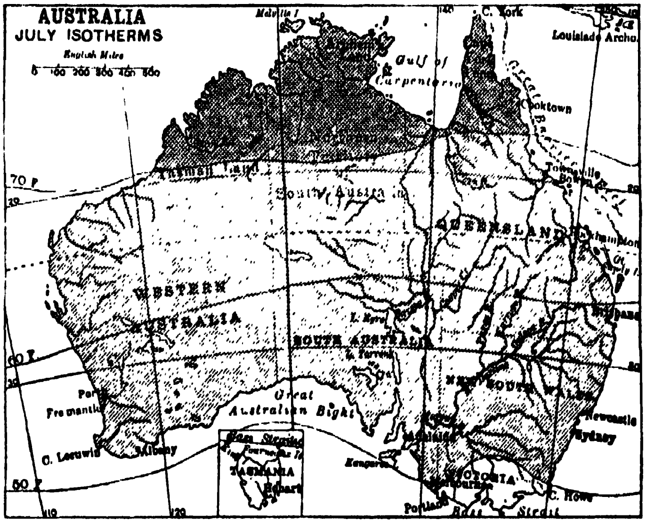


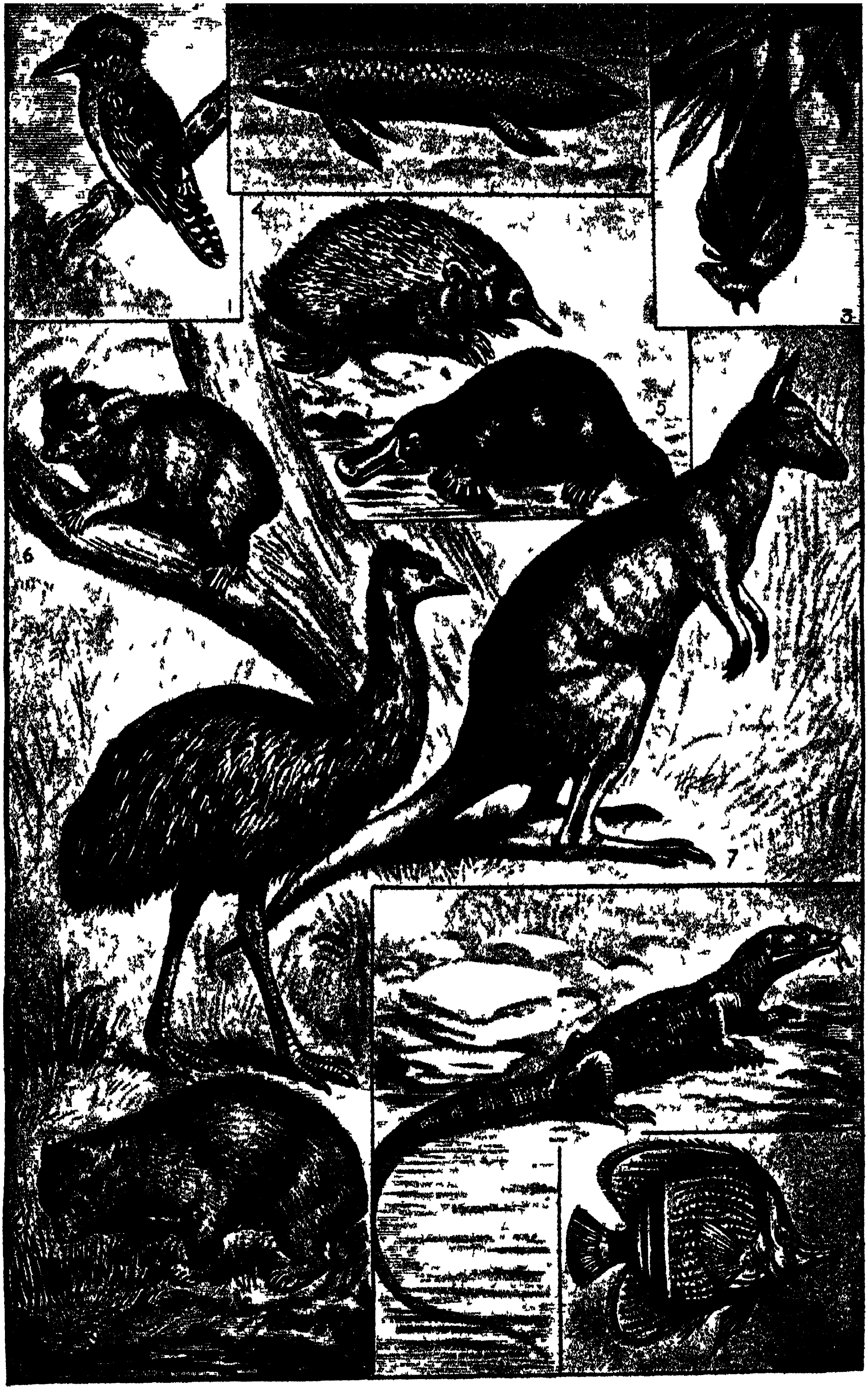
Yorke Peninsula, while tin is well distributed. Coal is found on the E. coast, especially round the Hunter R., and at Irrawarra in New South Wales, and round the Collie in W. Australia. Sydney, capital of New South Wales, is a first-class naval station; and the Commonwealth has a naval force of seven cruisers, four sloops, and a Naval Reserve of over 700 men.

History.—The N. and W. coasts were discovered by the Dutch in the first half of the 17th century. In 1770 Captain Cook first explored the E. coast, and by the beginning of the 19th century the general outlines of the whole coast were known. The *Beagle*, with Darwin as naturalist, surveyed much of the W. coast in 1837-43; and the *Rattlesnake*, with Huxley, the Great Barrier Reef and E. coast in 1846-50. In 1788, Botany Bay, so called by Sir Joseph Banks and Dr. Solander, was settled by 1,030 persons, most of whom were convicts; but the Blue Mts. proved an insurmountable barrier to penetration of the interior till 1813. During the next quarter of a century the exploration of the Darling-Murray system and Victoria was made by Hamilton-Hume, Sturt, and Mitchell. Port Phillip was founded in 1835, S. Australia in 1836, but Perth in 1829. The interior was explored by Eyre, who discovered Lakes Torrens and Eyre. In 1840-1 he traversed the barren S. coast for 1,200 m. to the Swan R. settlement. Sturt, in 1844-5, penetrated from the Darling almost to the heart of the continent. Leichhardt first reached the N. coast overland in 1844. The ill-fated Burke and Wills expedition crossed from the S. to the Gulf of Carpentaria in 1861. In 1862 Stuart succeeded in crossing the continent farther W., and in 1872 the overland telegraph line was laid along his route. Warburton and Giles crossed the W. plateau from E. to W., and Forrest from W. to E., by different routes, in the 'seventies.

In 1835 the population of Australia was about 80,000, of whom the majority lived in New South Wales and Tasmania. In 1850 it was about 400,000; but by 1861, owing to the discovery of gold in Victoria and New South Wales, the population had nearly trebled. In the 'fifties responsible government was granted to all the colonies, except W. Australia, which had then very few settlers. Victoria was separated from New South Wales in 1851, and received responsible government in 1855, the year after the mother colony, and the year before S. Australia and Tasmania. Tasmania, previously known as Van Diemen's Land, and for twenty-two years a dependency of New South Wales, became independent in 1825. Owing to the discovery of gold, the population of W. Australia was so increased that responsible government was granted in 1893. On Jan. 1, 1901, the six colonies were proclaimed a British colonial federation of six states, under the title of 'The Commonwealth of Australia.' The legislature consists of the crown (represented by a governor-general), a Senate of 36 members (six elected by each of the six original states for six years, half retiring every three years), and a House of Representatives numbering more than twice the Senate, and elected every three years. The members of the House of Representatives sent from each state are proportional to its population, but not less than five in the case of any of the original states. The first House of Representatives had 75 members (New South Wales, 26; Victoria, 23; Queensland, 9; S. Australia, 7; W. Australia, 5; Tasmania, 5). The Federal Parliament controls defence, finance, banking, commerce, communications, census, marriage, emigration, currency, weights and measures, and conciliation in labour disputes. The state parliaments retain all rights not delegated to the Federal Parliament. The executive consists of the governor-general, representing the crown, and an executive council of seven ministers of state. The capital of the new Commonwealth is Dalgety, a township 296 miles S. of Sydney, on the Snowy River.



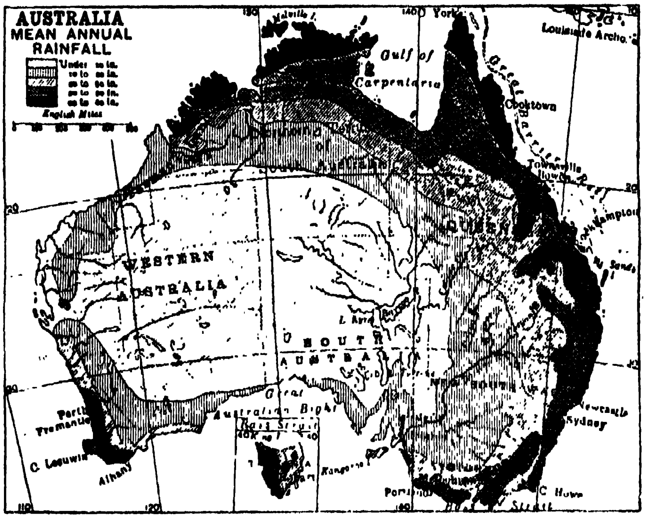


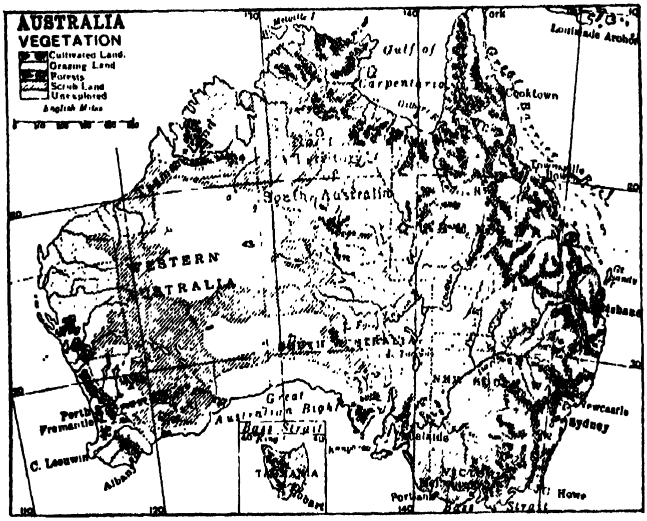


Animal Life in Australia.

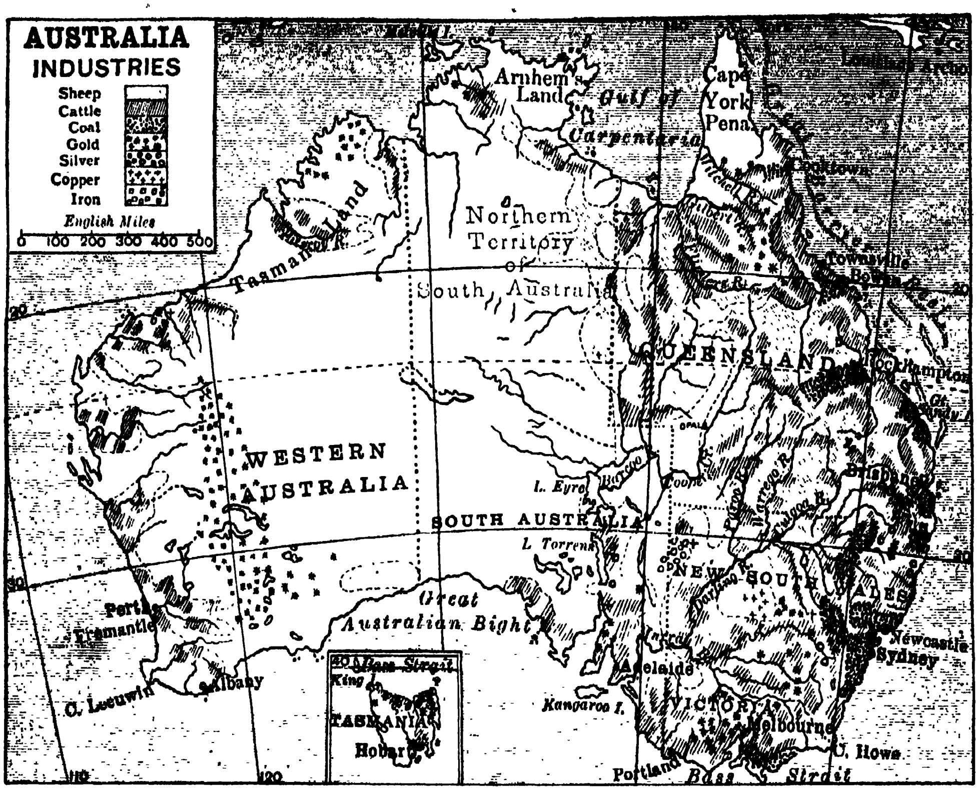
1. Laughing jackass or laughing kingfisher 2. Ceratodus. 3. Gray headed fruit bat. 4. Common Australian echidna. 5. Australian duck-mole. 6. Australian tree-bear or koala. 7. Kangaroo. 8. Common emu. 9. Common wombat. 10. Gould's monitor. 11, Chelmo.

Australian Race.—The native race of Australia (aborigines) is rapidly dying out. Ethnographers differ as to its origin, many holding that the numerous tribes scattered over Australia were not originally of common descent. Sir G. Grey, however, believed that, notwithstanding apparent differences between tribes, their common origin and fundamental unity must be admitted (*vide* Sir G. Grey's *Two Expeditions of Discovery in N. W. and W. Australia*, 1841). The theory that they are of exclusive Papuan descent is untenable, as they are widely separated from the Papuans of New Guinea by their silky hair, full beards, and contrasted features, no less than by their ignorance of the bow and arrow, the chief weapon of most of the Papuan tribes. But a fundamental connection with the negro stock, whether Oceanic or African, is shown in the dark colour, shape of the skull (highly dolichocephalic, or long-headed), and several other physical characteristics. The Australian aborigine is about the same height as the average European, but is inferior in muscular development. In complexion, different tribes vary from light coffee colour to coal black. Their mental faculties are low, but they have a keen sense of the ridiculous and a great talent for mimicry. Although the native idioms often differ greatly in their vocabulary, the phonetic system, the grammatical structure, and the universal absence of radicals for numerals beyond *two* or *three*, point to a common origin. The natives cultivate no sort of food crop, and have no domesticated animals except the 'dingo,' or native dog, and have no permanent dwellings but mere hovels of boughs or grass, for temporary shelter. In their primitive state the aborigines, male and female, are found entirely naked, or with a tussock of grass, resembling a Scottish sporran, suspended over the loins. In cold weather they sometimes wear a cloak of skins over the shoulders. Cannibalism—formerly, perhaps, universal—is still practised, especially amongst the Queensland natives. They live ordinarily on roots, herbs, berries, fish, birds (including the emu), kangaroos, iguanas, snakes, rats, and several sorts of grubs found in trees. Their principal weapons are spears (which are sometimes tipped with poison), hatchets with stone heads, nulla-nullas (clubs made of hard wood), and the boomerang, a weapon peculiarly their own. They practise polygamy, and morality, as understood by Europeans, is unknown. The aboriginal population was shown by the 1901 census to be less than 22,000, distributed thus: Queensland, 6,670; W. Australia, 6,200; New South Wales, 4,280; S. Australia, 3,880; Victoria, 650. The Commonwealth constitution expressly exempts aborigines from federal control, but the state parliaments have made humane and adequate provision for their protection. They have many curious customs—including, with some tribes, the practice of circumcision—which are fully described in the numerous works on early Australian exploration. The most accurate and recent information about the aborigines is to be found in the periodical reports on the subject issued by the Australian state governments. These may be obtained by application to the agents-general in London of the several states. See also E. M. Curr's *The Australian Race* (1888); E. Giles's *Australia Twice Traversed* (1890); G. S. Lang's *The Aborigines of Australia* (1865); C. Lumholtz's *Among Cannibals* (in Queensland) (1890); W. Brough Smyth's *The Aborigines of Victoria* (1878); B. Spencer and F. J. Gillen's *The Native Tribes of Central Australia* (1899).





Australian Forces. — The Australian colonies, including Tasmania, have all passed Defence Acts to regulate their military service. The forces consist generally of a nucleus of permanent troops, mainly artillery, a headquarters staff, and a small permanent staff for all branches of the service. The remainder of the troops are either militia,



partially paid volunteers, or ordinary volunteers. Reserve forces are to be formed consisting of men who have completed their militia service, and who will receive a retaining fee in consideration of keeping up their military efficiency and returning to the service in time of war. A large supplementary reserve is also provided for by the formation of rifle clubs.

See Aflalo's *Natural Hist. of Australia* (1896); *Annual Blue Book* and *Statistical Register* for each colony; Barton's *Outlines of Australian Physiography* (1895); Bentham and Mueller's *Flora*

General Statistics of the Australian Commonwealth.

States.	Area in Sq. Miles.	Population in 1902.	Population in 1903.	Revenue, 1904.	Expenditure, 1904.	Imports, 1903.	Exports, 1903.	Miles of Railway, 1903-4.	Miles of Telegraph 1903.	Acres under Crop, 1903.
				£	£	£	£			
Victoria..............	87,884	1,205,513	1,208,854	7,313,591	6,914,993	12,339,615	11,188,939	3,381	6,596	3,389,069
New South Wales....	310,700	1,405,450	1,427,342	11,248,328	11,319,887	13,977,917	18,861,213	3,362	14,395	2,542,919
South Australia....	380,070	361,455	368,823	2,568,101	2,707,253	3,224,370	3,638,242	1,901	6,038	2,356,824
North Part........	523,620	4,336	....	....	....	....	....	....	....	....
Queensland..........	668,497	514,851	575,530	3,595,440	3,607,864	3,249,627	3,726,975	3,030	10,180	566,569
West Australia......	975,920	215,157	226,954	3,550,016	3,698,312	4,228,554	9,458,125	2,170	6,079	283,752
Tasmania............	26,215	177,072	179,487	857,668	879,356	791,388	1,296,670	620	1,852	259,611
Total....	2,972,906	3,883,834	3,986,990	29,133,144	29,127,665	37,811,471	48,170,164	14,464	45,140	9,398,764

Statistics of Agriculture.

States.	Harvest of 1903-4.							Live Stock.			
	Wheat.	Oats.	Barley.	Maize.	Potatoes.	Hay.	Wine made.	Sheep.	Cattle.	Horses.	Pigs, 1902.
	Bushels.	Bushels.	Bushels.	Bushels.	Tons.	Tons.	Gallons.				
Victoria..................	28,525,579	13,434,952	1,218,003	904,239	167,736	1,233,063	2,551,150	8,774,731	1,522,265	376,548	350,370
New South Wales......	27,334,141	1,252,156	174,147	6,836,740	56,743	816,800	1,086,820	28,656,501	1,880,578	458,014	192,097
South Australia.........	13,209,465	902,936	487,920	*2,487	31,415	479,723	2,345,270	5,350,258	538,580	192,411	82,777
North Part...........	....	....	....	....	....	....	....	....	....	....	1,014
Queensland..............	2,436,799	70,713	510,557	1,923,623	17,649	136,117	38,558	8,392,044	2,481,717	401,984	77,202
Western Australia......	1,876,252	258,503	53,227	....	4,542	121,934	200,000	2,600,633	497,617	82,747	52,765
Tasmania................	767,398	1,621,950	212,459	....	171,298	115,513	....	1,597,053	185,938	35,541	52,092
Total......	74,149,634	17,541,210	2,656,313	9,667,089	449,383	2,903,150	6,221,798	55,371,220	7,104,695	1,547,245	808,317

In 1903 there were 835 camels in the western division of New South Wales, and 2,031 in Western Australia. * Other states.

Australiensis (1863-78); Sir J. A. Cockburn's *Australian Federation* (1901); Coghlan's *Statistical Account of the Seven Colonies of Australasia* (1900, annual); Collingridge's *Discovery of Australia* (1895); Favenc's *Hist. of Australian Exploration* (1888); Finch-Hatton's *Advance Australia* (1885); Froude's *Oceana* (1886); Garran's *Coming Commonwealth* (1897); Gordon and Gotch's *Handbook* (annual); J. Grattan Grey's *Australasia Old and New* (1901); E. Jenks's *Hist. of Australia* (1902); Saville Kent's *Great Barrier Reef of Australia* (1893); P. Leroy-Beaulieu's *Les Nouvelles Sociétés Anglo-Saxonnes* (1902); Reeves's *State Experiments in Australia and New Zealand* (1902); Roth's *Queensland Aborigines* (1897); Rusden's *Hist. of Australia* (3 vols. 1883); Schmeisser's *Gold Fields of Australasia* (1899); Silver's *Handbook* (5th ed. 1888); Russell Wallace's *Rural Economy and Agriculture of Australia and New Zealand* (1891), and *Australia and New Zealand* (1893); the *Year Book of Australia*; Zimmermann's *Die Europäischen Kolonien* (1896).

Australian Natives.

1. South Australia. 2. Northern Territory. 3. Queensland. 4. Tasmania. 5. New South Wales.

Austrasia, or KINGDOM OF THE EAST (as opposed to *Neustria*, which formed the KINGDOM OF THE WEST), a large part of Frankish Gaul, comprising Thuringia, the duchies of Alemanni, of Bavaria, and Friesland, with all the country between the Rhine, Meuse, and Scheldt. Metz was its capital. Austrasia was founded in 511, and governed from the 6th to the 8th century by a succession of Merovingian kings, ultimately being merged under Charlemagne's successor into Germany, as Neustria was into France.

Austregisille, ST. (551-624), a native of Bourges, who, after filling various offices at the court of Gontran, king of Burgundy, was ordained priest, and granted the abbacy of St. Niziers at Lyons. In 611 he became bishop of Bourges. His remains were burned by the Protestants in the 16th century.

Austremoine, or STREMONIUS, ST., apostle and first bishop of Auvergne; introduced Christianity into Issoire in the 3rd century, but the Christian community he established was overthrown in the 5th century by the Vandals. The church of St. Paul at Issoire is built on the site of his tomb. His day is November 1st.

Austria. The empire of Austria embraces generally the western half of the Austro-Hungarian monarchy — *i.e.* the duchy of Silesia, the kingdom of Bohemia, the margravate of Moravia, the grand-duchies of Upper and Lower Austria, the duchies of Styria, Salzburg, Carinthia, and Carniola, the county of Tyrol, the dependency of Vorarlberg, the county of Görz and Gradiska, the margravate of Istria, the town of Trieste, and a coast strip of the Adriatic — *viz.* the kingdom of Dalmatia. North and N.E. of Hungary lie the kingdom of Galicia and the duchy of Bukowina, both members of the empire. Apart from the three appanages last mentioned, the whole territory forms a fairly compact region, stretching from Prussia and Saxony in the N. to Italy in the S., and from Switzerland and Bavaria in the W. to Hungary in the E. The total area reaches 115,903 Eng. sq. m., and the population (1900) was 26,150,708.

The southern half of the empire is entirely occupied by the ranges and peaks of the E. Alps. The dominating feature towards the Adriatic, especially in Dalmatia, is the barren limestone region of the Karst. In the N., Bohemia is girdled by the ranges of the Bohemian Forest, the Erzgebirge, the Riesengebirge, and other chains of the Sudetic system. Farther S.E., the Little Carpathians and the Beskids separate Lower Austria and Moravia respectively from Hungary, and the Carpathians divide this last kingdom from Galicia and Bukowina. The Danube divides the empire into two fairly equal parts—the N. region being drained by the Moldau, Elbe, and March, the Vistula, Dniester, and Pruth draining Galicia and Bukowina; the Inn, the Enns, the Etsch, the Drave, and the Save drain the region S. of the Danube.

Generally speaking, the river valleys are narrow but fertile. The climate is anything but uniform. On the whole it is moderate, being warm in the S. in summer, and severe in the mountainous parts in winter. The mean annual temperature may be estimated from that of certain representative towns—*e.g.* Trieste, 57° F.; Vienna, 49°; Prague, 49°; Cracow, 46½°. The rainfall is heaviest on the Adriatic coast and in the Alpine regions, and lowest in the interior of Bohemia and Moravia. The snow-line on the Alps runs at about 9,200 ft.; on the Carpathians at 8,500 ft.

Notwithstanding considerable progress in recent years in the manufacturing and mining industries, agriculture still continues to be the mainstay of Austria, supporting 55 per cent. of the population. The estates in Upper Austria, Styria, Carinthia, Salzburg, and Tyrol are large; those of Galicia, Moravia, and the Adriatic coast-lands small (8 to 10 ac.). Most arable land is found in Galicia, Bohemia, Moravia, and Lower Austria; most grazing ground in Galicia and Bohemia. Istria, Dalmatia, Lower Austria, Styria, Moravia, Carinthia, etc., have the largest area of vineyards. Forest lands are well divided; the state owns two and a quarter million acres, chiefly in Galicia, Bukowina, Salzburg, and Tyrol. In addition to the usual cereals, the crops include potatoes, hay, maize, beetroot, turnips and mangolds, flax, hemp, etc. Cattle are carefully bred in the Alpine districts; pigs are fattened everywhere. Bee-keeping is carried on in Galicia, Bohemia, Styria, Moravia, Lower and Upper Austria, etc.

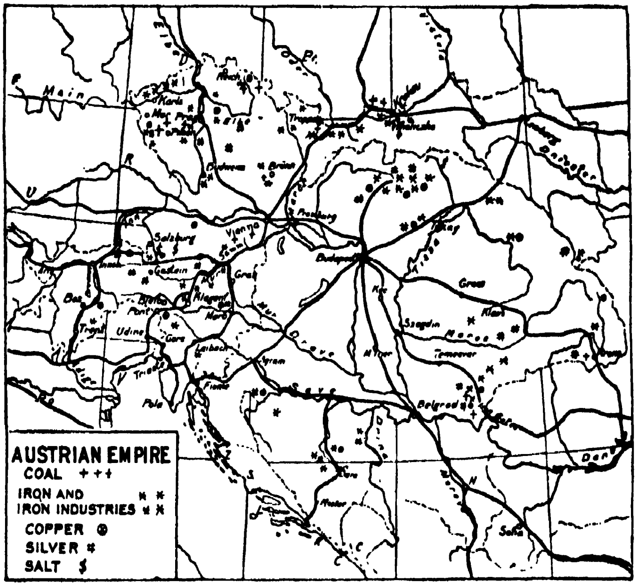
Austria produces considerable quantities of coal and iron—the former mostly in Bohemia, Silesia, Moravia, and Styria; the latter in Styria, Carinthia, Bohemia, and Moravia. Silver and lead and graphite are also mined in Bohemia and elsewhere. Galicia produces large quantities of petroleum and rock salt. Salt is extracted from brine springs in the Alpine districts, and from sea-water in Istria and Dalmatia. Besides the above, there are deposits of tin, copper, nickel, antimony, etc. The revenue from mining and furnace products amounts to about fifteen millions sterling annually. The manufacturing industries enjoy several natural advantages—*e.g.* good water supply, equable distribution of fuel, abundance of raw materials, cheap labour, fairly good and economical means of communication (Danube, etc.), besides being fostered by excellent technical schools, museums, and favourable legislative measures.

Everywhere the domestic industries are common and productive; large industrial establishments are most numerous in Bohemia, Silesia, Moravia, Lower Austria, and Vorarlberg. The industries carried on on the greatest scale are various iron trades; the manufacture of sugar, porcelain, pottery, glass, chemicals, beer, musical and scientific instruments, paper, leather, silk, woollens, cottons and linens, tobacco, bronze and other fancy articles; flour-milling, lace-making, saw-milling. Fishing is carried on in the Adriatic. In 1901 there were 12,000 m. of railway, 67,500 m. of roads, 4,075 m. of waterways (818 m. being navigable by steamboats). In 1901 a bill was passed authorizing the construction of a gigantic system of canals, designed to connect the Danube with the Elbe.

Scarcely any country in Europe presents such a complexity of races, tongues, and creeds as Austria-Hungary. In Austria there are Germans, Czechs and Slovaks, Poles, Ruthenians, Slovenes, Serbs and Croats, Roumanians, Jews, Magyars, Italians, Albanians, Armenians, and Gypsies. Roman Catholics form about four-fifths of the whole population; Greek Catholics, 11½ per cent.; Orthodox Greeks, 2¼ per cent.; Protestants of all sects, 1¾ per cent.; Jews, 4¾ per cent. The school system is generally based on that of Germany. Higher education is provided in eight universities (Vienna, two at Prague, Graz, Innsbruck, Cracow, Lemberg, and Czernowitz), in technical schools (technical high schools at Vienna, two at Prague, Graz, Lemberg, two at Brünn, and a high school for agriculture at Vienna), mining academies, art and commercial schools, etc. Austria (excluding Hungary) is a constitutional monarchy, the sovereign being the hereditary emperor. The legislative power is vested in the Reichsrath.

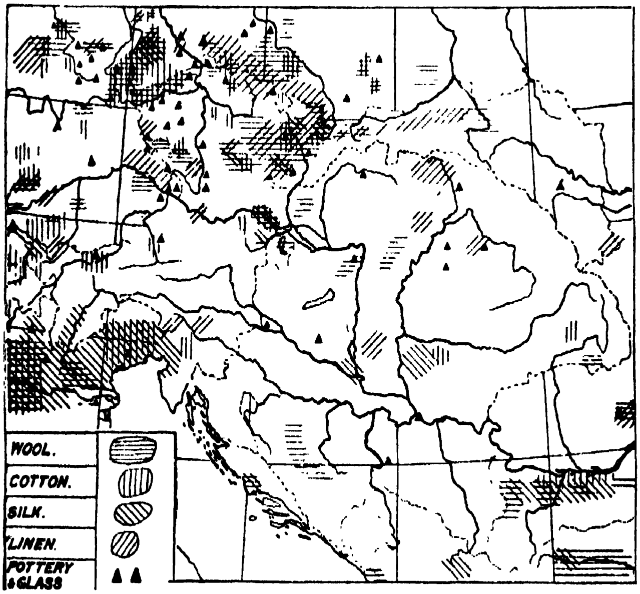
See F. Umlauft, *Die Oesterreichisch-ungarische Monarchie* (3rd ed. 1897); *Die Oester.-ungarische Monarchie in Wort und Bild* (1886, etc.); *Die Länder Oester.-Ungarns*, ed. by Umlauft (13 vols. 1880-4); *Die Völker Oester.-Ungarns* (11 vols. 1881-5); *Oester. Statistisches Handbuch* (annual); *Hausindustrie und Heimarbeit in .... Oesterreich* (4 vols. 1899); Von Hohenbrück, *Die Verteilung der Gesammtfläche Oesterreichs zwischen Gross- u. Klein-Grundbesitz*, in *Statist. Monatsschrift* (new series, 1900), pt. iii.; and James Baker, *Report on Technical and Commercial Education in .... Bohemia* (Board of Education paper, 1900).

History.—The present Austro-Hungarian monarchy took its rise in a margravate founded by Charlemagne (end of 8th century) to the east of Bavaria, as a defence against the Avars, and afterwards called Oesterreich, or Austria (first mentioned in 996). In 900 the Magyars seized the Mark, but in 955 Otto the Great again annexed it to Germany. In 974 the Emperor Otto II. gave the Mark of Austria to Leopold I., of the house of Babenberg. This prince showed energy in conquering a large portion of Hungarian territory, and peopling it with German colonists. For some 260 years, till the family died out, the house of Babenberg continued to rule the Austrian lands. The eastern boundary of the margravate was fixed at the Leitha in 1044, and from that time onwards that river formed the frontier between Austria and Hungary. In 1156 Austria was made a duchy by the Emperor Frederick Barbarossa, as compensation for the recession of the duchy of Bavaria, which had been bestowed upon Henry the Free-handed in 1139. The first duke was Henry, nicknamed Jasomirgott (1141-77). Henry's successor, Leopold V., the foe of Richard Cœur de Lion, in 1192 obtained Styria, and Leopold VI. Carniola. In 1246 Frederick the Quarrelsome (1230-46) was killed in a battle against the Hungarians, and with him the Babenberg line became extinct. His death was followed by a period of confusion in the Austrian lands. After some fighting, Ottokar, king of Bohemia, got possession of them (1252), to which he added by inheritance Carinthia and Carniola in 1269; but he lost them all in 1276, through his refusal to recognize as emperor Rudolf of Hapsburg. Rudolf then gave (1282) Austria, Styria, and Carniola in fief to his sons Albert and Rudolf, though Rudolf voluntarily retired in 1283; Carinthia being given later (1286) to Count Meinhard of Tyrol, the father-in-law of the emperor. Thus was founded the future greatness of the house of Hapsburg. Till 1365 the Austrian territories were ruled by Albert and his descendants, Tyrol being added in 1364; but in 1379 two of his grandsons, Albert III. and Leopold III., made a division—the former taking Austria, and the latter Styria and the remaining lands. Leopold fell at Sempach in 1386, warring against the Swiss, but his family continued to rule in Styria. Albert v. secured (1437) Hungary and Bohemia by marriage with the daughter of the Emperor Sigismund, and was himself chosen king of the Romans in 1438. From this time the imperial crown was held without interruption by the house of Austria till 1740, when the male line died out. On Albert's death, in 1439, he was succeeded by Frederick v. (Emperor Frederick III. from 1442), duke of Styria, who governed (alone from 1463) till 1493. In 1453 he raised his hereditary lands into an archduchy. Between 1439 and 1526 Hungary and Bohemia were ruled by other princes, but by clever policy and prudent marriages the Hapsburg power steadily grew. *Bella gerant alii; tu felix Austria, nube*, was no less true of the Austrian house in the 15th than it was in the latter half of the 18th century. Frederick's son, the Emperor Maximilian I., was, in his own right, archduke of Austria, duke of Styria, Carinthia, and Carniola, and count of Tyrol, besides having lands in Swabia and Alsace. His death, in 1519, was followed by the accession of his grandson, Charles II. of Spain, to the imperial throne as Charles v. Never before or since was the house of Hapsburg more powerful. The Archduke Ferdinand, brother of Charles, had married the daughter of Ladislaus, king of Bohemia and Hungary, and on the death of her brother, Louis II., at Mohacz, in 1526, he was elected and crowned king of Bohemia, and also chosen king of Hungary. But in the latter country a powerful party placed John Zapolya, voivode of Transylvania, on the throne, and called in the aid of Solyman the Magnificent, the Turkish Sultan, who twice advanced to the walls of Vienna (1529 and 1532). It was not till the beginning of the 18th century that the Hapsburgs obtained undisputed possession of the whole of Hungary. Ever since the election of Frederick v. to the imperial crown the Hapsburg emperors had endeavoured to extend their hold over the electors and princes, and to lessen their independence. But the outbreak of the reformation movement strengthened the forces of disintegration, and frustrated Charles v.'s hopes of forming a strong centralized German monarchy. The policy of his successors in Austria—Ferdinand I. (1556-64), Maximilian II. (1564-76), and Rudolf II. (1576-1612)—was fly dictated by the religious controversies of the age, the last named, a ready tool in the hands of the Jesuits, finally electing for Roman Catholicism, and ruthlessly oppressing his Protestant subjects. Ferdinand II., the Hapsburg emperor (1619-37), made, during the Thirty Years' war (1618-48), a last attempt to bring all Germany under the direct control of the Hapsburgs. Never was the dream of the undisputed supremacy of the Austrian house so nearly realized as in the years from 1619 to 1630. Frederick, Count Palatine, was swept in turn from Bohemia and the Palatinate. Wallenstein, at this time the avowed champion of the absolutist ambition of the emperor, and Tilly, at the head of the armies of Ferdinand and the Catholic League respectively, advanced to the Baltic; and Wallenstein's plan of making the Baltic an Austrian lake, dominated by an Austrian fleet, seemed on the eve of being carried out. But though the opposition of Christian IV., king of Denmark, was easily crushed at Lutter (1626) by Tilly, Stralsund stubbornly resisted, and was never taken; and the intervention (1630) of Gustavus Adolphus put an entirely new complexion on the struggle. From the time of Gustavus's victory over Tilly at Breitenfeld, in 1631, all chance of the establishment of 'the rule of the Jesuit and the soldier' throughout Germany disappeared; and when France, in 1635, joined in, the war ceased to be a religious and became a purely political struggle between the Hapsburgs and the Bourbons. The peace of Westphalia, in 1648, placed the political and religious independence of the German princes on a secure footing; and the emperors, recognizing the impossibility of founding an absolutism, henceforward abandoned their imperial and devoted themselves to purely Austrian interests. The Emperor Leopold I. (1657-1705), by the harshness of his rule and the bigotry of his policy in Hungary, provoked the Hungarians to revolt, and they called in the Turks, who in 1683 laid siege to Vienna. The city was only saved by the arrival of Charles of Lorraine with an army of Germans, and of John Sobieski with another of Poles. Their victories, and those of the Margrave Louis of Baden (at Szalankemen in 1691) and Prince Eugene (at Zenta in 1697) enabled the emperor to force upon the Turks the peace of Carlowitz in 1699. By this he compelled the Turks to cede to Hungary the country lying between the Danube and the Theiss. Meanwhile Ferdinand had been engaged in a long duel with France, which eventually culminated in the war of the Spanish Succession (1701-14), which was prosecuted with equal vigour by his successor, Joseph I. (1705-11). Though the hopes entertained by the Hapsburgs of securing the Spanish succession were not realized, Charles VI. (1711-40) obtained for his house, by the peace of Utrecht (1713) and the treaty of Rastadt (1714), the Spanish Netherlands, as well as Milan, Mantua, Naples, and Sardinia. In 1718, by the peace of Passarowitz, after fresh victories of Prince Eugene at Peterwardein (1716) and Belgrade (1717), the Turks were forced to yield important provinces on



Austria—Minerals.

the Danube, and in 1720 Sardinia was exchanged for Sicily. Till his death Charles was involved in constant difficulties. In contravention of treaties, he endeavoured to set up the Ostend E.I.C., in order to secure for the Netherlands some of the trade which fell to Britain and Holland; and he made constant efforts to induce the powers of Europe to accept the Pragmatic Sanction, an instrument securing to his eldest daughter and heiress, Maria Theresa, the whole of the Austrian possessions. In 1725 he allied with Spain, and a European war over the Polish succession was only prevented by the want of harmony between the allies, and by the peaceful policy of Louis xv.'s minister, Fleury; while in 1731, when Don Carlos, the elder son of Elizabeth Farnese, queen of Spain, succeeded to Parma and Piacenza, war was averted simply by the diplomatic skill of Walpole. In 1733, however, France, Spain, and Sardinia did attack Charles vi.; and at the peace of Vienna, in 1738, Charles was compelled to cede to Don Carlos Naples, Sicily, and the Tuscan ports, in exchange for Parma and Piacenza. Nor did his misfortunes end here. In 1737 Charles became involved, in conjunction with Russia, in a war against Turkey, in which the Austrians were unsuccessful; and by the peace of Belgrade (1739) he lost the greater part of his gains in 1718. His death, in 1740, threw open to Europe (1) the imperial crown, and (2) the succession to the Austrian possessions. The invasion of Silesia by Frederick the Great of Prussia, and the invasion of Germany by French troops, proved the beginning of the famous Austrian Succession war (1740-8), which in many ways benefited Austria. Maria Theresa (1740-80) had married Francis of Lorraine, who had received Tuscany in exchange for Lorraine. She desired the imperial crown for her husband, and the preservation of the integrity of her ancestral lands. But no sooner had France espoused the cause of the elector of Bavaria in the matter of the imperial crown than the elector himself, together with Saxony, Spain, and Sardinia, advanced claims to different portions of the Austrian possessions. Britain supported the cause of Maria Theresa, and Europe was involved in war. After many vicissitudes, peace was concluded at Aix-la-Chapelle in 1748. Prussia remained in Silesia, and Sardinia secured some districts in Italy. Otherwise the Pragmatic Sanction was carried out. Moreover, in 1745, on the death of the elector of Bavaria, who had been elected emperor, Maria Theresa's husband Francis had secured the imperial crown; while, for the first time in its history, Hungary had remained loyal to the Hapsburgs, and became an integral portion of their dominions. But the Anglo-Austrian alliance was weakened by Maria Theresa's determination to recover Silesia—a determination which brought Austria into alliance with Russia and France in the Seven Years' war (1756-63). The alliance made in 1756 with France constituted what is known as the Diplomatic Revolution, and continued till the French revolutionary war of 1792. For a time it seemed that Prussia would be overwhelmed. But the courage and skill of Frederick the Great, who was aided by British money, saved his country from destruction; and at the peace of Hubertsburg, in 1763, Maria Theresa was forced to acquiesce in the loss of Silesia, and to recognize in Prussia a formidable rival. Henceforward Austria and Prussia intrigued against each other for supremacy in Germany, and it was not till the Austro-Prussian war of 1866 that the battle of Sadowa finally assured the predominance of Prussia.



Austria—Manufactures.

Freed at length from the anxieties of nearly a quarter of a century of warfare, Maria Theresa now turned her attention to the internal condition of her country and its peoples. The government was centralized, and ecclesiastical abuses were reformed; industry and commerce were fostered, the condition of the serfs improved, and education encouraged. On the death of the Emperor Francis, in 1765, his son, Joseph ii. (1765-90), succeeded, both as emperor and as joint ruler with his mother over Austria; and he developed and expanded Maria Theresa's reforms in every direction. But until her death, in 1780, he was unable to exercise freely his extraordinary energy. He took part with his minister Kaunitz in the partition of Poland in 1772, and in 1778 endeavoured to secure Bavaria. This project was defeated by the resolution of Frederick the Great, who, as in 1745, realized that Austria, if possessed of Bavaria, would be able to impede the growth of Prussian supremacy in Germany. In 1781 Joseph made his famous alliance with Russia, and in 1787 joined with that power in an attack upon Turkey. At the same time he was busily engaged in carrying out the most far-reaching reforms. He decreed freedom of worship and civil rights to Protestants, and toleration to Jews; he abolished numerous monasteries and convents; he abolished serfdom (1782); he improved the system of education; he insisted on uniformity of legislature throughout his dominions, and on the general use of the German language. These well-meant reforms, inaugurated *en bloc*, roused the conservative feelings of the various divisions of his empire, and stirred up the bitter hostility of the church. His disregard for national prejudices earned special dissatisfaction in Hungary and the Netherlands, and revolt broke out (1788) in the latter province. With the Netherlands in a state of revolution, and the Austrian troops unsuccessful in the Turkish war, the break-up of the Austrian monarchy seemed imminent; for Frederick William II. of Prussia was preparing to take advantage of the Austrian weakness, and had mobilized a large army. This was, however, prevented by the death of Joseph in February 1790, and by the accession of his brother Leopold, archduke of Tuscany. Leopold II. (1790-2) was a statesman, and by his moderation, firmness, and wisdom saved Austria. He quelled the revolt in the Netherlands, and restored their privileges; he made with Prussia the convention of Reichenbach (July 1790), and he concluded the peace of Sistova (1791) with the Turks. This crisis was, however, no sooner over than the conduct of the French revolutionists brought Austria into conflict with France, and in 1792 the great war began. Anxiety with regard to the action of Prussia and Russia in Poland weakened the alliance between the courts of Vienna and Berlin, and contributed to the French successes in 1792 and 1794. Meanwhile Leopold was succeeded by Francis II. (1792-1804; Emperor Francis I. of Austria, 1804-35). In 1795, by the treaty of Basel, Prussia, Sweden, Spain, and Tuscany retired from the war, leaving Austria, England, and Sardinia to continue the resistance to the French armies. Beaten in Italy in 1796 by Bonaparte, Austria made the peace of Campo Formio in 1797, and received Venetian territory as compensation for the loss of Lombardy and the Netherlands. Henceforward, till 1814, Austria suffered greater and greater territorial losses at the conclusion of each fresh struggle with Napoleon. By the peace of Luneville, in 1801, Tuscany was taken from its Austrian grand-duke, and Austria, as at Campo Formio, recognized the Rhine as the limit of France. After the disastrous Austerlitz campaign, the treaty of Pressburg, in 1805, inflicted new losses upon Austria. Venice, Istria, and Dalmatia were ceded to the kingdom of Italy, and the Tyrol and part of Swabia to Bavaria. On the adoption by Napoleon, in May 1804, of the title of Emperor of the French, Francis II. had erected the Austrian dominions into a hereditary empire, taking the title of Emperor of Austria. The days of the Holy Roman Empire were over, and the treaty of Pressburg was followed by the establishment of the Confederation of the Rhine, under the protectorate of Napoleon. Till the overthrow of the French domination at the battle of Leipzig in 1813, Germany was practically submerged. In 1809 Austria did, indeed, make a heroic effort to recover for Germany its independence, and 'the campaign of Aspern and Wagram is the most glorious in the Austrian annals.' But the peace of Vienna (1809), which closed the war, saw Austria deprived of the whole of W. Galicia (which the minister Thugut had gained for her at the second partition of Poland in 1795), Trieste, Carniola, Istria, and most of Croatia, which were formed into the Illyrian Provinces, and, at the same time, of the Tyrol and the greater part of Salzburg. Six days before peace was signed Metternich became chief minister in Austria—a position which he held for nearly forty years.

In 1810 Napoleon married Maria Louisa, daughter of the emperor of Austria, and war with Russia became inevitable. During the Moscow campaign (1812) Austria joined Napoleon, but on the retreat of the expedition Metternich took up an independent attitude. When Napoleon refused to accept the Austrian terms, Metternich joined Russia and Prussia (Aug. 12, 1813) in the war of liberation. The overthrow of Napoleon and the reconstitution of Germany went on simultaneously, and from 1815 to 1848, under the influence of Metternich, Austria played an important part in German politics. Having, at the Congress of Vienna, recovered her lost territory, and added to it Lombardy, she naturally opposed all further revolutionary movements, and, with Russia and Prussia, took an active part in the Holy Alliance (1816). In 1835 Francis was succeeded by his son, Ferdinand I. The revolutionary movements of 1848 threatened to bring about the fall of the Austrian empire. Risings took place in Vienna, and in Hungary, Bohemia, and Italy. The Emperor Ferdinand abdicated, and was succeeded by his nephew, the present emperor, Francis Joseph I. With Russian aid the rising in Hungary was put down, though with great severity, and gradually the insurrections in other parts of the Austrian empire were suppressed. The re-establishment of the Austrian monarchy was followed by a movement for the union of Germany. The influence of Prussia was steadily increasing, and in 1850 war between Prussia and Austria seemed imminent. But before the question of supremacy in Germany was decided, Austria entered upon a war with Sardinia and France in Italy, and was beaten in the battles of Magenta and Solferino (1859). In the peace (Villafranca) which followed, Austria gave up Lombardy, except the fortresses of Mantua and Peschiera. In 1864 Austria joined Prussia in wresting Schleswig-Holstein and Lauenburg from Denmark; but in 1866 the allies fell out and went to war. The famous six weeks' war settled once for all the question of Prussian or Austrian predominance in Germany. Beaten at Sadowa, Austria was compelled to recognize the supremacy of Prussia. In 1867 the emperor wisely restored to Hungary the constitution taken from her in 1848, and with his consort was crowned at Pest amid great public rejoicings. At the same time, by the *Ausgleich*, or 'Compromise,' it was agreed that 'the common affairs of Austria and Hungary were to be settled by the delegations chosen by the two Houses. (See AUSTRIA-HUNGARY.) After the Franco-Prussian war of 1870-1, Bismarck established with Austria and Russia the Alliance of the Three Emperors, to preserve the *status quo* in Europe, and to oppose all revolutionary movements. But owing to the events in the Russo-Turkish war of 1877-8, the friendship of Austria and Russia came to an end, and in 1879 Bismarck signed a close defensive alliance with Austria. In 1882 Italy joined it, and the league has since been known as the Triple Alliance. The treaty of Berlin, in 1878, gave to Austria the protectorate over Bosnia and Herzegovina, and agitations stirred up by Panslavists in those regions have been vigorously suppressed. The growth of the influence of Hungary, together with the expansion of the Slav elements in the Austrian territories, has caused many modifications in the character of the administration. With a population composed of Germans, Czechs, Poles, Ruthenians, Slovenes, Serbs, Magyars, Italians, Roumanians, Jews, and others, it seems surprising that the Austrian empire has held together. The magic link which holds them all together is the personal influence of the Emperor Francis Joseph.

See Bryce, *The Holy Roman Empire* (1862); Fisher, *The Mediæval Empire* (1898); Tout, *The Empire and the Papacy* (1898); Giesebrecht, *Geschichte der Deutschen Kaiserzeit* (1855, etc.); Coxe, *House of Austria, 1218-1792* (1847); Ward, *The House of Austria* (1869); Gindeley, *History of the Thirty Years' War* (Eng. trans. 1886); Vehse, *Geschichte der Deutschen Höfe* (1851-8); Bright, *Maria Theresa* (1897); De Broglie, *Frédéric II. et Marie Thérèse* (1882); Arneth, *Geschichte Maria Theresias* (10 vols. 1863-79); Bright, *Joseph II.* (1897); Arneth, *Joseph II. und Leopold von Toscana* (1872); Sorel, *Europe et la Révolution Française* (1885); Zeissberg, *Zur Deutschen Kaiserpolitik Oesterreichs* (1889); Beer, *Zehn Jahre Oesterreichischer Politik, 1801-10* (1877).

Austria, Lower (area, 7,652 sq. m.), a crown land of Austria, and the E. half of the archduchy of Austria, is divided into a N. and a S. half by the Danube. The S. half is occupied by secondary ranges and foothills of the E. Alps. The N. is a table-land, tilted E. towards the low plain of Marchfeld. The March R. marks the E. boundary on this side of the Danube, as the Leitha does in part on the S. of that river. Manufacturing employs 39½ per cent. of the population, and agriculture 30 per cent. Most factories and mills are in Vienna, but outside the capital there is also much activity. Sawmills abound everywhere, and weaving and allied industries are important, as are brewing and distilling, brickmaking, the manufacture of tobacco, glass, cottons, haberdashery, gold and silver wire, wood pulp, chemicals, sugar, leather, rubber, clocks, etc. The population in 1900 numbered 3,100,493 (mostly of German blood, and Roman Catholic in religion), and of these 1,674,957 were in Vienna. The affairs of the province are administered by a governor nominated by the emperor, and by a committee chosen from among the seventy-eight members of the Provincial Assembly. To the Austrian Lower House of Parliament Lower Austria sends forty-six deputies.

Austria, Upper (area, 4,626 sq. m.), a crown land of Austria, and the W. half of the archduchy of Austria, is divided into two unequal parts by the Danube. The Inn and its affluent the Salzach separate it from Bavaria. The Traun and other streams drain the S. portion, while the part N. of the Danube is entirely occupied by the Böhmerwald and its tablelands. South of the Danube the Alps and their subsidiary chains cover almost the whole surface. The climate varies with the altitude; it is, however, too cold for the successful culture of the vine.

Nearly 37 per cent. of the entire surface is forest land, but agriculture is the principal industry. Cattle-breeding is also extensively carried on. The chief mineral is salt (a state monopoly), and lignite, gypsum, millstones, whet and grind stones, and granite are also obtained. Amongst manufactures, which are less developed than in Lower Austria, ironware and cutlery take the first place, chiefly at Steyr, where the well-known small-arms factory is situated. There are manufactures of linens and cottons, india-rubber, leather, paper, and glass. The population in 1900 was 810,246 (almost entirely of German descent, and Roman Catholic in religion). The most important towns are Linz, the capital (pop. 58,788), Steyr (17,592), Wels (12,187), and Gmunden (7,126). The provincial assembly numbers fifty members; the executive is in the hands of a committee chosen from amongst these fifty members, and directed by a governor nominated by the emperor. Upper Austria sends twenty delegates to the Austrian Lower House of Parliament.

Austria-Hungary, a dual sovereignty of Europe, embracing the empire of Austria and the kingdom of Hungary. The two states are perfectly independent of each other, possessing each its own constitution, legislature, and executive for most state affairs. The bond of union is a common monarchy, and a close and intimate political alliance. The present dual agreement was brought about by the *Ausgleich* (Agreement) of 1867. For historical events leading up to it see Hungary (History). The monarch is *Kaiser* of Austria and *Király* of Hungary, and the crown is hereditary in the Hapsburg-Lorraine dynasty, passing to males by primogeniture and lineal succession, and on failure of male heirs to females. The monarch must be a Roman Catholic, and he is head of the army and the executive. Affairs common to the two states and administered by common ministries are (*a*) foreign affairs; (*b*) military and naval affairs (excluding army legislation); (*c*) common finance. Each state provides, assesses, collects, and transmits its own contribution. There is a common system of weights and measures, and up to 1907 a Customs Union, in addition to a joint bank of issue, common commercial and political representation abroad, and common monopolies of salt, tobacco, spirits, beer, sugar, gunpowder, and mineral oil. The voting of money to be applied to joint purposes, and the control of the common ministries (of foreign affairs, war, and finance), are exercised by the delegations, which consist of two bodies, each of sixty members, summoned annually to Vienna and Budapest alternately, and deliberating separately—twenty being chosen from each of the Upper Houses (*viz.* the Austrian Herrenhaus and the Hungarian Förendihaz), and forty from each of the Lower Houses (*viz.* the Austrian Abgeordnetenhaus and the Hungarian Képviselöhaz). In the case of non-agreement, the delegates, or an equal number of representatives from each delegation, meet and vote, without discussion.

The two diets usually adopt a mutually jealous attitude, and any sign of ascendency on the part of one body is bitterly resented by the other. Either diet, by refusing its share of the common expenses or quota of troops, can paralyze the financial and defensive powers of the monarchy. That such a contingency is not remote was demonstrated in 1897, when the Customs Union, established by the *Ausgleich*, came up for renewal. Scenes of unparalleled disorder took place in both diets, and the continuance of the Customs Union had to be decreed by imperial warrant. An arrangement has now been made by which it is to continue until 1907. Hungary's contribution to the common expenditure was fixed at $33\frac{4}{11}$ per cent., and thus a working agreement has been made. Austria, however, is still seriously discontented with the comparatively small proportion of the common expenses which prosperous Hungary pays.

Military service is universally compulsory, though all men are not actually called upon to serve with the colours. On a peace footing the forces amount to about 346,000 officers and men, exclusive of the special forces of Austria and of Hungary. In time of war these forces, by drafting in the reserves, amount to 1,540,000 officers and men; while, in addition, a general levy of all men capable of bearing arms may be made. The navy is organized chiefly for coast defence, and comprises ten or twelve battleships, twelve cruisers, and seventy or more torpedo boats. A war flotilla is placed on the Danube. The chief naval station, strongly fortified, is Pola, but Trieste also serves as a naval base.

The total imports of the empire, including Bosnia and Herzegovina, in 1903, were £82,711,425, and the exports £90,708,232. Of the imports, £6,088,142 came from the United Kingdom, and £5,049,789 from the British colonies, etc.; and of the exports, £9,212,224 went to the United Kingdom, and £1,678,511 to the British colonies, etc. The largest trade, however, is with Germany. The chief imports and exports (in order of value) for 1903 were as follows:—Imports: raw cotton, wool, coal and coke, tobacco, instruments, watches, fancy goods, leather and leather goods, seeds, machinery, cereals, coffee, cattle, woollen yarn, eggs, silk goods, wine. Exports: wood, sugar, cattle, eggs, cereals, coal, leather goods, woollen goods, malt, and horses. For bibliography see Austria and Hungary.

Austria, Don Juan d', an obsolete Austro-Hungarian battleship, named after Don John, a natural son of the Emperor Charles V. The name has also been given to a cruiser launched in 1887 for Spain, and captured at the battle of Manila by the American admiral Dewey.

Austrian Lloyd Steam Navigation. This line of steamships, established about 1836, runs between Trieste and various Adriatic, Mediterranean, and Levant ports, in addition to services to Brazil, India, China, Japan, and Africa. The company owns a large fleet of small steamers; and when those vessels in course of construction are completed, it will own seventy-five steamers, aggregating 190,313 tons.

Auteuil, former vil. of the dep. of Seine, France, now incorporated in Paris, is situated on the r. bk. of the Seine, near the Bois de Boulogne, and has cold mineral springs. See Paris.

Authon, Jehan d' (*c.* 1466–1527), chronicler and poet, became historiographer to Louis XII., whom he accompanied to Italy. He died at Poitiers. See his *Chronique du Roi Louis XII.*, republished by Jacob (1834-5).

Author and Publisher. See Copyright and Publishing.

Authors, Royal Incorporated Society of, largely owes its foundation to the late Sir Walter Besant. Its objects are to defend the interests of literary, dramatic, and musical property. It issues works of guidance to authors, and advises authors on matters of publishing and proprietary interest. A pension fund for unsuccessful authors has been projected. The annual subscription is one guinea, and the secretary is G. H. Thring, 4 Portugal Street, Lincoln's Inn Fields. There are 1,500 members and associates: members must have written a book. The society publishes a monthly journal, *The Author.*

Auto, in Spain and Portugal a kind of short religious play, analogous to the miracle and mystery play of the middle ages. They were greatly in vogue from the 12th to past the middle of the 18th century; but were forbidden in Spain in 1765, though they are still represented in Portugal. The Spaniard Encina (*c.* 1469–1534) and the Portuguese Gil Vicente (*c.* 1475–1536) wrote several of these. In Spain, Lope de Vega (1562–1635), Calderon (1600–81), Gabriel Tellez, better known as Tirso de Molino (*c.* 1585–1648), and others, wrote several opera-like *Autos Sacramentales*, which were usually represented during the great processions of the festival of Corpus Christi. Four volumes of these were edited by Rouanet at Paris in 1901-2.

Autobiography, or the record of one's own life, is a province of letters of which we do not find many instances in the earlier stages of history. It is in the later works of Hebrew Scripture that the prophet or historian describes his own actions or fortunes in the first person; and if in the New Testament St. Paul may be said to be his own biographer, this is only by way of apology, either in speech or letter. The father of history, Herodotus, was also a traveller, and therefore confirms his statements, when he can, by his own experience; the same may be said of his mediæval counterpart, Froissart, whose personality, however, emerges more distinctly in his Chronicle. In contrast with this (we make no attempt at chronological sequence in an article necessarily rather suggestive than complete) is the self-effacement of Thucydides, the historian of the Peloponnesian war, who mentions in two words that he himself was stricken in the great plague of Athens which he graphically describes, recounts in the briefest terms his failure to relieve Amphipolis, and speaks later and quite incidentally of the opportunity of watching at leisure the progress of events which his consequent banishment afforded him. Xenophon is more communicative about himself; yet he writes in the third person, as did Cæsar in his *Gallic War*—two notable instances of autobiography, real but not professed. A man is no less his own biographer when he writes letters which he himself and his friends for him are careful to preserve: the *Life of Cicero*, whether written by Middleton or Strahan Davidson, must be gathered in great part from his letters; as must the *Life of Erasmus*, whether written by Jortin or Froude. We should know little of the life of the younger Pliny but from his own letters, written, after the model of Cicero's, with the same careful eye upon the world and posterity, and including his famous consultation of Trajan as to the treatment of the Christians in his province, and his account, as an eye-witness, of the destruction of Herculaneum and Pompeii, which, like Pepys's narrative of the fire of London, comes to us out of the past with the distinctness of a living voice. This reminds us that the diary is another form of autobiography. The deciphering of that of Pepys, in 1827, is among the most interesting achievements of modern times; as among the most precious of modern *trouvailles* is Evelyn's, found in an old clothes basket in 1817: both throw a vivid light upon history, character, and manners in England in the 17th century. Scarcely less valuable for the 18th and early 19th century is the *Diary* of Mme. D'Arblay (Fanny Burney, authoress of *Evelina*, etc.).

The contemplative and the religious life lean to autobiography, and the solitary falls back upon his memories. The Emperor Marcus Aurelius (Antoninus, A.D. 121–180) is said to have written an autobiography which has perished; but the first book of his *Meditations* is an account of his early education, and a tribute to his teachers. Almost all that is authentic about the ill-used minister of the Gothic emperor Theodoric—Boëtius, who was put to death A.D. 525—we learn from his own incidental statements, among the most valuable of which are those in the first book of his *De Consolatione Philosophiæ*, written in prison. But the first memorable autobiography, in the strict sense of the word, is the *Confessions* of St. Augustine, written *c.* 397 A.D. Its modern counterpart is Newman's *Apologia pro Vita Sua*, provoked by a careless remark of Kingsley's in *Macmillan's Magazine* (Jan. 1864). Under the title *History of my Religious Opinions*, it still remains a most interesting and pathetic record, but it has lost much that made it a miracle of dialectic skill. Between these two great names lie religious autobiographies almost innumerable — Bunyan's *Grace Abounding to the Chief of Sinners*, simple and touching; the self-revelations of William Huntington, S.S. (*Sinner Saved*), vainglorious and grotesque (1745–1813). The friend of Cowper, the Rev. John Newton, wrote the story of his own conversion and the strange vicissitudes of his early life. Cowper himself wrote an autobiographical fragment; and we have also the 'experiences' preserved in the *Journals* of Wesley and of Whitefield. 'There is no end of them,' writes Macaulay, significantly adding that Goethe (in a digression in *Wilhelm Meister*) is the only unbeliever who has imitated them with success. In France, Madame Guyon (d. 1717), the Quietist, whose verses Cowper translated, was her own biographer. Of wider literary interest, and the record of a quiet life in a somewhat different sense, is the *Journal* of Eugénie de Guérin (1834 *seq.*), of whom Matthew Arnold has given a sympathetic account in his earliest volume of *Essays*. French literature is rich in *Mémoires*, more or less autobiographical. Those of Sully, the great minister of Henry IV., are more uniformly personal than those of Saint-Simon, which throw much light upon the times of Louis XIV.; those of De la Porte, page to Anne of Austria, for whose sake he was sent to the Bastille, are interesting, especially in connection with Mazarin and the early life of the Grand Monarque. Perhaps the English counterpart to Sully is Clarendon, whose *Life*, written by himself, is a sequel to his *History of the Rebellion*. Montaigne makes no secret of the fact that he wrote his *Essays* about himself; his biography may be written from them; and what self-love did for him, affection did for Madame de Sévigné, whose letters, mainly to her daughter, are the best revelation of her own life and character. The *Mémoires* of the Baroness de Staal-Delaunay (d. 1750) anticipated in interest and vivacity the *Diary* of Madame D'Arblay. She must not be confused with the more famous Baroness de Staël-Holstein, who is directly autobiographical in her *Dix Années d'Exil*, and indirectly in everything else she wrote. In her *Delphine* she idealizes herself, her friends, and her enemies. ('I am told,' said Talleyrand, 'that you have put yourself and me in your book—*both* under the disguise of women.') She is herself the 'Corinne' of her most famous work, and is a good instance of the tendency to mingle truth with fancy in reminiscence. It is charitable to suppose that the most morbid aspects of Rousseau's remarkable *Confessions* are due to exaggeration; and when Goethe wrote his far healthier *Aus meinem Leben*, he added as a second title, *Wahrheit und Dichtung*, that it might be understood that he had given imagination a certain range. Similarly, readers of De Quincey's *Confessions of an English Opium Eater* or Borrow's *Lavengro* will not take all for gospel.

It is a reflection on humanity to note how much autobiography owes to the prison. The patriot Silvio Pellico wrote much, but is only remembered by *Le mie Prigioni*. The Prussian, Trenck, speaks of many books of his which no one has ever read, but the account of his adventures and ten years' imprisonment in Magdeburg is still amusing: combine parts of *Barry Lyndon* with parts of *Monte Cristo*, and you can form some notion of the work of this splendid liar. The unedifying Casanova de Seingalt (d. 1798) made a daring escape from the *piombi* at Venice, and lived to write his cynical story in many volumes. Another gifted rascal among autobiographers, Benvenuto Cellini, Goethe thought it worth while to translate: for a delightful account of this strange artist, see the essay 'A Rogue's Memoirs' in Birrell's *Obiter Dicta*. The artist life is seldom of this complexion, although it is sometimes, as in the autobiography of Haydon, a story of blighted hopes, and in the journal and letters of Marie Bashkirtseff (b. 1860; d. 1884) of brilliant promise cut short by death.

The strenuous life has not often much leisure or inclination to keep its own record, yet a very noteworthy autobiography is that of Benjamin Franklin—a little too self-complacent, not altogether pleasant reading, yet throwing interesting light upon the condition of Massachusetts and Boston, Pennsylvania and Philadelphia, while these were still British dependencies. Cobbett's American career, coincident with the early days of American independence, has the same historic interest: he tells it (1798) in the *Life and Adventures of Peter Porcupine* (his *nom de guerre*). Even Nelson has given a brief and fragmentary account of himself in manly, sailor-like fashion: and the autobiography of the ill-used Lord Dundonald is a spirited record of brilliant enterprise; whilst the *Two Years before the Mast* of the American Dana is one of the best sea-books ever written.

Of the pursuit of knowledge under difficulties, Franklin, already cited, may pass as an example; but the 18th century supplies us with two others who have left a record of their struggles: these are Ferguson (James), the astronomer and mechanician, the shepherd boy who mapped the stars for himself by means of a stretched thread strung with beads; and William Hutton, the historian of Birmingham, whose early hardships are a sad and cruel story. In contrast with these are Colley Cibber's *Apology for his Life*—by far his best work and the *Memoirs* of Gibbon, which leave on us the impression of a self-centred man, mainly concerned to vindicate his own tastes, studies, and opinions. Walpole's *Short Notes of my Life* are a chronological epitome of the little labours of a dilettantist. A pretty record of his own early life is given by Walter Scott (see Lockhart's *Life*). Wordsworth has left his own autobiography; but Wordsworthians will set more value on the reminiscences in *The Prelude*. The valuable *Biographia Literaria* of Coleridge is to the ordinary reader a wilderness of criticism and philology, with oases of personal history. The autobiography of Leigh Hunt (1850) was praised in the highest terms by Carlyle; it is noteworthy that, soon after its publication, the author was described by his friend Dickens in *Bleak House* in the guise of the irresponsible and ungrateful 'Harold Skimpole.' As we approach our own days, selection on the subject becomes practically impossible; vanity, goaded by the interviewer, overcrowds the scene. Yet there emerge very distinctly Hugh Miller's story of his early days, in *My Schools and Schoolmasters*, and the autobiographies of John Stuart Mill and Carlyle—the first valuable as an acknowledgment that the severest thinkers have their spiritual needs, and the second as a tardy tribute to the worth and genius of a much-enduring wife. Harriet Martineau's autobiography delights the English positivists—'fit audience, though few.' Two eminent lawyers, Ballantyne and Montagu Williams, have recorded their amusing experiences of the seamy side of life; amidst public entertainers, the Bancrofts have disclosed in the most interesting fashion the secret history of the stage. Ruskin's *Præterita*, and Huxley's very brief autobiography, present in effective contrast the imaginative and scientific attitude in face of the great problems that vex humanity; and the reminiscences of Mark Pattison and Augustus Hare have confirmed the nascent suspicion that autobiography is destined to add a new terror to the living.

Auto-car. See Motor Car.

Autoclave, or Digester, is an apparatus for heating substances under pressure. It usually consists of a strong iron or steel pot, provided with a cover that can be bolted on air-tight, and is often lined with an acid-resisting material. It is usually provided with a safety-valve, and is often swung on trunnions for convenience.

Autocles, an Athenian general and orator of the 4th century B.C. In 371 he negotiated a peace with the Spartans, and in 362 conducted an expedition into Thrace.

Autocracy. See Government.

Auto da Fé. See Inquisition.

Autodidactus, The ('Self-taught man'), an Arabic romance setting forth the growth, into knowledge of nature and God, of a child cast upon a desert island; by Abu-Bekr-ibn-Tofail (Lat. trans., *Philosophus Autodidacticus*, E. Pocock, 1671; Eng., *The Improvement of Human Reason*, S. Ockley, 1711).

Autographs, documents of any kind in the handwriting of their authors (Gr. *αὐτογράφα*). Interest in autographs was first shown in the vogue of the album, or *Liber Amicorum*, which seems to have begun in Germany as early as the 14th century, and has continued in the form of visitors' books to our own day. The British Museum contains several of these albums, with signatures of celebrities of the reigns of Elizabeth and James I., in whose time they were especially popular. The collection of detached autographs is said to have begun in France as early as the 16th century; in England the first notable collector was the antiquary Ralph Thoresby, who died in 1725. The finest modern collection in private hands is that formed (1865-82) by Mr. Alfred Morrison, of which a descriptive catalogue, in six volumes, with facsimiles, was printed between 1883 and 1892. The best books on the subject are: *Autographs of Royal, Noble, Learned, and Remarkable Personages..... from the Reign of Richard II. to that of Charles II.*, by J. G. Nichols (1829); *The Handwriting of the Kings and Queens of England*, by W. J. Hardy (1893); *Facsimiles of Royal, Historical, Literary, and other Autographs in the British Museum* (1895-9); *A Guide to the Collector of Historical Documents, Literary Manuscripts, and Autograph Letters*, by Dr. Scott and Samuel Davey (1891).

Autogravure. See PHOTOGRAPHY.

Auto-intoxication, self-intoxication, or poisoning by compounds produced internally by oneself, as in uræmic poisoning.

Autolycus, an ancient Greek hero, the son of Hermes, and father of Anticleia, the mother of Odysseus. He was famous for his craft and cunning, and is said to have been able to render himself and his stolen goods invisible. It was from him that Odysseus was held to have inherited his craftiness.

Autolycus OF PITANE (c. 300 B.C.), Greek astronomer, wrote two works on the sun and stars, ed. by Hultsch: *Autolycide Sphæra quæ movetur de Ortibus et Occasibus* (1885).

Automatic Action, a term applied in physiology to instinctive or involuntary movements. It is impossible always to distinguish them from reflex action, though theoretically the first proceeds from an internal impulse, the second from an external. Sleep-walking may be given as an example of automatic action. The involuntary movement of the eyelid, when threatened with a blow, is reflex.

Automatic Machines. See MACHINES, AUTOMATIC.

Automatism, the doctrine according to which all the actions of living beings, including the voluntary actions of man, can and must be completely explained in purely physiological terms; so that consciousness or volition, where it occurs, is merely a concomitant of the bodily movement (or the brain change), but has no part in bringing it about. See Huxley's essay on 'The Hypothesis that Animals are Automata' (*Collected Essays*, vol. i. 1898); and, for criticism, Ward's *Naturalism and Agnosticism* (1899).

Automaton (Gr. 'self-moving'), a machine contrived to imitate the motions and actions of some living creature. In ancient history many automata are reported as having been invented by Archytas, Hero, and others. The most famous modern invention was Vaucanson's flute-player, exhibited in Paris in 1738, which imitated to the life an executant on the instrument. Other automata in Germany, Austria, and Hungary were also musical, and some represented persons writing words and sentences, the best known being the chess-player of the Hungarian Kempelen, brought to London in 1783, which was in reality no automaton, but was found to be managed by a clever player of diminutive size ingeniously concealed in the interior. All automata, however, have been surpassed by the specimens invented by Mr. Maskelyne, and exhibited at the London Egyptian Hall - *e.g.* 'Psycho' (1875), a figure seated on a glass cylinder, which plays cards against all comers, and works arithmetical questions of great difficulty; 'Zoe' (1877) draws on a paper the likeness of any person selected by the onlookers from a list of two hundred notabilities.

Automobiles. See MOTOR CARS.

Autonomy, in its philosophical sense, a term used by Kant to express the principle that the moral reason, or conscience, cannot recognize as binding any law which is not affirmed by the moral reason itself, but merely imposed from without, and supported by an appeal to non-moral or interested motives (ultimately pleasure and pain). A law thus imposed from without is termed by Kant *heteronomous*.

Autonomous States are those in which the citizens have a certain degree of self-government. Frequently the term is employed to designate a self-governing state under the suzerainty of another power.

Autoplasty (Gr. 'self-formation'), a surgical operation whereby a diseased or injured part is replaced by tissues taken from the same body. Thus, a deficiency in the nose is supplied from a triangular flap of skin and subcutaneous tissue marked off on the forehead immediately above, with the apex between the eyebrows. The triangle is separated from the forehead, except at the apex. It is brought down and twisted on the apex, so that it has still the right side out, and its raw edges fixed to a raw surface below. The nose is then shaped and moulded. This is called rhinoplasty. Skin-grafting is another example.

Autopsy. See POST-MORTEM EXAMINATION.

Autotype. See PHOTOGRAPHY.

Autotypography. See ZINCOGRAPHY.

Autrefois Acquit Autrefois Convict. A man is not to be tried twice for the same offence, and a person so charged may plead verbally or in writing *autrefois acquit* or *autrefois convict* - *i.e.* that he has already been acquitted or convicted on the same charge, either at home or abroad, by a court of competent jurisdiction. In Scotland the plea is 'tholed an assize.'

Autumn is that season of the year which begins astronomically in the northern hemisphere when the sun enters the zodiacal sign Libra - *viz.* about Sept. 23. In the southern hemisphere this is the beginning of spring. The beginning of the sign Libra is at the intersection of the equator and the ecliptic, or the point of the sky at which the sun crosses from north to south of the equator. This is known as the autumnal equinox, and day is then equal to night all over the world. Autumn ends and winter begins on Dec. 21, when the sun has reached its lowest position south of the equator. The Americans call the autumn 'the fall.' The term was formerly in good literary use in England.

Autun (anc. *Augustodunum*), dist. tn. and episc. see, dep. Saône-et-Loire, France, on the Arroux, 51 m. N.N.W. of Mâcon. It has Roman remains, such as a theatre, and the Pierre de Couhard, a pyramid of masonry 88 ft. high. The cathedral, begun 1060, dates mainly from the 12th century, and has a beautiful spire of the 15th century. Industries, especially textiles, tanning, paper-making, and brewing, are important. Originally the seat of a Druidical school, it was under the Romans famous for its school of rhetoric. It was sacked by the Vandals in 406, by the Burgundians in 414, by the Huns in 451, by the Franks in 534, by the Arabs in 739, and by the Normans in 895. It was burned by the English in 1379, and suffered from plague in 1494 and 1564. In 1870 Garibaldi checked the Germans before Autun. Pop. (1901) 15,664.

Auvergne (*Arvernia*), former prov. of Central France, now forming the dep. of Puy-de-Dôme, Cantal, and the N.W. of Haute-Loire. The cap. was Clermont-Ferrand, though at one time that town was independent, and the rest of the province was divided into a dukedom (cap. Vodable) and a county (cap. Vic-le-Comte). The province belonged for a long time to the Count de Toulouse, and then to the house of Bourbon, but has been French since 1531.

Auwers, ARTHUR (1838), German astronomer, born at Göttingen; director of the new observatory at Potsdam (1881), and conductor of expeditions for observation of transits of Venus (1874 and 1882). His works include *Untersuchungen über veränderliche Eigenbewegungen der Fixsterne* (1862); *Katalog von 9,789 Sternen* (1896); *Determinations of the Solar Parallax* (1896), with Sir D. Gill at Cape Town.

Auxerre (Rom. *Autissiodurum*), tn., cap. of dep. Yonne, France, on the slope of a hill, rising from the l. bk. of the Yonne, 109 m. S.E. of Paris. The beautiful cathedral of St. Etienne mainly dates from the 13th to the 15th century, and the abbey St. Germain, with a tower of the 14th century, is now a school. The prefecture was formerly the bishop's palace. There are manufactures of cloth, and a trade in wines, bricks, leather, and ochre. Pop. (1901) 18,901.

Auxetophone. See Talking Machines.

Auxiliary Forces. See Militia and Volunteers.

Auxonne (anc. *Assonum*), a fort. dist. tn., dep. Côte d'Or, France, on the l. bk. of the Saône, 19 m. S.W. of Dijon. It contains a church of Notre Dame, erected from 1309-60, and a fortified château in the Renaissance style. Manufactures of cloth, muslin, etc. Pop. (1901) 6,135.

Auzout, Adrien (1630-91), French mathematician, born at Rouen. Inventor of the micrometer, and one of the first members of the Academy of Sciences. He published *Traité du Micromètre* (1667).

A.V., abbreviation for Authorized Version; also for Artillery Volunteers.

Ava. See Kava.

Ava, ruined city on the l. bk. of the Irawadi; was the cap. of Burma from 1364 to 1740, and again from 1822 to 1838. Its many temples, and a sandstone image of Gautama, 24 ft. in height, were destroyed by an earthquake in 1839.

Ava. See Dufferin and Ava, Marquis of.

Avalanche, a mass of snow or ice which slides or rolls from the mountain slopes into the valleys, often causing great damage to villages and forests. Four kinds are distinguished—(1) *Drift A.*, formed of powdery snow driven before a gale; (2) *Rolling A.*, hard snow rolling down and gathering bulk as it goes; (3) *Sliding A.*, snow impelled by its own increasing weight; (4) *Glacial A.*, a mass of frozen snow and ice detached from a glacier in spring, when the snow begins to melt.

Avalon, 'the island-valley of Avilion' of Tennyson's *Morte d'Arthur*, is the paradise of the departed heroes of Celtic tradition. Its 'magic apples' suggest a connection between Avalon and the garden of the Hesperides. The Celtic legends of the journey to the soul-kingdom formed one of the sources of Dante's poem. For one of the most perfect of them see Whitley Stokes's trans. of *Fis Adamnain.*

Avalon, peninsula, S.E. Newfoundland, with Trinity Bay to the N. and Placentia Bay to the S.; contains St. John's, the cap.

Avanturine, an artificial glass in which red spangles of copper are scattered; also a kind of quartz in which small plates of brown mica produce a similar effect. The natural can be distinguished from the artificial avanturine by its being harder than a steel knife-blade. It is used in brooches, umbrella handles, vases, and other ornaments. The best specimens come from the Urals: a vase 4 ft. high, carved from a single block of Siberian avanturine, presented by Nicholas I. to Sir Roderick Murchison, is now in the Museum of Practical Geology, London. A green variety comes from India.

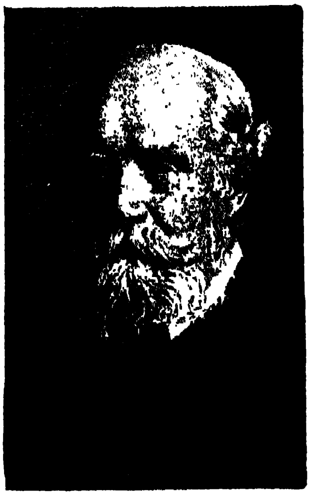
Avaris, ancient tn. of Lower Egypt, on the isthmus of Suez, near Pelusium, headquarters of the invading Hyksos, or shepherd kings. These people were finally besieged in Avaris by Aahmes I., founder of the 18th dynasty, and the city was captured, and the Hyksos driven into S. Palestine.

Avars. (**1.**) A people of Ural-Altaic race, who dwelt on the steppes of the Don, near the Sea of Azov, later also near the Caucasus. In 558 A.D. they offered their services to the Byzantine emperor Justinian, who commissioned them to subjugate the Bulgarians, who had invaded Mœsia (now Bulgaria). Having performed this task, they settled in Pannonia (the present Hungary), and in 566 helped the Longobards to break the power of the Gepidæ, or Goths. Then they extended their dominion over Dacia and the territories between the Alps and the Black Sea. But they were very troublesome neighbours, and made frequent incursions into the Byzantine empire (581), against the Franks (596) and against the Longobards (610). In 619 they plundered the country round Constantinople. After the death (630) of their chief, Bajan, their downfall was rapid, and the peoples under their domination liberated themselves one after the other. Nevertheless, during the 8th century they made frequent incursions into Germany and Italy, until Charlemagne took the field against them, and completely destroyed their power in 796. After that they became merged in the Bulgarians and the different Slav peoples of the Danube region; and after the middle of the 9th century scarcely anything more is heard of them. (**2.**) People, allied to the Lesghian stock, dwelling in the Khanate of Avaria, Daghestan.

Avatar (Sans. 'descent'), applied to the 'descent' (incarnation) of the principal deities in Hindu mythology; especially applied to Brahma, Siva, and the ten incarnations of Vishnu.

Avatcha, or Avacha, bay, tn., and active volcano with double peak (8,500 and 10,000 ft.), S.E. Kamchatka. Petropaulovsk is on the E. shore of the bay.

Avebury, or Abury, Wiltshire, England, an ancient artificial mound and 'Druidical circle' or 'heathen temple,' now almost obliterated. It resembled Stonehenge, which lies 17 m. due S. of it. A plan of the circle, made by Dr. Stukeley (*Stonehenge and Abury*, 1740), shows it as then almost complete, while two smaller circles were still traceable within it. The great circle was about 1,400 ft. in diameter, and was marked by 100 upright stones, of which some stood 20 ft. above the ground. See Sir R. Colt Hoare's *Ancient Wiltshire* (1812-44).



Lord Avebury.
(*Photo by Elliot & Fry.*)

Avebury, Sir John Lubbock, First Baron (1834), banker and scientist, was born in London, and educated privately and at Eton. Entering his father's banking business (Robarts, Lubbock, and Co.) in 1848, he became a partner in 1856. He was vice-chairman of the London County Council (1889-90), and chairman (1890-92); as well as president of the Linnean Society (1881-6). After representing Maidstone in Parliament from 1870-80, he sat for London University (1886-1900). In the latter year he was raised to the peerage as Baron Avebury. His name is associated with over twenty important measures, including the Bank Holidays Act (1871). Avebury has most distinguished himself by his anthropological researches and observations of insect life, more especially of bees and ants. Among his numerous works are *Prehistoric Times* (1865; new ed. 1900); *The Origin of Civilization and the Primitive Condition of Man* (1870; 1902); *The Origin and Metamorphoses of Insects*

(1873); *On British Wild Flowers* (1873); *Monograph on the Collembola and Thysanura* (1873); *Fifty Years of Science* (1882); *Ants, Bees, and Wasps* (1882), which has run through fourteen editions; *The Pleasures of Life* (1891), by far his most popular work; *The Senses and Instinct of Animals* (1888); *Flowers, Fruits, and Leaves* (1886); *On Representation* (1890); *The Beauties of Nature* (1892); *The Use of Life* (1894); *The Scenery of Switzerland* (1896); *Buds and Stipules* (1898); *The Scenery of England* (1902); *Short History of Coins and Currency* (1902); *Essays and Addresses* (1903); *Free Trade* (1904).

Aveiro, dist. (area, 1,146 sq. m.; pop. (1900) 302,181) and tn. (episc. see), prov. Beira, Portugal, at the S.E. corner of the coast lagoon of Aveiro, 40 m. by rail S. of Oporto. The people are engaged in fishing (sardines and oysters), and in producing salt.

Avellaneda, GERTRUDIS GOMEZ DE (1816-73), Spanish poetess, who often published under the pen-name of 'Peregrina;' born in Cuba, but lived in Madrid and Seville. Besides *Poesias Liricas* (new ed. 1850), she wrote novels and dramas. Of the former may be mentioned *El Mulato Sab* (1841), *Dos Mujeres* (1842), *Espatolino* (1842), and *Dolores* (1843); of the latter, *Leoncia* (1840), and the Biblical dramas of *Saul* (1849) and *Baltasar* (1849).

Avellino. (**1.**) Province, formerly Principato Ulteriore; area, 1,172 sq. m.; pop. (1901) 402,890. (**2.**) Town (episc. see), Italy, cap. of prov., 59 m. by rail E. by N. of Naples; has for centuries been famous for its hazel-nuts. Linen, paper, sausages, and hats are manufactured. The town was founded in the 9th century. The ancient *Abellinum* (now Atripalda) lay 4 m. E. Close to it is the famed church of Monte Vergine, with a wonder-working image of the Virgin, and the tomb of Catherine of Valois. Pop. (1901) 23,602.

Ave Maria, or ANGELICA SALUTATIO, a prayer used in the Roman Catholic Church, addressed to the Virgin Mary. It first consisted of the salutation of Mary by the angel Gabriel (Luke 1:28), along with Elisabeth's greeting to Mary (Luke 1:42). The addition, 'Holy Mary, Mother of God, pray for us sinners, now and in the hour of our death,' dates from the 15th century, but was first authorized for daily use in the breviary by Pius V. in 1568.

Avempace, surnamed IBN-SAYEG or IBN-BADJA (d. 1138), Arab philosopher, physician, astronomer, and poet, was born at Saragossa. He is said to have written on Aristotle, on medicine, music, and logic; his great philosophical work, *The Conduct of the Individual*, is known to us only through its mention by Averrhoes, and notes upon it by Moses of Narbonne. Avempace travelled to Fez, where he is said to have been poisoned by a rival physician.

Avenarius, FERDINAND (1856), German poet and writer on art, was born in Berlin, from which in 1871 he moved to Dresden. *Wandern und Werden*, his first volume of poetry, appeared in 1881 (new ed. 1897); in the following year he compiled an excellent anthology, *Lyrik der Gegenwart seit 1850*. He founded in 1887 *Der Kunstwart*, and wrote the critical work *Max Klingers Griffelkunst* (1894). He has also written volumes of lyrical poetry—*Stimmen und Bilder* (1897; 2nd ed. 1903); *Die Kinder von Wohldorf* (1886; 2nd ed. 1896); *Lebe!* (1893; 4th ed. 1903)—showing great metrical skill and power.

Avenches (Ger. *Wiflisburg*; anc. *Aventicum*), vil., canton Vaud, Switzerland, 7 m. N.E. of Payerne. Its mediæval castle stands on part of the site of the great Roman colony Aventicum Helvetiorum, formerly occupied by an older Helvetian town mentioned by Tacitus, and ruined in A.D. 69. Pop. (1900) 1,952.

Avens, the English name of plants of the genus Geum, or their allies. The common avens, which is found in woods and hedges, has erect flowers and sessile heads of fruit. The water avens has drooping flowers with purplish calyces, both varieties having the qualities of cinchona.

Aventine Hill (*Aventinus Mons*), one of the seven hills of ancient Rome, situated on the l. bk. of the Tiber, and S.W. of the Palatine Hill. Ancus Martius colonized it with the inhabitants of the conquered Latin towns. Servius Tullius brought it within the fortified part of the city, and built upon it the celebrated temple of Diana. After 455 B.C. it was the special plebeian quarter of Rome. At the present time it is almost deserted, being covered with gardens, vineyards, and a few old churches.

Aventinus, JOHANNES (1477-1534), whose proper name was TURMAIR, known as the 'Bavarian Herodotus,' a German historian, studied under Celtes at Ingolstadt in 1495. In 1517 he was appointed historiographer of Bavaria. His *Annales Boiorum* and its German edition appeared after his death, in 1554 and following years. His *Chronica* is the first important work on German history based on a critical examination of the sources. The Bavarian Academy of Sciences issued a complete edition of his writings in 5 vols. (1881-6). See *Lives* by Döllinger (1877) and Wegele (1890).

Avenue Theatre. This London house was opened on Mar. 11, 1882, under the management of Mr. Edmund Burke, with *Madame Favart*, Miss Florence St. John being the chief attraction. *Manteaux Noirs*, an adaptation from the French of Scribe, followed. For some years French opéra bouffe was the mainstay. In September 1890, Daudet's play, *La Lutte pour la Vie*, adapted by Robert Buchanan and Frederick Horner, was produced. It was soon replaced by Mr. R. C. Carton's *Sunlight and Shadow*. In 1892, Mr. Henry Arthur Jones succeeded Mr. Henry Lee as manager, and in the same year Mr. Jones's *Crusaders* brought the Avenue season to a close. In 1893 the Kendals returned hither after their American tour. Among recent successes was Mr. R. Ganthony's *A Message from Mars*, in which Mr. Charles Hawtrey took the principal rôle.

Average, in law. (**1.**) General average is the term applied to the rule by which losses or sacrifices arising on a voyage are recouped by an average contribution from all parties who benefit by such loss or sacrifice. For this purpose the adventure is considered as consisting of three parts—ship, freight, and cargo. Suppose the ship is worth £20,000, the freight (*i.e.* the money being earned by the ship on its voyage) £5,000, and the cargo £10,000. The captain, in order to lighten the ship in a storm, throws overboard £2,000 worth of cargo. This loss will not fall entirely on the owners of the cargo, but, according to the principle of general average, will be divided. The owners of the ship will pay four-sevenths—*i.e.* the proportion of the value of the ship to the value of ship and freight and cargo; the owners of the freight will pay one-seventh; and only the remaining two-sevenths will fall upon the owners of the cargo. Of course the principle is the same if the loss falls on the ship—*e.g.* if the sails are cut away to save the ship; or if it falls on the freight—*e.g.* if the freight is lost by putting into a port to refit. But in order that there may be a general average contribution, the following conditions are necessary:—(1.) The loss must be an intentional one—*e.g.* there is no general average for cargo washed overboard, but only for cargo intentionally jettisoned. (2.) It must be for the benefit of all parties—*e.g.* an extraordinary expenditure of coal in order to bring the ship to port in time will not be a general average, for it benefits the freight alone, and not the ship and cargo. (3.) It must be incurred under pressure of immediate and unusual necessity. (4.) It must not arise from the negligence of the parties—*e.g.* improper stowage or navigation. The loss may take the form either of a sacrifice (*e.g.* jettison of cargo) or of an expenditure (*e.g.* salvage). As a rule, deck cargo, if jettisoned, is not entitled to a general average, because cargo should not be placed on deck; but timber and cattle are perhaps exceptions. (**2.**) Particular average is a misleading term, applied to a loss which falls upon the owner of the particular article lost, and which is not recouped by a general average. See Lowndes on *General Average* (1888).

Average. See STATISTICS.

Averaging, in stock-exchange operations, is a system in use among speculators when the market is going against them. A speculator for a rise purchases more stock, or one for a fall sells more, so that the average cost of the whole would be less or more than that of the first purchase, a relatively smaller movement being then necessary to ensure a profit.

Averments. See INDICTMENT.

Avernus, LAKE, Italy, 10 m. W. of Naples, the crater of an extinct volcano, where the ancients placed the entrance to the infernal regions. (*Cf.* '*Facilis descensus Averno*,' Virgil's *Æneid*, VI.). Agrippa, at the command of Augustus, connected the lake with the sea, and built a naval port, which existed down to 1538, when the volcanic uprising of Mount Nuovo destroyed it, and completely altered the face of the adjacent country. Lake Avernus is 21 ft. deep, but only 4 ft. above sea-level, and not more than 2 m. in circumference.

Averrhoës, or AVERROES, whose name was ABUL-IBN-ROSHD (1126-98), Arab philosopher, was born at Cordova in Spain; acted as judge (from 1169) in Seville and Cordova, and then for many years officiated as court physician to Yakub al-Mansur, Almohade sovereign of Morocco and Cordova. Having an unbounded admiration for Aristotle, whom he regarded as the incarnation of all human wisdom, he was for ages famous as the great commentator of his master, and at Padua his school flourished until nearly the middle of the 17th century. Roger Bacon and John Baconthorpe were the most conspicuous of the English Averrhoists. Averrhoës drew the clearest distinctions between human science (knowledge) and religion, and discriminated sharply between this last and the logic-chopping subtleties of theology. One of the central features of his teaching was the postulation of a universal transcendent intellect which manifests itself eternally in different degrees in individual men. By substituting the conception of the human soul for the intellect in this doctrine, the theological opponents of the Averrhoist school accused Averrhoes of denying the immortality of the soul. The best Latin edition of his commentaries was issued at Venice in 1552 and following years. See J. Müller's *Philosophie und Theologie* (1875); Renan's *Averroès et l'Averroïsme* (3rd ed. 1869); and Mehren's *Études sur la Philosophie d'Averrhoès* (1888).

Avers, Alpine valley, canton Grisons, Switzerland, joining the valley of the Hinter-Rhein. The lower portion (Ferrera Glen), between Canicül and Cresta (which stands at an altitude of 6,394 ft.), is one of the highest inhabited places in Europe.

Aversa, tn. and episc. see, prov. Caserta, Italy, 12 m. by rail N. of Naples. In the castle of Aversa, Andreas, king of Hungary, husband of Joanna, queen of Naples, was assassinated by Niccolò Acciajuoli in 1345. Wine is made here; hemp and cotton are woven, and furniture manufactured. The place has been identified by some with the ancient *Atella*. Pop. (1901) 23,189.

Avesta. See ZEND-AVESTA.

Aveyron, dep., France, on S.W. slope of central plateau, roughly triangular in outline; area, 3,376 sq. m. Wholly in the basin of the Garonne, the dep. is crossed by its tribs., the Lot, the Aveyron, and the Tarn. The frontier on the N.E. is formed by the Monts d'Aubrac, entirely volcanic in character, and on the S.W. by the ridge of the Cevennes; between these lie lofty chalky plateaus (*causses*), with deep ravines and grassy valleys. The mountains N. of the Lot are granitic. Much of the surface is barren, the agricultural districts being found chiefly in the lower valleys of the Lot and Aveyron (Basse Marche). Forests are still extensive, and round Aubin coal, iron ore, lead, and silver are mined. The natural beauties of the dep. and its mineral springs attract tourists. Pop. (1901) 382,074.

Avianus, FLAVIUS, a Latin fabulist of the 4th century, author of forty-two fables in imitation of Phædrus and Babrius, still extant, set forth in elegiac verse. They made a favourite school-book of the middle ages, and were translated by Caxton (1484). Ed. by Lachmann (1845). See *The Fables of Avianus*, ed. by R. Ellis (1887).

Aviary, a large cage or enclosure for keeping birds. See CAGE BIRDS.

Avicebron, or SALOMON-IBN-GABIROL (1020-70), Jewish poet and philosopher, born at Malaga in Spain. He is the author of the philosophical work *Fons Vitæ*, or *Fons Sapientiæ*, written in Arabic, which had a great influence on the scholastic writers of the middle ages. His teaching was compounded of Jewish theology, Aristotelianism, and Neo-Platonism. His writings exercised also a great influence upon the development of the Cabbala. He composed numerous poems and hymns, several of which now form part of the synagogue prayer-book. See Kaufmann's *Studien über S. Ibn Gabirol* (1899); Geiger's *S. Gabirol und seine Gedichte* (1867); Munk's *Mélange de Philosophie Juive et Arabe* (1857).

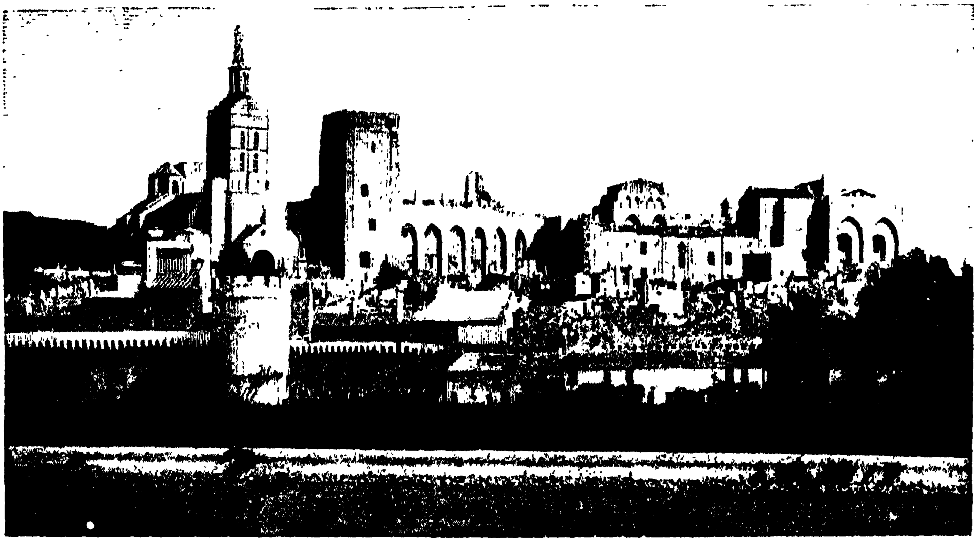
Avicenna, or IBN-SINA (980-1037), Arabian philosopher and physician, born near Bokhara; died at Hamadan, in Persia. For some years he led an unsettled life, living, among other places, at Rai, near Teheran; then he found his way to Hamadan, where for a time he occupied the position of grand-vizier to the ruling chief; and finally settled in Ispahan. His principal work is the *Canon of Medicine*, written in Arabic, early translated into Latin, and for centuries (to the middle of the 17th century in some) a leading text-book in European universities. This is based upon Galen *i.e.* ultimately upon Hippocrates and Aristotle. In philosophy his most important work was *Ash-Shafa*, an encyclopædia of the philosophical sciences, of which an extract, *Al-Nadjat*, contains his logic, metaphysics, and physics. His philosophical doctrine is mainly Aristotelian, adapted in many parts to the religious faith of the Koran. His works, which were translated into Latin in the 12th century, appeared in 1493 in Venice, and afterwards in numerous editions. See Munk's *Mélanges de Philosophie Juive et Arabe* (1857), Mehren's *Traités Mystiques d'Avicenne* (1889-99), and Carra de Vaux's *Avicenne* (1900).

Avicennia, or WHITE MANGROVE, a genus of Verbenaceæ, evergreen trees and shrubs indigenous to the tidal estuaries and salt marshes of most tropical countries. The astringent bark of the *A. tomentosa* is much used in Rio Janeiro for tanning; in New South Wales the wood, being hard and durable, is used for mallets, etc.

Avienus, RUFUS FESTUS, a Latin poet who wrote on geographical and astronomical subjects in the 4th century A.D. To him are ascribed (1) *Descriptio Orbis Terræ*; (2) *Ora Maritima*, a description of the coast of the Mediterranean from Marseilles to Cadiz; (3) *Aratea Phænomena* and *Aratea Prognostica*, free translations from the Greek author Aratus. See Wernsdorf's *Poetæ Latini Minores*, vol. v., or Holder's ed. (1886).

Avigliano, tn., prov. Potenza, Italy; is built on a hill (3,010 ft.) 8 m. N.W. of Potenza; it manufactures explosives. Pop. (1901) 18,481.

Avignon (Lat. *Avenio*), tn., cap. of dep. Vaucluse, France, on l. bk. of Rhone, 143 m. below Lyons and 25 m. above the apex of the delta. The city is the seat of an archbishop. The citadel-like palace of the popes, built 1336-70, with six towers and walls 18 ft. thick, is the chief object of interest. The metropolitan church, Notre Dame des Doms (12th century), perched on a rock (280 ft.), between which and the river is the well-known Promenade des Rocher des Doms, and a multitude of other ecclesiastical structures, are interesting (*la ville sonnante* of Rabelais). A continuous belt of walls (1349-68) encircles the city. Villeneuve, on the r. bk. of the river, is connected with Avignon by the famous bridge built in 1108, and partly destroyed in 1669. The only industries of note are those of silk, copper, zinc, and lead. The Popes regularly resided in Avignon from 1309 to 1378, and at intervals up to 1417, the town and surrounding district remaining a papal possession until 1791. Petrarch first saw Laura in Avignon, and she was buried in the church of the Cordeliers, now destroyed. In 1873 John Stuart Mill died here. Pop. (1901) 46,896. See Joudon's *Avignon: son Histoire, ses Papes, ses Monuments, et ses Environs* (1842); and Muntz's '*La Cour pontificale d'Avignon*,' in *Revue des Questions Historiques*, vol. xxii. 99).



The Palace of the Popes, Avignon.

Avila (anc. *Abula*), city of Spain, cap. of prov. of same name, 70 m. N.W. of Madrid, on main N. Ry., ancient and picturesque decaying city on the lower slopes of the Guadarramas. The Moorish walls and towers stand almost intact. Avila was the birthplace of Santa Teresa (1515-82). Pop. (1900) 11,885. The province (part of Old Castile) is relatively poor agriculturally, but produces timber, chestnuts, and olives; its rich mines of coal, copper, and lead are little worked. Pop. (1900) 197,694.

Avila, JUAN DE (1500-69), the 'apostle of Andalusia,' born in La Mancha; passed twenty years as a priest. He belonged to the Spanish mystic school, and left a number of works published by Ruiz de Mesa in *Vida y Obras de Juan de Avila* (1618).

Avila, SANCHO DE, a Spanish general who served under the Duke of Alva and under Requesens in the Netherlands. He defeated Louis of Nassau, and sacked Antwerp in 1576, but was killed at the siege of Maestricht in 1579. See Brantôme's *Vies des Grands Capitaines* (1665).

Avila y Zuniga, LUIZ DE (c. 1490-1560), Spanish historian and diplomatist, favourite of Charles V. His account of the emperor's war with the Protestant princes, *Comentarios de la Guerra de Alemaña* (1548; new ed. 1852), has been translated into several languages.

Aviles, or SAN NICOLAS DE AVILES, tn., prov. Oviedo, Spain, 15 m. from Oviedo, on ry. to Gijon. Port on Bay of Biscay. Several foundries and textile factories. Pop. (1900) 12,763.

Avison, CHARLES (?1710-70), English musician, of Newcastle; is known by his *Essay on Musical Expression*, by several sets of sonatas and concertos, and by his edition, in eight volumes, of Marcello's Psalms. See Hawkins's *Hist. of Music* (1776) and Browning's *Parleyings with Certain People* (1887).

Avispoort, an opening in the mountains in Damara Land, German S.W. Africa, close to Little and Great Windhoek.

Avitus, MARCUS MÆCILIUS (d. 456 A.D.), emperor of the West (455-456 A.D.), was a descendant of a noble family of Auvergne. As prefect of Gaul he defeated the Huns and Vandals. He became ambassador at the court of Theodoric, king of the Visigoths, with whose assistance he ascended the throne at the death of Maximus (455). After a reign of fourteen months he was deposed by Ricimer, and appointed bishop of Placentia.

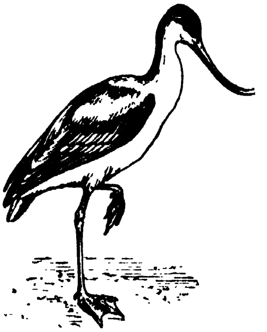
Aviz, ORDER OF ST. BENEDICT, a Portuguese military and religious order founded in 1162 to oppose the Moors, the knights being under the Cistercian and Benedictine discipline. In 1211-23 King Alfonso removed the order to the fortress of Aviz, whence the name. It is now (since 1879) simply a military order, with three classes - grand cross, commander, and chevalier. See Lawrence-Archer's *Orders of Chivalry*.

Avizandum. In Scotland, when a court takes time to consider before deciding a case, it is said to take the case *ad avizandum*: in England, the court is said to reserve judgment.

Avlona (Ital. *Valona*), tn. and seapt., Turkey in Europe, vilayet Janina, on the bay of the same name, Adriatic, 58 m. S. of Durazzo. Until 1691 it was under the suzerainty of Venice. It is an archiepiscopal see of the Orthodox Greek Church. Pop. over 6,000.

Avoca, or OVOCA, short riv., Co. Wicklow, Ireland, formed by the sub-tribs. Avonmore and Avonbeg at 'the meeting of the waters,' and famed for its silvan scenery and for Thomas Moore's well-known lines (*Irish Melodies*, 1779).

Avocado Pear. See ALLIGATOR PEAR.



The Avocet.

Avocets, widely-distributed birds belonging to the genus Recurvirostra, of which one, *R. avocetta*, bred in England till 1824. The avocets are limicoline birds, allied to the plovers and sandpipers, and are characterized by their curious curved beak.

Avogadro, COUNT AMADEO (1776-1856), professor of physics at Vercelli (1809), of mathematics at Turin (1820), discovered 'Avogadro's law'—that equal volumes of different gases, at the same temperature and pressure, contain the same number of molecules.

Avoirdupois. See WEIGHTS AND MEASURES.

Avola, tn., prov. Syracuse, Sicily, 22 m. by rail S.W. of Syracuse; produces excellent wine, almonds, and sugar. Pop. (1901) 16,301.

Avon, Celtic word meaning 'river;' a common name for British streams, of which the following are the most important:—(**1.**) Upper or Warwickshire Avon, rising near Naseby, Northamptonshire, and flowing through Warwickshire and Worcestershire to join the Severn on the l. bk. at Tewkesbury, passing Stratford, hence Shakespeare's designation 'Swan of Avon.' Its length is nearly 100 m. (**2.**) Lower Avon, or Bristol Avon, entering the Bristol Channel 6 m. below Bristol: length, 70 m. It is subject to very high spring tides, which sometimes rise above 40 ft. (**3.**) East Avon, in Wiltshire, flowing through Salisbury; length, 50 m. (**4.**) A trib. of Spey, Banffshire, Scotland, 30 m. long. (**5.**) Trib. of Clyde, Lanarkshire, Scotland, 28 m. long.

Avondale, par., 9½ m. S.W. of Hamilton, W. Lanarkshire, Scotland, with the battlefield of Drumclog (1679), immortalized in Scott's *Old Mortality*.

Avonmouth, tn. and docks at mouth of river Avon, Gloucestershire, England, 6 m. N.W. of Bristol. In March 1902 the first sod for the extended dock works was cut by the Prince of Wales.

Avranches, tn., dep. Manche, France, on St. Michel's Bay, 67 m. S. of Cherbourg. Candles, lace, nails, bell foundry, coppersmiths, tanneries; cider, butter, salt, cattle. It was a bishopric from 6th century till 1791; and in English possession from 1421 till 1450. It suffered at the hands of Protestants in 1562, and again in 1639 during a revolt of the peasants. Pop. (1901) 7,384.

Awaji, island of Japan, at the eastern entrance of the Inland Sea, two hours by steamer from Kobe. Its area is 218 sq. m., and pop. some 170,000. Its scenery is very beautiful, and the island is much visited by tourists.

Award. See ARBITRATION.

Awe. (**1.**) River of Argyllshire, Scotland, flowing N.W. from loch of same name into Loch Etive; a famous salmon and sea-trout stream with rugged and precipitous banks, especially in the Pass of Brander. (**2.**) Loch of Argyllshire, Scotland, 22 m. E. of Oban, 118 ft. above sea-level, and 22¾ m. long. Ben Cruachan looks down on the island-studded N. end, and on the N.E. shore is Kilchurn Castle (built 1441), mentioned in 'The M'Gregors' Gathering.'

Awl-wort (*Subularia aquatica*), a plant of the order Cruciferæ, found in shallow water or in wet places. Roots numerous and fibrous; leaves like awls—short and narrow; flowers inconspicuous.

Awn, a bristle-like growth, called also *beard*, which arises from the backs or apices of the outer flowering glumes of many species of grasses and cereals; a prolongation of the midrib.

Awomori, or AOMORI, tn. and seapt., Japan, with a fine natural harbour, at N. extremity of Nippon, 444 m. by rail N. of Tokyo. Has considerable trade, chiefly with Hakodate. Pop. 11,000.

Ax, or AX-LES-THERMES, tn., dep. Ariège, France, on Ariège R., 25 m. S.E. of Foix, at 2,350 ft. altitude; famous for its warm sulphur springs, sixty-one in number (63-171° F.). Pop. (1901) 1,503.

Axarfjord, the estuary of the Jökulsa R., N.E. of Iceland.

Axe (spelt *ax* in the Bible), an instrument used for hewing and chopping wood; formerly also a weapon of war. (See BATTLE-AXE.) It was in the earlier ages made of flint or bronze, but is now made of iron with a cutting edge of steel. The head is pierced to allow entrance to the end of the handle, haft, or helve. The cutting edge is in the same plane as the handle, and not, as in the adze, at right angles to it.

Axestone, a hard variety of mineral, jade or nephrite, of a greenish colour; so called from its use by the Maoris and the South Sea islanders for axe-heads. It is found in Cornwall, also in Silesia, Central Asia, and China.

Axholme, or AXHOLM, ISLE OF, a dist. in Lincolnshire, insulated by the Trent, Don, Idle, and Torne; about 17 m. long by 9 m. broad. Epworth and Crowle are the principal places in it. The practice of 'warping'—*i.e.* of inundating the land at certain times with mud-laden water—is still pursued. It was drained and reclaimed by Vermuyden (1625-34).

Axil, the upper angle between a leaf and the stem from which the leaf arises. It is the normal position for the origin of lateral buds, which are therefore termed axillary. The old term was *ala*.

Axilla (Lat. 'armpit') is, strictly speaking, the armpit, or any other part of the body which forms a similar angle; but for practical purposes axilla is applied to the armpit only. It is the pyramidal space which lies between the inner side of the upper arm, or arm proper, and the adjacent part of the chest wall. The apex of this pyramid points upward and inwards toward the root of the neck. The large nerves and vessels for the arm pass through the axilla, and the glands there are a common seat of abscesses and other troubles.

Axim, seapt. tn., W. Africa, on the Gold Coast, W. of Cape Three Points; government hospital.

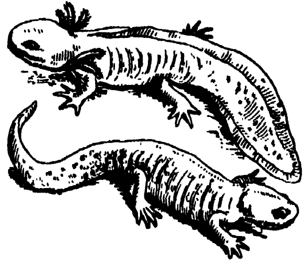
Axinomancy, an ancient Greek ordeal for the discovery of crime. See DIVINATION.

Axiom, a proposition or premise which, being self-evident, requires no proof, and is taken for granted. As a technical term the word 'axiom' is now restricted to the self-evident premises of geometry, the corresponding term in philosophy being intuition.

Axis, in general, an imaginary line about which any solid body rotates, or about which any geometrical figure or organic structure is symmetrical. Thus, we speak of the *axis* of a planet, running through the sphere from pole to pole; and in scientific instruments, machinery, etc., the axis is represented by a pin, bearing, axle, or other element, about which, as the centre of its rotation, a part is free to move. And again, we speak of the axis of an ellipse, parabola, cone, etc.; and the stem of a plant, about which the leaves, branches, etc., are disposed in a radially symmetrical manner, is termed the axis. In human osteology the name is applied to the second cervical vertebra, which supports the atlas, or highest bone in the vertebral column.

Axis Deer, an Indian form remarkable for its coloration, the body being profusely spotted with white on a dark background. It is about the size of the European fallow deer; the male has slender, sharp-pointed horns, little branched. It has been kept in parks both in England and on the Continent.

Axminster, mrkt. tn., Devon, England, on the L. & S.W.R., 27 m. w. of Dorchester, on the Axe. The town is pleasantly situated on the slope of a hill, and has an ancient church. The manufacture of carpets, for which it was formerly noted, has been (1835) transferred to Wilton. Tooth and nail brushes are now extensively made, and there are corn, flour, and saw mills and iron-founding. About 1 m. to the s. are remains of Newenham Abbey, a Cistercian foundation of the 13th century. Pop. (1901) 2,906.



-8 TO 10 IN.

Axolotl, gilled form (above) and adult (below).

Axolotl (*Amblystoma*, or *Siredon pisciformis*) is a Mexican and N. American amphibian, not infrequently kept in captivity in aquaria. It resembles a newt in shape, and has a powerful tail, two pairs of weak limbs, and three pairs of simple external gills. In this form it breeds freely, both under natural conditions and in aquaria, the young resembling their parents. Under certain conditions, as yet not fully understood, this gilled stage may be converted into another form (*Amblystoma*), in which the gills and the membrane of the tail are lost; these forms also reproduce, but their young are axolotls, and are not like their parents. These facts justify us in regarding the axolotl as a prematurely sexual larva, and the gill-less form (*Amblystoma*) as the adult.

Axum, Axoum, or Aksum, ruined tn., Tigré, Abyssinia, 113 m. s.w. of Massowah; formerly the capital of a powerful Ethiopian kingdom. (See Ethiopia.) Axum has been Christian since the 4th century, and is now regarded as a sacred city by the Abyssinians. There are numerous remains of Greek architecture. Pop. 5,000.

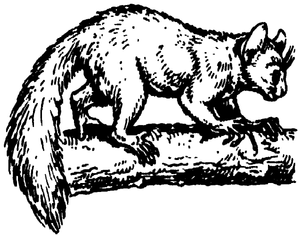
Ayacucho, tn., Peru, cap. of dep. of same name, in lat. 13° 8′ s. In 1539 Pizarro founded the town of San Juan de la Victoria on the site of the Indian Huamanga (Falcon Rock); and after the victory of General Sucre over the Spaniards (Dec. 9, 1824) the independence of Peru was secured, and the name of the town was changed to Ayacucho. Ayacucho contains a cathedral and several monasteries. Alt. 9,260 ft. Pop. 20,000.

Ayala, Pedro Lopez de (1332-1407), Spanish poet and historian. A noble of the court of Peter the Cruel, he fought for Henry of Trastamaro at the battle of Najera (1367). He afterwards occupied the positions of councillor to Henry II. and high chancellor to John I. His great work is the *Cronicas de los Reyes de Castilla, 1350-96*, a vivacious and brilliant work (best ed. 1780). He also translated Livy into Spanish.

Ayala, Pedro de, the ambassador of Ferdinand and Isabella of Spain at the court of James IV. of Scotland in 1498. His interesting account of Scotland and its people is given in Hume Brown's *Early Travellers in Scotland* (1891).

Ayamonte, fortified tn., prov. Huelva, Spain, on l. bk. of the Guadiana, about 2 m. from its mouth; good harbour, and fisheries of cod, sardines, and tunny.

Aye-aye (*Chiromys madagascariensis*), a remarkable animal now placed among the lemurs in the mammalian order Primates, though it was once regarded as a rodent. It is entirely nocturnal in its habits, and is confined to Madagascar, where it inhabits the dense forests. A notable peculiarity is the structure of the front teeth, which are large, curved, and chisel-edged like those of a rodent. The hands are also very remarkable, the middle finger being exceedingly long and very slender; it is said to be used in picking out wood-boring insect larvæ. The aye-aye is about as large as a cat, and has large naked ears.



The Aye-aye of Madagascar.

Ayenbite of Inwyt, The ('Remorse of Conscience'), a translation (1340) of Lorens's *Le Somme des Vices et des Vertus* (1279) by Dan Michel, an Augustinian monk of Canterbury. It is the best example of Kentish southern English, and is supposed to have been used by Chaucer for *The Persones Tale*. See ed. by Morris (Early Eng. Text Soc., 1866).

Ayesha, wife of Mohammed. On his death (632) she secured the caliphate for her father, Abu-Bekr, against the prophet's son-in-law, Ali; and again, at the Caliph Othman's death, she tried to exclude Ali, but was taken prisoner (656). She died at Medina (677). See Mohammed.

Aylesbury, mrkt. tn., Buckinghamshire, England, near the Thame; an important railway centre, situated on high ground, overlooking the fertile vale to which it gives name. Some of the interesting public buildings are due to the Rothschild family. Outside the town, on the N.E., is a female convict prison. Large printing works; other industries, straw-plaiting and lace-making. Dairy-farming and the rearing of ducks are extensively followed in the district. During the civil war the so-called battle of Aylesbury was fought (1642) at Holman's Bridge, near the town. John Wilkes represented the borough in the Parliaments of 1757 and 1761. Hartwell House, about 2 m. N. of Aylesbury, was the residence of Louis XVIII. during his exile (1810-14). Pop. (1901) 9,244.

Aylesford (anc. *Ailesforde, Eylesforde*), tn. and par., Kent, England, 3 m. N.N.W. of Maidstone, on the Medway, here crossed by an ancient bridge the only one between Rochester and Maidstone. In 455 a battle was fought in this neighbourhood between the Britons and Saxons, when Horsa, the Saxon leader, was slain; in 893 the Danes were defeated by Alfred, and in 1016 by Edmund Ironsides. Kits Coity House, a remarkable cromlech, 'The Countless Stones,' an intrenchment on Blue Bell Hill, and certain upright stones at Horsted, are all interesting remains. Pop. (1901) 2,678. See *Archæologia*, ii. 107-117, iv. 110-116, xi. 38-44.

Ayliffe, John (1676-1723), an eminent Whig jurist, was expelled from Oxford University because of personal attacks in his *Ancient and Present State of the University of Oxford* (1714), and was defended in *The Case of Dr. Ayliffe at Oxford*, probably (*Gent. Mag.*, lxxiv. 646) written by himself. He wrote *Parergon Juris Canonici Anglicani* (1726), a learned work, still authoritative; *The Law of Pledges* (1732), an inquiry into the methods of pawnbrokers 'and their accomplices in iniquity;' and *A New Pandect of Roman Civil Law* (1734). See G. B. Macdonell, in *Dict. Nat. Biog.*, ii. 279.

Aylmer, John (1521-94), tutor to Lady Jane Grey, was appointed archdeacon of Stow (1553), but was expelled for his disbelief in transubstantiation; took refuge in Strassburg, and later in Zürich, where he acted as tutor, and helped John Fox in the translation of *Acts and Monuments* into Latin. When Elizabeth came to the throne he returned to England, and became archdeacon of Lincoln (1562), and then bishop of London (1577), where he was very unpopular. His reply to Knox's *Monstrous Regiment of Women*, entitled *An Harborowe for faithful and trewe Subjects*, etc. (1559), is the best known of his works. He is said to have been the original of Spenser's Morrell, 'the proude and ambitious pastoure' of the *Shepheard's Calendar*.

Aylmer, Matthew, Lord Aylmer (1643-1720), British admiral. In the actions off Beachy Head (1690) and Cape Barfleur (1692) he commanded the *Royal Catherine*. In 1709 he became admiral of the fleet, and in 1714 governor of Greenwich Hospital.

Ayloffe, Sir Joseph (1709-81), English antiquary, appointed one of the keepers of state papers in 1763. He was vice-president of the Society of Antiquaries, whose charter of incorporation he took a prominent part in procuring. His chief work is *Calendars of the Antient Charters* (1772). He edited Leland's *Collectanea* (6 vols. 1771). See Thomson's *Hist. of the Roy. Soc.*

Aymaras, a numerous and formerly powerful S. American people whose territory lay chiefly on the Bolivian plateau round Lake Titicaca, and thence south to and beyond Lake Aullagas. The Aymaras, whose proper name is Colla, appear to represent the primitive stock from which sprang the Quichuas—*i.e.* the dominant people of the Peruvian empire. The two languages are related as mother and daughter. The Aymaras are generally undersized and ungainly, with short, thickset, robust figures, arched nose, small extremities, coppery skin, highly brachycephalic (round) head, and a sullen even churlish disposition. Their civilization was antecedent to that of the Incas, but was in some respects more highly developed, judging at least from the stupendous monuments of Tiahuanaco at the south end of Lake Titicaca. These surprising megalithic structures, rivalling those of Egypt and Baalbec in massiveness, were never completed, the works having been arrested by the Inca, Mayna Capac, about 1140 A.D., when the Quichuas overthrew the rival Aymara kingdom, and adopted much of their culture, religion, and traditions. All are now nominal Catholics. In 1900, Aymaras of pure stock were estimated at about 500,000, and the Hispano-Aymara half-breeds at 100,000.

Aymer de Valence, Earl of Pembroke (d. 1324), was the son of a half-brother of Henry III. In 1306 he became guardian of Scotland, defeated Bruce at Methven, but was defeated by Bruce at Loudon Hill. He sided with Lancaster against the court, but was afterwards reconciled to the king. He was appointed lieutenant of Scotland in 1314, and fought at Bannockburn.

Aymestry Limestone, a dark-gray impure limestone, not over 40 ft. thick, consisting chiefly of shells and corals, and named after the village in Herefordshire where it has long been quarried. It belongs to the Ludlow rocks of the Upper Silurian, and occurs also near Ludlow and Ledbury.

Aymon, or Haimon, of Dordogne, the father of four sons—Renaud, Guiscard, Alard, and Richard—whose adventures form one of the most popular romances of the middle ages, attributed to Huon de Villeneuve (13th century). Renaud, or Regnault, the owner of the famous steed Bayard, makes successful war against Charlemagne. The brothers appear in the works of Tasso, Boiardo, and notably the character of Rinaldo in Ariosto's *Orlando*. See Ferrario's *Storia degli Antichi Romanzi* (1828-9); Caxton's *Foure Sonnes of Aymon* (?1489).

Ayr, cap. of Ayrshire, Scotland, and a roy. bur., situated on river Ayr, 33 m. s.s.w. of Paisley, on the G. & S.W.R. A temporary barrack, known as the Barns of Ayr, was (1297) the scene of Wallace's tragical exploit. The old church of St. John was the meeting-place of the parliament of Bruce in 1315, which assigned the succession to his brother Edward. The Wallace Tower, 113 ft. high, was erected in 1834. There is a statue to Robert Burns (1891). The 'Twa Brigs' of Burns's poem stand within 500 yds. of each other. The town hall was rebuilt (1901-2). There is an excellent academy, founded 1760. The Carnegie Library was erected in 1893; a lunatic asylum, 1869; Ayr County Hospital, 1883. The harbour has a patent slip dock 800 ft. long; depth of water in the basins, 19 ft. to 23 ft. The industries are carpet, lace, woollen, chemical manufacturing, and shoemaking. Along with Campbeltown, Irvine, Inveraray, and Oban, it unites in sending one member to Parliament. Pop. (1901) 28,697.

Ayrshire, a maritime co. in the s.w. of Scotland, bounded on the w. by the Firth of Clyde and North Channel; area, 1,142 sq. m., or 730,947 ac.; its greatest breadth is 28 m., and its length 78 m. The Irvine and some smaller streams water the N. portion; the Doon, Stinchar, Girvan, and Ayr, with Lugar, traverse the county and fall into the Firth of Clyde. The principal heights are Shalloch on Minnoch (2,520 ft.), Kirriereoch Hill (2,562 ft.), and Cairnsmuir (2,613 ft.). The soils may be divided into three kinds—mossy and moorish, sandy, and clayey. Agriculturally rich, Ayrshire does a large export trade. The Ayrshire cows yield milk rich in butter-making qualities. The renowned 'Dunlop' cheese has been somewhat superseded by the Cheddar, which is largely made. Early potatoes are extensively grown. The principal town is Ayr; the seaports, in addition to Ayr and Ardrossan, being Girvan, Irvine, Largs, Saltcoats, and Troon. There are woollen and steam-engine factories, foundries, tanneries, chemical and dynamite works, shoe, carpet, and bonnet making, and extensive coal-mining. Ruins of ancient castles exist at Dundonald, Sorn, Turnberry, and Loch Doon. Alexander III., by his victory at Largs (1263), dealt the deathblow to Norwegian supremacy over the Western Highlands and Islands. Edward I. of England was defeated by Wallace and by Bruce at Ayr, Turnberry, and Loudon Hill. One member is returned to Parliament by N. and S. Ayrshire respectively. Pop. (1901) 254,468. See James Paterson's *Hist. of the County of Ayr* (1847-52); *Ayr Archæol. and Hist. Collections* (1878-79); and A. Millar's *Castles and Mansions of Ayrshire* (1885).

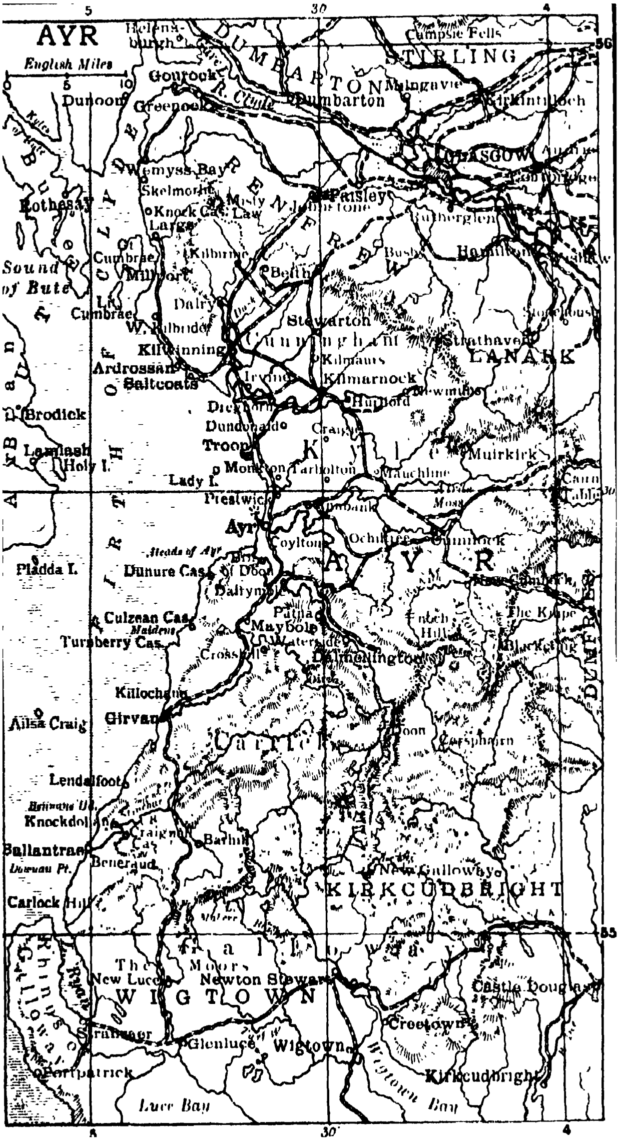
Ayrer, Jacob (d. 1605), a German dramatic poet, and a notary at Nuremberg, whose *Opus Theatricum* was published in 1618. In his early works he follows Hans Sachs, but frequently models upon Shakespeare, or uses the same sources. A new edition of his *Opus Theatricum*, in 5 vols., edited by Keller, was published at Stuttgart in 1865. See Robertson's *Zur Kritik J. Ayrers* (1892).

Ayres, John (*c.* 1680-1700), calligraphist, famous as the introducer of the Italian hand into Britain. He wrote a *Treatise on Penmanship* (1697). See More's *First Invention of Writing* (1716).

Ayrton, Edmund (1734-1808), English musical composer, was born at Ripon, son of a barber-surgeon. A pupil of Dr. Nares, he succeeded him as master of the children of the Chapel Royal (1780-1805). He was also vicar-choral of St. Paul's Cathedral, a Mus. Doc. (Cam. 1784), and the author of church services and anthems. See the *Harmonicon* (1833).

Ayrton, William (1777-1858), English impresario and writer, was the first to introduce *Don Giovanni* (King's Theatre, 1817); edited the *Harmonicon* for ten years from 1823, and published *Sacred Minstrelsy* (1834-5) and the *Musical Library*.

Ayton, Sir Robert (1570-1638), Scottish poet, was born at Kinaldie, Fifeshire; travelled in France, and was successively gentleman of the king's bedchamber, secretary to the queen, and master of requests. His poems have been edited by Sir Charles Rogers (1871; 2nd ed. 1884). The two songs, 'I do confess thou'rt smooth and fair,' and the early 'Auld Lang Syne,' printed in Watson's *Collection* (1707), have been attributed to Ayton, on questionable grounds. See Memoir prefixed to edition of 1871.



Aytoun, William Edmondstoune (1813-65), Scottish poet, was born in Edinburgh. In 1845 he became professor of rhetoric in the university. He married a daughter of Professor Wilson (Christopher North) in 1849, and in 1852 was appointed sheriff of Orkney and Shetland. He died at Blackhills, near Elgin. Aytoun, who was a staunch Jacobite, is best known for his *Lays of the Scottish Cavaliers* (1848) and the *Bon Gaultier Ballads* (1855), the latter written in conjunction with Sir Theodore Martin. His tragedy, *Firmilian* (1854), was written as a parody of the 'spasmodic' school of poetry, represented by Sydney Dobell and Alexander Smith. His other works include *Poland, Homer, and other Poems* (1830); *Bothwell*, a poem (1856); a collection of the *Ballads of Scotland* (1858); a translation of *Poems and Ballads of Goethe*, in conjunction with Sir Theodore Martin (1858); *Norman Sinclair*, a novel (1861). See *Life of Aytoun* (1867), by Sir Theodore Martin; *Pollok and Aytoun* (Famous Scots Series), by Rosaline Masson (1898).

Ayuntamiento, the Spanish town council, of which the alcalde is chairman. Instituted in Roman times, the alcaldes acquired great political and municipal authority, which they gradually lost under the Bourbons, but from 1812 to 1843 were partially restored. In 1870 the alcaldes were deprived of their political powers, and confined to the ordinary municipal administration.

Ayuthia, tn., Siam, built principally on piles, on the l. bk. of the Menam, 42 m. by rail N. of Bangkok, was the first capital (from the middle of the 14th century to 1767) of the present Siamese people. It was taken by the Burmese in 1767 after a two years' siege. Pop. about 50,000.

Azalea, a genus of the order Ericaceæ, differing from the rhododendron in having only five stamens. The hardy azaleas are all deciduous, and came from N. America and S. Europe. The American kinds are often called Ghent azaleas, from the place where their varieties were first cultivated. The British species is *A. procumbens*, found in patches on Scottish moors.

Azamgarh, tn., cap. of dist. of the same name, United Provinces, India, 52 m. N.E. of Benares. Pop. (1901) of tn. 18,835; of dist. 1,529,785.

Azan, the Moslem call to prayer, chanted or recited five times daily by the muezzin, with his face towards Mecca, generally from the turret of the mosque designed for this purpose.

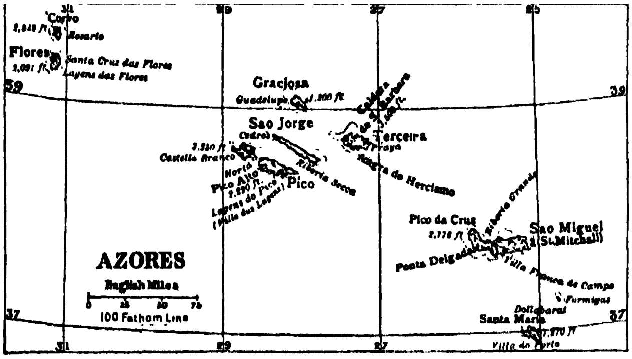
Azandeh, or Zandy. See Niam-Niam.

Azara, Felix de (1746-1811), naturalist and traveller in Paraguay (1781-1801), wrote the *Voyage dans l'Amérique Méridionale*, 4 vols. and atlas (1809), and *Nat. Hist. of Paraguay* (Eng. trans. 1838).

Azariah. See Uzziah.

Azazel, formerly supposed to designate the goat chosen to carry away the sins of the Israelites on the Day of Atonement (hence rendered 'scapegoat' in A.V.; see Lev. 16:7 *f.*), but now universally taken as the name of a desert-spirit or fallen angel, for whom the goat was destined. *Cf.* the bird liberated for leprosy (Lev. 14:6 *f.*), and, for analogies, Frazer's *Golden Bough*, ii. 18 *f.* (2nd ed. 1900).

Azeglio, Massimo Taparelli, Marchese d' (1798–1866), Italian statesman, artist, and author, came of a noble Piedmontese family. At fifteen years of age he went to Rome with his father, who was ambassador at the papal court. There he studied art and music, excelling as a landscape painter. When his father died, in 1830, Azeglio went to Milan, where he met Manzoni, whose daughter he married. Turning to literature, he produced two novels, *Ettore Fieramosca* (1833) and *Niccolò de' Lapi* (1841), which roused much enthusiasm among the patriotic party. He now traversed the country, stirring up the fires of patriotism, but discountenancing the extreme propaganda of Mazzini. In 1846 he wrote a pamphlet entitled *Degli Ultimi Casi di Romagna* ('On the Recent Events in the Romagna'), in which he satirized the papal government, and demonstrated to the Italian princes the necessity of a national policy. Two years later he joined the patriotic army against Austria, and was severely wounded at the battle of Vicenza (1848). When Victor Emmanuel II. ascended the throne, he appointed Azeglio president of the council and minister of foreign affairs; but in 1852 he resigned, making way for Cavour. In July 1859 Azeglio was sent to the Roman states as military commissioner. His political correspondence and autobiography were published after his death, under the title of *I miei Ricordi* (15th ed. 1895). See *Lives* by Pavesio (1871) and Bianchi (1884); *Italy, 1815–90*, by J. W. Probyn (1891).



Azerbaijan, or Aderbaijan (over 40,000 sq. m.), a fertile and mountainous province in N.W. Persia, and encroaching on Armenia towards Mt. Ararat (16,916 ft.). Mt. Savalan (15,820 ft.) lies towards the E.; Lake Urumiah lies in the W.; and the river Aras (Araxes) forms the N. boundary, its tributary, the Kara-Su, being the only other important stream. Wheat, maize, cotton, hemp, and tobacco are grown in considerable quantities. The chief towns are Tabriz (the cap.), Urumiah, Khoi, Ardebil, and Maragha. Pop. estimated at about 1,500,000.

Azevedo, Manoel Antonio Alvares de (1831–52), Brazilian poet; wrote, in the temper of Heine and Byron, *Lyra dos Vinte Annos* (1851; 5th ed. 1884), which show undeniable genius.

Azimuth is the angular distance of a celestial object from the N. or S. point of the horizon, or the angle comprised between the meridian and a vertical plane passing through the object. In the N. hemisphere it is usually reckoned from the S. point of the horizon through the W. from 0° to 360°. See Altazimuth.

Azincourt. See Agincourt.

Azo-Compounds contain one or more —N=N— groups connecting aromatic radicals of various kinds. They are prepared by complex processes, and in many cases—such as that of 'Bismarck brown,' 'chrysoidin,' 'Biebrich scarlet,' etc. are of value as dyes.

Azoic, a term applied to the earliest geological formations, as from them no fossils or other evidence of the existence of living creatures has been obtained. It is now discarded in favour of Precambrian or Archæan.

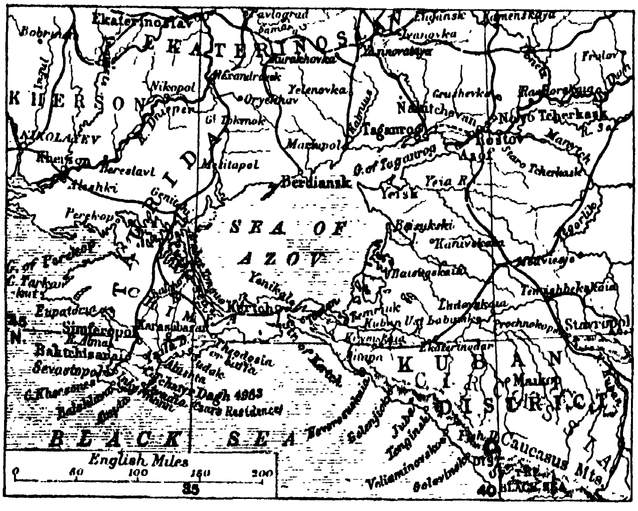
Azores (in Portuguese, *Açores* = 'Hawk Islands'), a group of islands in the Atlantic, 930 m. W. of the coast of Portugal, of which country they are not colonies, but a constituent part. They are of volcanic origin, have steep rocky coasts, a mountainous interior (7,700 ft.) seamed with glens, and a most excellent climate—a pure atmosphere and equable temperature (50° to 73½° F. being the range). The soil is fertile, and produces fine oranges, good wine (some 970,000 galls. annually), various other fruits, yams, bananas, coffee, sugar, and tea. Fishing is one of the chief occupations. Pottery, cottons, spirits, hats, woollens, linens, cheese and butter, soap, baskets and mats, bricks and tiles, are all made on the islands. The total trade reaches an annual value of over £200,000. The only tolerably safe harbour is at Horta, on Fayal I. Volcanic outbursts have shaken the archipelago in 1591, 1638, 1719, and 1841; and there are several mineral springs. The principal islands are São Miguel, or St. Michael, 300 sq. m., and pop. 127,566 in 1900, its chief town being Ponta Delgada, with (1900) 17,675 inhabitants; Terceira, 163 sq. m., and pop. 48,920, the chief town being Angra, with (1900) 10,843 inhabitants; Pico, 173 sq. m., and pop. 24,125; Fayal, 69 sq. m., and pop. 22,385—chief town Horta, with (1900) 6,734 inhabitants; São Jorge, or St. George, 94 sq. m., and pop. 16,138; Graciosa, with 24 sq. m., and 8,394 inhabitants; and the smaller St. Mary, Flores, and Corvo. The total area is 922 sq. m.; the total pop. (1900) 256,474; the chief town of the entire archipelago, Ponta Delgada. The people are mainly of Portuguese descent, but have a blend of Moorish and Flemish blood: because of the Flemish settlers introduced there by Isabella of Burgundy in 1466, the group was for some time known as the *Ilhas Flamengas*, or Flemish Islands. The Azores were discovered by the Portuguese navigator Cabral in 1431. In 1828–33 the islanders rendered loyal assistance to King Pedro against the usurper Miguel. See Godman's *Nat. Hist. of the Azores* (1870), and Ray's *The Azores* (1892).

Azotized Bodies, an old name for nitrogenous compounds.

Azotus. See Ashdod.

Azov, fort. tn., Russia, on l. bk. of Don, 7 m. from its mouth, 25 m. E. of Taganrog. The navigation of the river at this point is impeded by silt. The inhabitants are mainly engaged in fish-curing. Pop. (1897) 27,500.

Azov, Sea of (anc. *Palus Mæotis*), is a sea which penetrates into the S. of Russia, and is connected S. through the Strait of Kerch or Yenikale with the Black Sea. From the shore of the Crimea, in the S.W., to the mouth of the Don, in the N.E., it measures 220 m. It covers an area of 14,515 sq. m., and is everywhere very shallow, the maximum depth being only 53 ft. At the S.W., along the Crimean shore, it forms a long, narrow lagoon, separated by a ribbon of sand, and known as Sivash, or the Putrid Sea; and a further series of irregularly-shaped lagoons stretch across the N. of the Crimea to the isthmus of Perekop. Navigation of the Sea of Azov is beset with great difficulties, not only because of its extreme shallowness, but also because of the storms to which it is always liable, while in winter it is generally ice-bound. Its surface lies at about the same level as the surface of the Black Sea. Its waters, which are less salt than those of the Black Sea, teem with fish. Some three centuries before the Christian era the Greeks had flourishing mercantile colonies in the Azov region, and maintained them for at least seven hundred years; and again in the 13th and succeeding centuries other commercial stations (*e.g.* Tana) were established here by Genoese, Venetians, and Pisans. In 1903 the construction of a bridge spanning the Strait of Yenikale was sanctioned. The bridge will be 2,625 yards long, and its estimated cost seven million roubles.



Sea of Azov.

Azpeitia, tn., prov. Guipuzcoa, Spain, 20 m. s.w. of San Sebastian; the birthplace of Loyola. There are pilgrimages (July) to the monastery in which his house is preserved. Pop. (1900) 6,066.

Azrael, or Asrael, the 'Angel of Death,' is a figure in Jewish mythology as far back as the days of King Solomon. Like many other personages in the religion of the Hebrews, he has been recognized by the Mohammedans as one of the servants of Allah.

Aztecs, one of the chief cultured peoples of the New World; so called from Aztlan, the fabulous land of the 'Seven Caves' in the north, whence they migrated southwards, and founded a powerful empire in the valley of Mexico, some three or four hundred years before the discovery of America. Here they had been preceded by the Chichemecs and other conquering tribes, all belonging to the Nahua race, which had overthrown the still earlier empire of the Toltecs, and borrowed much of their culture. The relations are very obscure, but much light has been thrown on them by E. Seler's commentaries on the Mexican pictorial codices of the Aubin, Fejérvary-Mayer, and Vatican collections (English editions by A. H. Keane, 1901, 1902, 1903), from which the Aztecs would seem to have been northern barbarians, who developed their political and social systems under the influence of the Toltec (Maya) civilization which they had destroyed. Their polytheistic religion was largely their own, and this was marked by human sacrifices and other unspeakable horrors unapproached by any other religious system of which there is record. Their astronomy was mainly astrological, or used for astrological purposes the determining of good and evil days, divination, the taking of horoscopes, witchcraft, and the like. Yet they could take accurate observations, not only of lunations, but also of the periods of Venus; divided the solar year into 18 months of 20 days each, with 5 intercalaries; named each day by consecutive hieroglyphic signs (the day counts); and calculated annual periods of 4, 13, 52, and some say even 52 + 52 = 104 cycles. But the writing system was mainly pictorial, with few phonetic elements, and in this respect was greatly inferior to the Maya, which approximated to a true phonetic syllabary. The Aztec monuments also—mainly *teocalli*, *i.e.* truncated pyramids surmounted by temples—were not to be compared with those of Yucatan, while the finest in Mexico itself (Teotihuacan, Colula, Papantla) were the work of their Toltec predecessors. Before the overthrow of their empire by Cortes in 1520, the Aztecs had reduced the civilized peoples of Oajaca (Zapotecs, Mixtecs, etc.), and had founded settlements far to the s., where their descendants, the Pipils of Guatemala, Salvador, and the Niquirans of Nicaragua, still speak a corrupt form of the Nahua stock language. This language, which has long been cultivated, is at present spoken by about 1,000,000 full-blood Aztecs, and perhaps 500,000 half-breeds, on the Anahuac table-land. See Peñafiel's *Monuments of Ancient Mexican Art* (1891); Payne's *History of the New World*, vol. i. (1892); also works cited under Mexico.

Azuaga, tn., prov. Badajoz, Spain, 17 m. from Llerena. Centre of silver-lead-mining district. Important Roman ruins. Pop. (1900) 14,192.

Azul, tn., prov. Buenos Ayres, Argentina, 198 m. s. by w. of Buenos Ayres. It has steam mills and quarries. Pop. 8,000.

Azulai, Haim Joseph David (1724-1807), Jewish bibliographer, born in Jerusalem, but lived and died in Leghorn. His *Shem-ha-Gedolim* ('The Name of the Great Ones') is a catalogue of Jewish authors and their books.

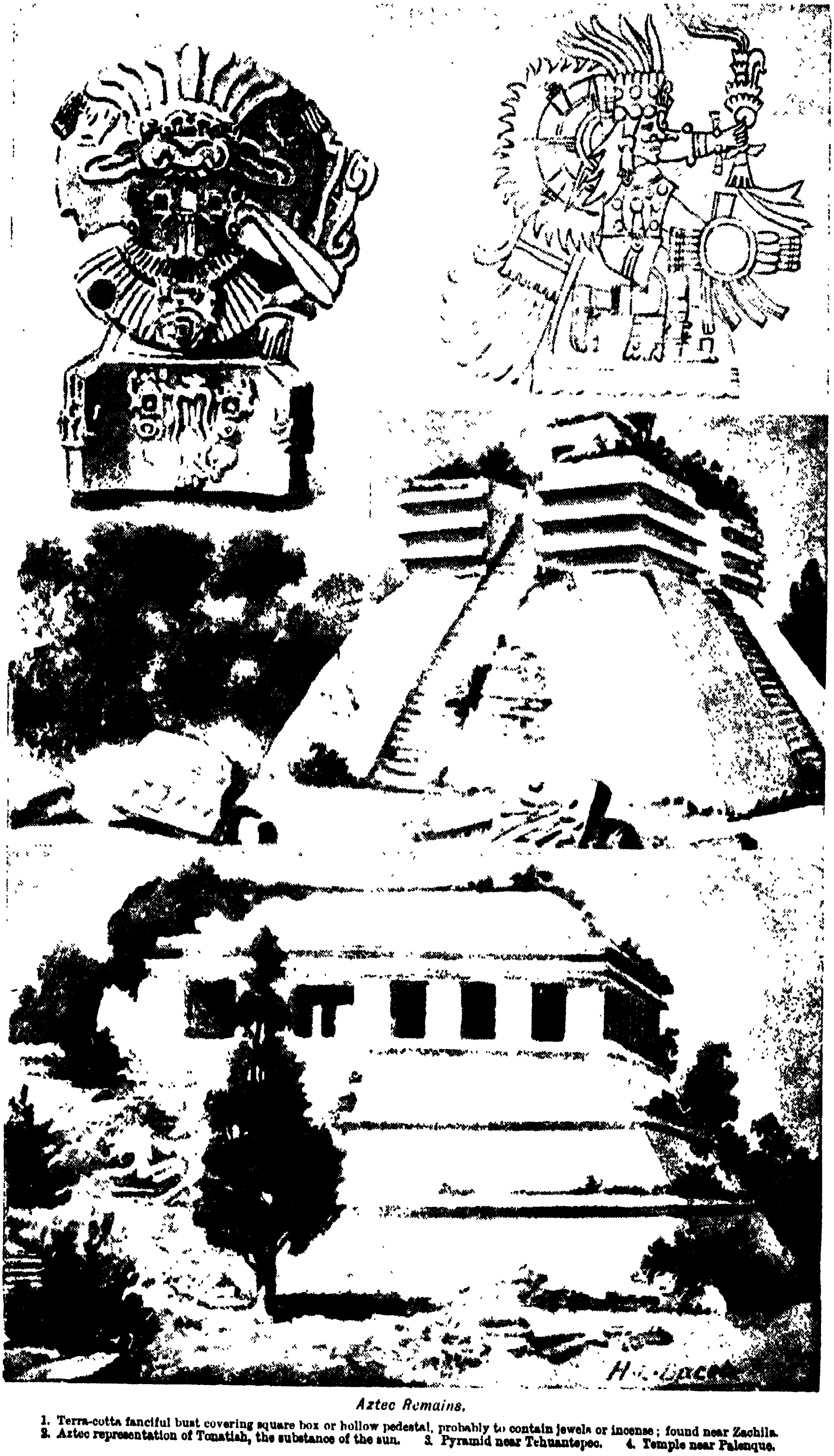
Azuni, Domenico Alberto (1749-1827), Italian historian and jurist, was born and died in Sardinia, but held judicial offices in Nice and Genoa, and was placed by Napoleon on the commission which drew up the commercial code. The *Sistema Universale dei Principi del Diritto marittimo dell' Europa* (1795), *Dizionario della Giurisprudenza Mercantile* (1786-8), and *Histoire de Sardaigne* (1802) are his chief works.

Azure (abbrev. Az), in heraldry the colour blue.

Azurine, or Blue Roach, is, according to some authorities, a mere variety of the rudd or red-eye (*Leuciscus erythrophthalmus*), a fresh-water fish common in certain parts of England, where it accompanies the roach. According to others, however, the azurine merits specific rank; it is then called *cæruleus.* See Rudd and Roach.

Azurite, or Lazulite, a copper ore, so called from its deep blue colour, and also known as chessylite, from its abundance in beautiful crystals at Chessy, near Lyons. It is a basic carbonate of copper, and, like malachite, which it often accompanies, is found chiefly where copper ores have been exposed to water containing carbonic acid. It was formerly much used by painters, but is liable to change to malachite and become green: this is believed to be the origin of the green skies in some old paintings.

Azymites (Gr. 'not leavened'), a name applied to members of a church where unleavened bread is used in the eucharist.



Aztec Remains.

1. Terra-cotta fanciful bust covering square box or hollow pedestal, probably to contain jewels or incense; found near Zachila.
2. Aztec representation of Tonatiah, the substance of the sun. 3. Pyramid near Tehuantepec. 4. Temple near Palenque.

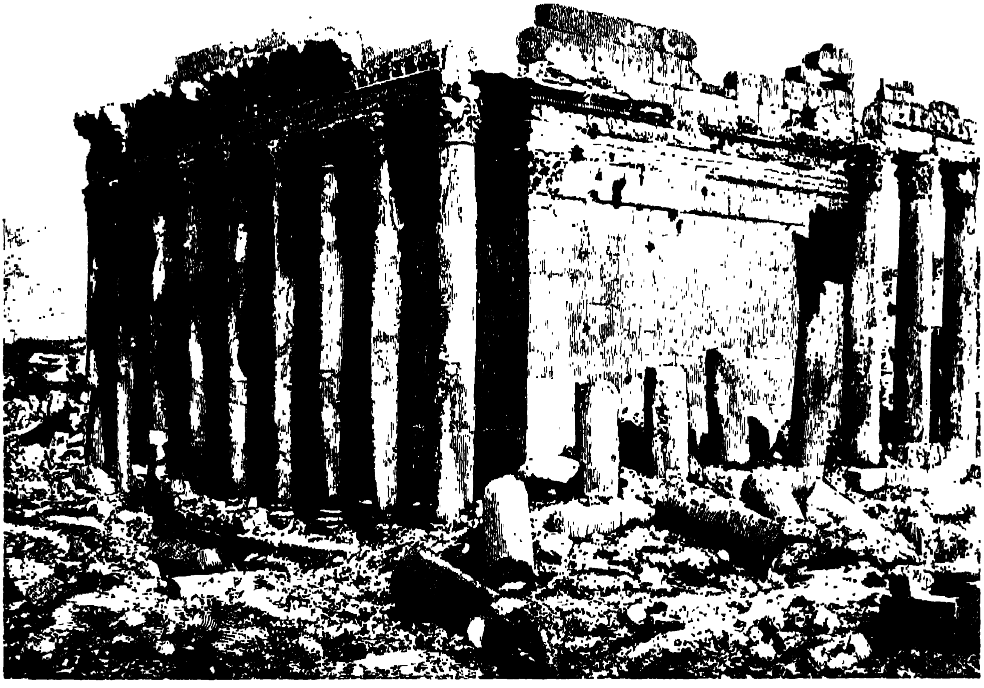
B

B. This letter represents a sound which differs very slightly in different languages. Before utterance the stream of breath is stopped by the lips, hence the modern classification of B as a stop consonant; it is the voiced labial stop. Like other stop consonants, it tends to change into the corresponding spirant, *v*. In this way the letter may come to represent the sound *v*. It did so partially in Latin from the 2nd century, and the usage passed to Britain also. In modern Greek, β has the value of *v*. In Irish, B is *b* mutated—*i.e.* *v* or *w*. Similarly, Hebrew בּ is B, ב *v*. In English, *b* has shown a tendency to become silent before *t* and after *m* ('debt,' 'lamb'). B is the Greek form of the sign, and became the Latin also. Except as a 'capital,' it is now supplanted by other forms. b is a Roman modification, which perhaps originated when the loops of B were written from the bottom. 𝒷 is a cursive variation of b (14th century). β and ϐ are the principal Greek minuscule variants. The Semitic original, 𐤁, was open at the bottom on the left. The Aramaic alphabet opened the top loop, and finally lost it entirely. Hence Hebrew ב is the lower part of English B, in Arabic reduced to ب. The Semitic name *beth* means 'house;' Greek *beta* is the same word.

B, in music, is the seventh degree or 'leading note' of the natural scale of C. In French and Italian it is called *si*; in German, H (*Ha*), with B for our B♭. The key of B natural has five sharps; that of B♭ has two flats.

Baader, FRANZ XAVER VON (1765-1841), German Roman Catholic mystic and philosopher, professor of philosophy and theology at Munich (1826), was a spiritual descendant of Boehme, with whose works he became acquainted when travelling in England (1792-6). His works, with *Life* (vol. xv.), were published in 16 vols. (1850-60); and a selection, with *Life*, ed. Claassen, in 2 vols. (1886-7).

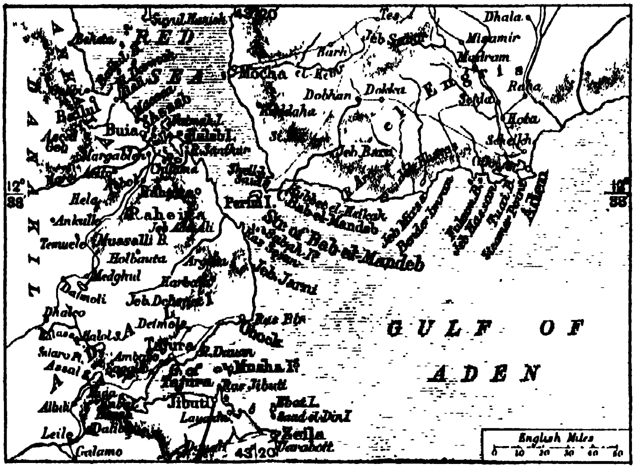
Baal (Heb. 'lord'), the name of the chief male deity of the N. Semitic nations, typifying the sun as the owner and fructifier of the soil. There was a magnificent temple to *the* Baal at Tyre. The worship of the Sidonian Baal was introduced into Israel by Jezebel, Ahab's Syrian wife. It spread in spite of the remonstrances of Elijah, but was finally banished by Jehu in 884 B.C. Allied to Baal worship were the cults of the Babylonian god Bel and the Tyrian god Mel. The name Baal appears frequently in the composition of names both of places and of persons—*e.g.* Baalbek, Jezebel, Hasdrubal, Hannibal ('Baal is gracious'). See W. R. Smith's *Religion of the Semites* (ed. 1894) and Sayce's *Hibbert Lectures* (1887).



Temple of Jupiter, Baalbek.

Baalbek (Gr. *Heliopolis*, 'city of the sun;' Scrip. *Baalath*), ancient city of Syria, on the plateau (alt. 4,500 ft.) of El Bekaa, at the foot of Anti-Libanus, 35 m. N. by W. of Damascus; chiefly remarkable for the magnificence of its ruins, which occupy a site analogous to that of the Acropolis of Athens. The temple of Jupiter (Little Temple), or the Sun, stands to the S. of the Great Temple. A third ruin is known as the Circular Temple. Elsewhere are numerous columns, altars, and the remains of the city walls (2 m.

in circuit). The older portions of the acropolis wall are probably of Phœnician or kindred origin, and date from a time when the worship of Baal was supreme. The early history of Baalbek is lost in the mists of antiquity; but as it stood on the route between Tyre and Palmyra, it early became a great entrepôt of Oriental commerce. Under Alexander the Great it rose to a high degree of prosperity, and Augustus made it a Roman colony. Antoninus Pius erected the Great Temple, which Theodosius converted into a Christian church. The Arabs conquered Baalbek in 636, after a stubborn resistance; in 1139, and again in 1260, it was captured by the Mongols; and Timur Beg (Tamerlane) utilized the temple as a fortress (1400). From this period the decline of Baalbek was rapid, and an earthquake (1759) completed the devastation begun by Tartars, Turks, and Damascene pashas. During the Crusades the city was frequently the centre of warlike operations. It is now a poverty-stricken little village, with about a hundred mean houses. The Germans excavated the site of the acropolis in 1900–2. See Wood's *The Ruins of Balbec* (1757; new ed. 1827); Lortet's *La Syrie d'aujourd'hui* (1884); Bellew (two articles) in *Temple Bar* (1861); Frauberger's *Die Akropolis von Baalbek* (1891).



Bab-el-Mandeb.

Baasha, a man of humble origin, who, having slain Nadab, son of Jeroboam I., ascended the throne of Israel about 914 B.C. His reign was marked by his active hostility to Asa, king of Judah, who, in self-defence, had to seek the help of Syria. See 1 Kings 15:27–16:7.

Baba, title of respect = 'papa;' applied to ecclesiastic and secular dignitaries in Western Asia.

Baba (Slav. 'old woman'), the name of a fantastic being who plays a great rôle in the folklore of the Slavonic peoples, especially the Russian, where she is called Iaga-Baba. See Ralston's *Russian Folk-tales* (1873).

Babahoyo. See BODEGAS.

Babbage, CHARLES (1791–1871), a scientific mechanician, who, with Herschel and Peacock, gave the first impulse to an English mathematical revival. He is famous for his unfinished calculating machines. Babbage was Lucasian professor of mathematics at Cambridge University (1828–39), and wrote a good little book called *Economy of Machinery* (1833), also *Tables of Logarithms* (1827; new ed. 1889). See Weld's *Hist. of Roy. Soc.*, vol. ii. ch. 11 (1848).

Babel, TOWER OF. The narrative of Gen. 11:1-9 is obviously intended to explain the different varieties of race and language, and the name Babel (Aram. *balbel*, 'confound') seemed to the writer a corroboration of the story. But it is probable that the legend arose from the name, which is really *Bâb-ili*, 'gate of God,' and has no connection whatever with the Aramaic word for 'confound.' Recent scholarship is disposed to identify the 'Tower of Babel' with the *zikkurrat* of the temple E-sagilla, the extensive ruins of which are now known as Amran, in Babylon itself. See Sayce's *Fresh Light from the Ancient Monuments* (1884), and his edition of G. Smith's *Chaldæan Account of Genesis* (1880).

Bab-el-Mandeb, strait uniting the Red Sea with the Indian Ocean (14½ m. wide). The island of Perim divides it into two unequal channels (the western 12½ m. and the eastern 2 m. wide). The cape of the same name is on the Arabian side of the strait.

Babel und Bibel, the title of a series of lectures delivered in Berlin in 1902-3 by Professor Delitzsch, director of the Royal Museum at Charlottenburg, and a student of Assyriology, in which he expounded the relations between the Bible and the results of the recent excavations at Babylon and the ancient Mesopotamian centres of culture.

Baber (the Tiger), ZEHIR ED-DIN MOHAMMED (1483–1530), first Mogul emperor in India, and founder of the Mogul dynasty, which lasted to the beginning of the 19th century, was a descendant of Timur-Beg (Tamerlane), and succeeded his father, Sheikh Mirza, at the age of twelve on the throne of Andijan in Ferghana. In 1504 he conquered Kandahar and Kabul, and thence made four expeditions against India between 1508 and 1525. In 1526 he appeared in the Punjab, defeated his opponents near Delhi, and occupied Delhi and Agra, and in the following year pushed his conquests as far as Bengal. He made Agra his favourite residence. Baber was also a poet, writing in both Turkish and Persian; but the most important of his literary works is his *Autobiography* or *Memoirs*, which he wrote in Turkish, at the end of his life: trans. into English by J. Leyden and Erskine under the title *Memoirs of Zehir ed-Din Mohammed Baber, Emperor of Hindustan* (1826). See Lane Poole's *Babar* (1899).

Babeuf, FRANÇOIS NOEL (1760–97), a French revolutionist who formed a plot against the French Directory. Babeuf was executed. See Advielle's *Histoire de Babeuf* (1884).

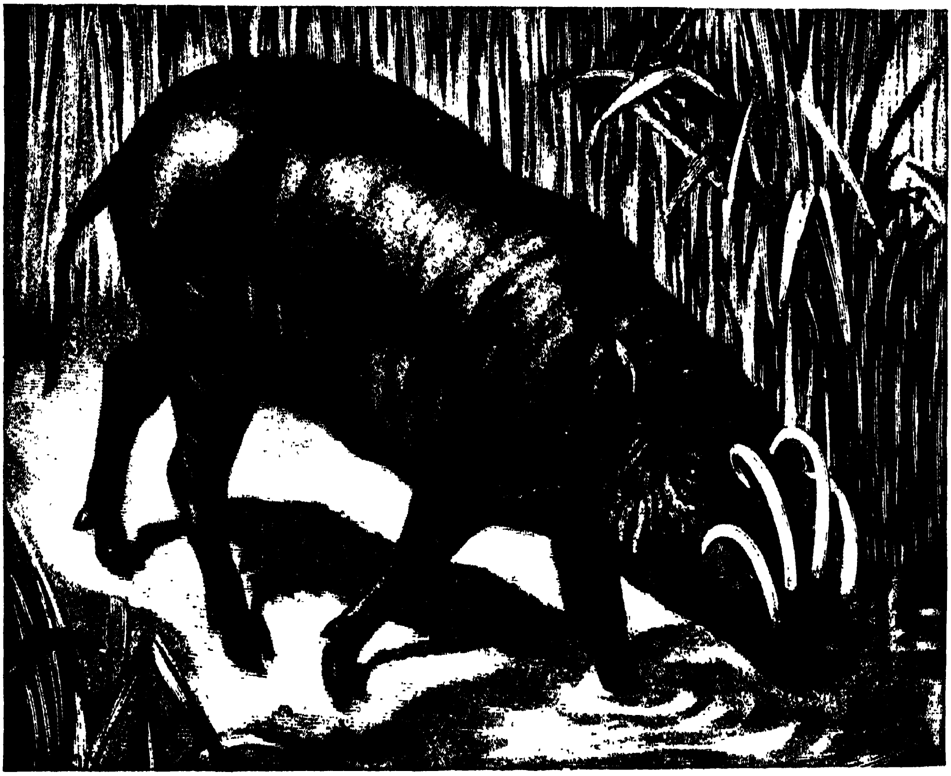
Babi and **Babiism.** The term Babiism denotes the tenets of a school of religious reformers who arose in Persia in the middle of the 19th century. The founder was a young sayid, Mirza Ali, son of Mohammed, who was born at Shiraz in 1819, and who, while resident near Bagdad, in 1844, began to preach a faith which differed in many respects from the orthodox Sufism of Persia. Regarding himself as the latest prophet of God, he took the title of *Bab al-Din* ('gate' or intermediary between the Twelfth Imam and the faithful), whence he became known as 'the Bab,' and his disciples as 'Babis.' Later he styled himself the *Nuqta* ('point,' 'centre,' or 'focus'), believing that in him all previous dispensations centred. Mohammed, Christ, and Moses he revered as prophets, but as *his* forerunners. The doctrine which he preached was largely a healthy protest against the ideas of the Persian hierarchy. He forbade polygamy and concubinage, as degrading to womanhood, and he placed women on the same level as men. Asceticism and mendicancy he equally condemned; and although disapproving of the use of intoxicating liquors, he advocated a life of generosity to oneself as well as to one's neighbours. But his creed was also strongly tinctured with Gnostic, Pantheistic, and Buddhist ideas. The numbers 7 and 19, for example, are regarded as of great significance. The latter number, indeed, expressed the name of the Deity, whom he believed to be incarnate in himself and his eighteen fellow-prophets or colleagues, but chiefly in himself. The preaching of doctrines such as these quickly aroused the antagonism of the orthodox mullahs. It was in 1843-4 that the Bab distinctly declared himself. By the year 1848 he and his followers were in open rebellion against their persecutors; but after a brave resistance they were defeated and dispersed, and the prophet himself was, on July 8, 1850, put to death at Tabriz. An attempt against the life of Shah Nasr ed-Din in 1852, attributed to the Babis, led to renewed severities; and they were deported (1863) to Constantinople, and shortly after to Adrianople, and again in 1868 to Famagusta in Cyprus. Since 1868 Acre has been the home of a section led by Baha, who now number between half a million and a million. A new schism ensued upon the death of Baha. There are some 3,000 Babis in the United States. See E. G. Browne, *A Traveller's Narrative, written to illustrate the Episode of the Bab* (1891), and *The New History of the Bab* (1893); and Khayru'llah and H. MacNutt, *Beha'u'llah* (Chicago, 1900).

Babington, ANTHONY (1561-86), English Roman Catholic conspirator, served as page to Queen Mary of Scotland, to whom he was devoted. Having been selected by an association of youths for the purpose, he led the conspiracy to kill Elizabeth and release Mary. Babington confided their plot to Mary, who wrote her approval (July 17, 1586) in the letter which brought her, Babington, and the other conspirators to the scaffold. See W. D. Cooper's *Notices of Anthony Babington* (1862), repr. from the *Reliquary* for April 1862; *State Trials* vol. i.; Turnbull's *Letters of Mary Stuart* (1845); and Froude and Lingard's *Hists. of England.*

Babington, CHARLES CARDALE (1808-95), professor of botany at Cambridge; wrote *Manual of British Botany* (1843; 8th ed. 1881). He left his herbarium of 50,000 specimens and his library to Cambridge University. See his *Memorials, Journal*, etc. (1897).

Babington, WILLIAM (1756-1833), physician and mineralogist; was the founder of the Geological Society, and author of *A Systematic Arrangement of Minerals reduced to the Form of Tables* (1795), and *A New System of Mineralogy* (1799).

Babirusa, an interesting mammal closely allied to the common pig, but found only in the islands of Celebes and Buru, in the East Indies. Its special peculiarity lies in the fact that the canine teeth in the male go on growing throughout life, and form huge, curved, hornlike structures arching over the snout. The upper canines do not enter the mouth at all, but perforate the skin of the face, and arch backwards over the forehead. Though undoubtedly homologous with the tusks and horns often present in the male sex in hoofed animals, the exact use of these remarkable teeth is quite uncertain, and has given rise to much discussion. See A. R. Wallace's *The Malay Archipelago* (1890).



Babirusa.

Baboon, a name which should strictly be applied only to African monkeys of the genus Cynocephalus. These monkeys are distinguished by the fact that the fore and hind limbs are nearly equal, and that the animals are thus adapted for quadrupedal progression on the ground, rather than for arboreal life like other monkeys. The face and jaws are large, and the brain-case relatively small, giving rise to the name dog-faced monkeys (*Cynocephalus*). The baboon which was sacred to the ancient Egyptians is supposed to have been the hamadryad. For examples, see MANDRILL, CHACMA, DRILL.

Baboon.

Babrius, a Greek poet, probably before the time of Augustus. His work, called *Fables*, in ten books, was a version of *Æsop's Fables*, and seems to have been the base of all the various Æsopean fables which have come down to us. In 1842 a Greek named Minas discovered 123 fresh *Æsop's Fables*, under the name of Babrius, in a MS. at Mount Athos; and others were discovered in MSS. in the Vatican library by Knöll in 1877; and yet others on wax tablets at Palmyra by Von Assendelft in 1891. Ninety-five other fables brought forward by Minas in 1857 have been pronounced forgeries by Conington and others. The best editions are those of Rutherford (1883) and Cruzius (1897). See Bentley's *Dissertation on the Fables of Æsop* (1776); Tyrwhitt's *Dissertatio de Babri* (1776); Conington's *Miscellaneous Writings*, vol. ii. (1872).

Babu, a native of India who possesses a superficial education in English; though, strictly speaking, the term is equivalent to 'Mr.' For an admirable travesty of 'Babu' English, see Anstey's *Baboo Jabberjee, B.A.* (1897).

Babul Tree, of India (*Acacia arabica*), 30 to 40 feet high, yields a transparent gum which is used medicinally and also as food. The wood is used for railway sleepers, and the bark yields a brown tanning dye.

Babuyanes, fertile island group, largely volcanic, Philippines, N. of Luzon. The most important are Claro, Babuyan, Calayan, and Camiguin, one of the largest (54 sq. m.), which yields large supplies of sulphur. Products: tobacco, rice, maize, and tropical fruits. Area, 212 sq. m. Pop. (1899) 9,500.

Baby, BABY FARMING. See INFANT.

Babylonia. This name is derived, through the Greek Βαβυλωνια, from the native *Bâb-îli* (rarely *Bâb-îlāni*), 'gate of God' (or 'of the gods'), the name of the city which, after the accession of the royal house known as the first dynasty of Babylon, became the capital of the country. The history of the name Bâb-îli is unknown, but it is not improbably due to a folk etymology, as is suggested by the fact that Nebuchadnezzar the Great often gives the name as Babilam (a form ending with *a*, and provided with the 'mimmation'), a way of writing it which bears a likeness to a city name read as Babalam, mentioned in an inscription of King Gaddas. Both form and meaning, however, are of sufficient antiquity, as is shown by the fact that it was at an early date translated into the primitive language of the country under the form of Ka-dingira, with the same meaning.

In its widest extent the country stretched from about the 31st degree N. lat. in a S.E. direction to the Persian Gulf, having on the W. the Arabian desert, on the N. Mesopotamia and Assyria, and on the E. the plains at the foot of the mountains of Elam. It was anciently divided into different districts, which were inhabited by various tribes, in some cases speaking languages of a widely divergent nature. On the N. were the two districts of Sumer and Akkad, called by the non-Semitic inhabitants Kingi-Ura, corresponding with the Shinar of the Old Testament, which is derived either from Sumer, or from a dialectic form of Kingi-Ura, by the change of K into S. In Gen. 14:1, 9, the tract of which Ellasar (Larsa; the modern Senkara) was capital is mentioned as if it did not form part of Shinar, or Babylonia proper. The tract in the extreme S. was called *mât Tâmtim*, 'the country of the sea,' and had its own native governors until a comparatively late date. In addition to the above names, the district immediately bordering on Assyria was called Kar-Dunias; and at least a portion of this, where Sippar and the city Babylon lay, bore the name of Edina, or 'the plain' (*cf.* Gen. 10:2), and was, according to Fried. Delitzsch, the original of the Eden of Gen. 2:8, etc.

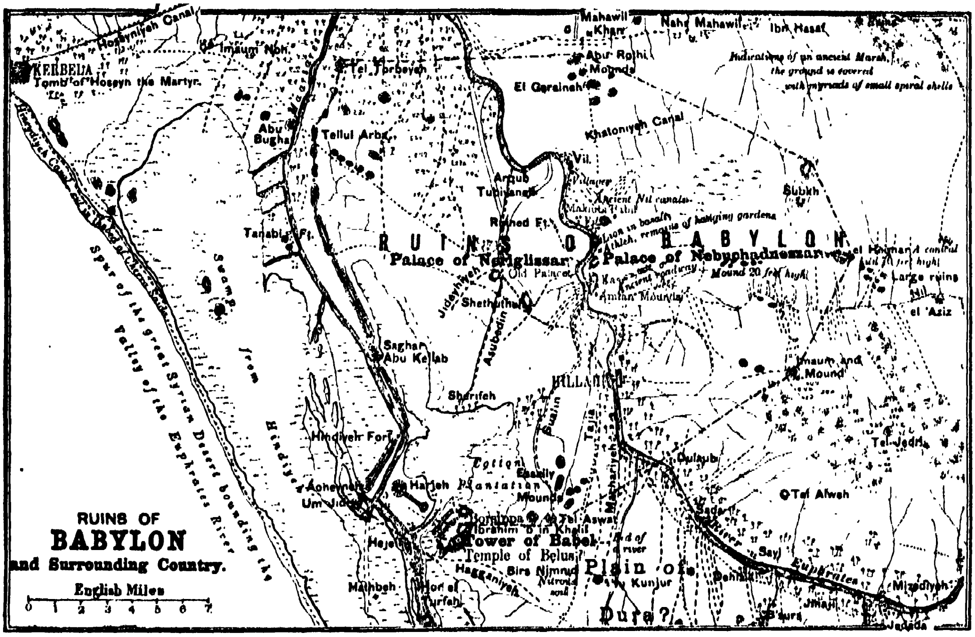
Besides the city of Babylon, which was the capital of the country in later days, Babylonia contained a number of other cities of the most remote antiquity, equalling, or perhaps exceeding, in that respect, Babylon itself. These were Sippar and Akkad, the Accad of Gen. 10:10; Uriwa or Ur, identified by ancient writers and modern scholars with the 'Ur of the Chaldees' of Gen. 11:28, now Muqayyar or Mugheir; Nippuru, stated by the rabbins to be the Calneh of Gen. 10:10, now Niffer; Unuga or Uruk, the Erech of Gen. 10:10, now Warka; Larsa=Ellasar (see above); Lagas, now Tel-loh (Tello), from which some very fine sculptures of ancient date have been obtained; Kis, now Hymer, near Babylon; Borsippa, now represented by the ruins of Birs-Nimrud, the celebrated tower identified (probably incorrectly) with the Biblical Tower of Babel; the sacred city of Eridu; Nisin or Isin; Dûr-ili; Aratta; Marad; and many others.

This fertile region is watered by two great rivers, which, rising in the mountains of Armenia, run through extensive districts before entering Babylonia, and fall ultimately into the Persian Gulf. Flowing through many hundreds of miles of territory, they have, in the course of centuries, brought down with them extensive alluvial deposits, of which a considerable stretch of country at the upper extremity of the gulf has been formed. Indeed, so great has been the addition of territory that a proper understanding of the statements referring to this part, in legend and in history, is only possible by bearing the fact in mind.

Numerous inscriptions found in the ruins of the cities testify to the success of the ancient Babylonians as agriculturists. The plain is still covered with a network of old canals, some of them of considerable extent, which anciently not only irrigated but also drained the land, keeping the inundation within due limits, and rendering healthier and more cultivable what is at present in too many cases a marsh. The digging of a new canal was considered, 2000 B.C., as being of sufficient importance to date by.

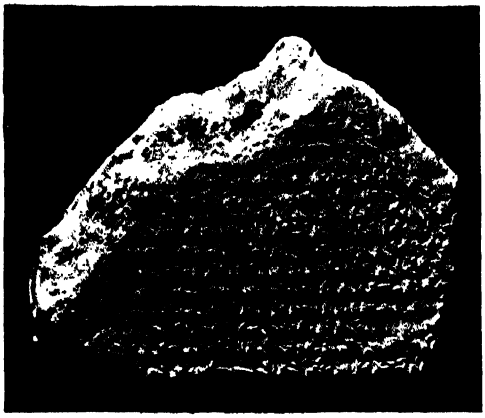
As is indicated by the tablets and the sculptures, at least two races anciently inhabited the country, each speaking its own language, and living side by side, until, in the course of centuries, they became one people. These two races were the Semitic Babylonians, who spoke a language akin to Hebrew and Arabic; and the non-Semitic population, speaking an agglutinative tongue generally regarded as Turanian, and akin to Finnish, Tartar, and Chinese. Which nationality was the first to enter the country, and whether the entry of those who were not the aborigines was a peaceful one or not, is unknown. It is probably not without significance in this connection, however, that Nimrod or Merodach, the founder (according to Gen. 10:10 and the bilingual account of the creation) of the great cities of Babylonia, is described in Gen. 10:8 as a son of Cush, and therefore not of Semitic race, as his name likewise indicates. The great majority of the archaic inscriptions of the country are, moreover, in the non-Semitic language of the country, often called in Britain Akkadian, and generally, on the Continent, Sumerian. There were at least two dialects of this language, which was finally superseded by Semitic Babylonian about 2000 B.C., though isolated compositions in it of a later date are known. The earlier bas-reliefs of Babylonia also show types of the inhabitants of the time which are certainly not Semitic.

The beginnings of Babylonian history are lost in obscurity, but were certainly of considerable antiquity. According to the American explorers, the rubbish accumulations of the ancient city Nippuru (Niffer) go back no less than 10,000 years—that is to say, as far as 8000 B.C. Naturally this is disputed, though the site is certainly one of the most ancient in the land, as were also the Babel (Babylon), Erech, and Accad of Gen. 10:10, together with others less renowned. In the earliest period of which any record has been preserved, Babylonia was divided into a number of small states of varying extent and power. These were Kis, Girsu or Lagas (Tel-loh), Upe or Opis, Uriwa or Ur (Muqayyar), Unuga or Uruk (Erech), Ararma or Larsa (Ellasar), Agadé, Nisin or Isin, Babylon, and Asnunna or Esnunna, with one or two others. The earliest king is one whose monuments have been found at Niffer, and who calls himself 'lord of Kengi'—*i.e.* Sumer, or the south. He bore the name of En-sag-kus-anna, and is regarded as



having reigned before 4500 B.C. The one historical event of his reign which is known is that he attacked the city of Kis, and dedicated the spoils which he captured to the god Ellila or Bel. Naturally, the small kingdom of Kis, against which En-sag-kus-anna fought, was of as great antiquity, and a state not without influence, as may be judged from the fact that its conquest was a thing worth boasting about, and that, at a later date, it attained to considerable power—its king, Mesilim (about 4000 B.C.), triumphing over a district whose name has not yet been read with certainty, but which seems to have lain near Opis. Equally glorious with the other states of Babylonia, however, was the little territory of which Lagas (Tel-loh) was the capital. Beginning with Uru-ka-gina, about 4500 B.C., this district possessed a line of rulers, sometimes called kings, but generally bearing the title of *patesi* or *issaku* (headman), who ruled the district wisely and well for a long series of years, until, as with the other states of Babylonia, the little kingdom was absorbed into the great Babylonian empire. Whilst they reigned, however, they watched over the welfare of their subjects, and at the same time gained glory by foreign conquest. Thus Gudea, who reigned about 2700 B.C. or earlier, and who was one of the most renowned of the *issaku*, says that the god E-girsu (Nin-girsu), the patron deity of Lagas, 'delivered all things unto him from the upper sea to the lower sea' (the Mediterranean and the Persian Gulf). From Amalum (regarded as Amanus, in N. Syria) he brought cedar and other trees of large size; stone, among other places, from Musalla or Supsalla, in the mountains of Martu (the land of the Amorites). From Tidalum, a mountain in the same district, he brought a kind of limestone; from Melahha, identified with the peninsula of Sinai, gold dust; and from Til-Barsip, now Bir or Birajik, a material the nature of which is uncertain. Besides this, he claims to have smitten the city of Ansan, in Elam, with the sword, and to have dedicated its spoils to his deity E-girsu.

1



2

Obverse of an unbaked Babylonian Tablet. *Edge of same.*

1. Mentions Dûr-makh-ilâni, son of Eri-Aku, probably Arioch, king of Ellasar; Tudkhula, probably Tidal, king of nations; and Kudur-Lagamar, king of Elam, probably Chedorlaomer, king of Elam. (Gen. 14:1.) Now in the British Museum. 2. Shows the characters '-Aku' (the last two characters of Arioch) written 'round the corner,' in continuation of line 9.

Exceedingly interesting is the history of the northern kingdom of Akkad. As far as can at present be ascertained, it was the state in which Semitic influence predominated, and seems, therefore, to have given to Babylonia its first dynasty of Semitic kings. Of these, the now celebrated ruler Sargani-sar-ali, known as Sargon of Agadé (Akkad), son of Itti-Bel, was the most renowned. According to a tablet of omens referring to his reign, he carried the arms of Akkad as far as the Mediterranean and Cyprus, in which island he seems to have set up an image of himself. To do this, he had to subjugate the land of the Amorites. This is the ruler of whom it is recorded that his mother placed him in a little ark on the Euphrates, and he was brought up by a canal overseer (?) who found him. Notwithstanding his popularity, he had on one occasion to put down a revolt which took place among all the elders of the land. His son, Naram-Sin, was no less renowned than he was, it being stated of him that he conquered Apirak and Maganna. The little recorded by this omen-tablet concerning the reign of Sargon is supplemented by recent French excavations at Susa, which show that he invaded Elam, an old Semitic colony.

It is noteworthy that though Sargon of Agadé came into contact with Babylon, that city does not appear as a place of importance until a comparatively late date; and that when it does come to the front, its kings gradually reduce all the other petty states to subjection, and the latter are not heard of afterwards except as integral parts of the Babylonian empire. Yet the city of Babylon must have had a past as glorious as any of the others. As is well known, the patron divinity of Babylon was Merodach, called, in Gen. 10:8 and elsewhere, Nimrod, who, as the reputed founder of the great cities of Babylonia, was in all probability the first really renowned king of the city and its district. But a German mission is at the present time excavating the ruins.

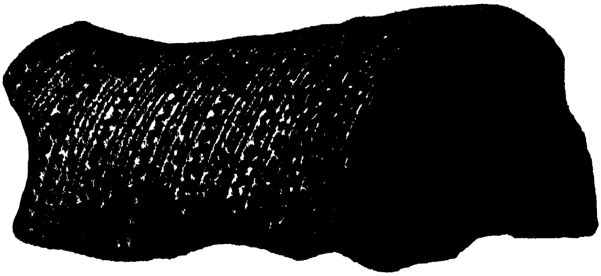
The city's history practically begins with the royal house called the dynasty of Babylon, consisting of eleven kings, who reigned, in all, about 290 years, beginning about 2200 B.C. Although this dynasty is called 'the dynasty of Babylon,' it was certainly not a Babylonian one. To all appearance it corresponds with what Berosus calls the Arabian dynasty, though he gives the number of the kings as nine, and makes the total of their reigns 245 years. Taking these rulers in order, the native records inform us that Sumu-abu, the first king, built or rebuilt various temples and fortifications, and destroyed Kazallu; Sumu-la-ilu or Sumu-le-el dug the 'canal of the Sun,' smote Halambu with the sword, destroyed the city of Kis, drove out Ya'zar-ilu from Kazallu, 'smote him with the sword' a few years later, and carried out several useful and defensive works, including the wall of Babylon. The next king, Zabû, among other things, restored (?) the great temple of Belus at Babylon, rebuilt (?) the walls of Kazallu, and inaugurated (?) an image of himself. Apil-Sin performed several pious works, including the setting up of a 'supreme throne' for the sun-god at Babylon; and Sinmubalit occupied himself largely with the digging of canals, building the defences of the chief towns, and other things of a similar nature. It is to Hammurabi, his son and successor, however, that the principal interest attaches. This ruler, whom a later text calls Ammurapi, is the Amraphel of Gen. 14. As there recorded, he took part, with Chedorlaomer of Elam, Arioch of Ellasar (Larsa), and Tidal, king of nations, in an attempt to reduce again to subjection the king of Sodom and his allies. There is no record in the inscriptions of Babylonia of any expedition of Hammurabi to Palestine, though there are three inscriptions which apparently refer to Kudur-Lagamar, or Chedorlaomer, one of them being in the form of a poetical legend. In the thirty-first year of his reign Hammurabi captured Rim-Sin (supposed to be the same as Arioch, with which name it agrees sufficiently well in meaning), thus putting an end to the last of the principalities independent of Babylon.

Hammurabi was succeeded by Samsu-iluna, his son, who also had a very successful reign. To all appearance he employed himself in consolidating the newly-formed kingdom, and to this end fortified certain cities. His other works were the restoration of temples (notably that of Belus at Babylon), the dedication of thrones, etc., to the gods, and the digging of canals. In the mutilated list of colophon dates there is a reference seemingly to the destruction of the city Eres; but as this place was, to all appearance, on Babylonian soil, warlike operations are doubtful. Of the other kings of the dynasty of Babylon little is known.

The names of many kings occur, but very little history, until the time of the Kassite dynasty, the first ruler of which was named Gandas or Gaddas (*c.* 1800 B.C.). This ruler calls himself 'king of the four regions, king of Sumer and Akkad, king of Babalam (for this last name see the opening section above). Seven reigns later we have the name of the celebrated king Agu or Agu-kak-rime, who states his titles at length thus: 'King of Kassu and Akkadu (Accad), king of the wide land of Babylon (*mât Bâb-ili*), colonizer of Asnunnak, an extended people, king of Padan (Padan-aram) and Alman, king of the land of Guti, a rebellious (?) people, the king who has quieted (?) the four regions, the obedient one of the great gods, am I.' He then goes on to state that he had sent and fetched (the images of) Merodach and his consort, Zir-panitum, from the land of Hani, and describes with what state they were replaced in shrines at Babylon.

In the time of Kallima-Sin and Burna-burias II. (*c.* 1430-1380 B.C.) Babylonia had relations with Egypt, and a daughter of the former was given in marriage to Amenophis III. A tragic passage in the history of Babylonia is that in which Kadasman-Murus (about 1370 B.C.), after deporting the numerous Suti (nomads of the west), and building fortresses in the land of Amurru (Amorites), was killed by Kassites in Babylonia. This brought down upon the country the vengeance of the Assyrian king Assur-uballit, whose grandson he was, and Suzigas (otherwise Nazi-bugas), whom they had raised to the throne, was deposed—Kuri-galzu II., a youth, son of Burna-burias, being installed in his place. A great deal of space is devoted, in the Babylonian chronicle, to this ruler (there is just the possibility that the text speaks of two kings bearing the same name), who seems to have had a very glorious reign. Among other things recorded of him is that Hurba-tila, king of Elam, sent him a challenge to battle, and, as a result, was defeated by him at Dûr-Dungi.

Another notable ruler was Nebuchadnezzar I., son of Ninib-nadin-sumi, who warred in Elam and the east generally, and in Syria (Amurru). He is said to have been defeated in battle by the Assyrian king Assur-rês-isi. (See ASSYRIA.) How fortune varied for the Babylonians is illustrated by this, and also by the fact that during the reign of Simmas-Sihu, about 1040 B.C., the Sutu nomads invaded Babylonia, and carried off as spoil the property of the temple of the sun-god at Sippara.



Fragment of a Clay Seal of Hammurabi.

About the year 892 B.C. the kingdom fell under the dominion of Tukulti-Ninip II., king of Assyria; but native rule was restored seven years later, when he met his death in a rebellion. (See ASSYRIA.) The result of this was that Babylonia had a great advantage; for Assyria not being in a position to make a vigorous resistance, the Babylonians, to all appearance, occupied and devastated a large part of the country. The next two kings mentioned by the chronicle are Bel-nadin-sumi and Ram-manu-sarra-iddina, in whose reigns the country suffered apparently on account of the invasions of an Elamite king named Kidin-hutrudas. This in all probability weakened the country, enabling the Assyrians to defeat a later king, Nabu-abla-iddina, who had allied himself with the Shuites. Peace was concluded between the two powers in the reign of the Assyrian king Shalmaneser II. (See ASSYRIA.)

In 747 B.C. Nabonassar came to the throne, but all that is stated of his reign is that a revolt occurred in Babylon and Borsippa, but was quelled. As to his reign having commenced a historical era, there is no trace of that in the inscriptions. Perhaps the true explanation is that systematic astronomical observations were recorded in his time.

Nabu-nadin-zêri or Nadinu (Nadios), his son, reigned two years, meeting his death at the hands of Nabu-sum-ukin or Sum-ukin, who reigned two months. Ukin-zer (Chinziros), chief of the tribe of Bît-Amukkan (731 B.C.), was taken prisoner by Tiglath-pileser III. of Assyria, after a reign of three years. The Assyrian king, having seized the throne, ruled under the same name as in Assyria, though he is called Pulu (Pul, *cf.* 2 Ki. 15:19) in the Babylonian canon. He reigned in Babylonia two years, and was succeeded by Ululâa (Elulæus), as the canon calls the Assyrian king Shalmaneser IV. (See ASSYRIA.) On his death, in 721 B.C., Merodach-baladan II., a native of the district of the Persian Gulf, mounted the throne, and had a great many conflicts with the Assyrians. He was captured by them about 711 B.C., and Sargon of Assyria became king of Babylonia. On the death of Sargon, in 705 B.C., his son, Sennacherib, became king of Babylon, but was repudiated by the Babylonians in 703 B.C., when Marduk-zakir-sumi was placed on the throne. This king, however, reigned only two months; for Merodach-baladan, having escaped from prison, killed him, and once more resumed the reins of government. He was soon again deposed by Sennacherib, and fled. The Assyrian king thereupon installed Bêl-ibni, the Belibos of Ptolemy. The rule of this last, however, not being satisfactory, he was removed by the suzerain, who placed his own son, Assur-nadin-sumi, on the throne.

Whilst Sennacherib was engaged in the south against Merodach-baladan, Nergal-usêzib, whom he had once defeated, seized Babylon, and taking Sennacherib's son prisoner, sent him to Elam. The Assyrian army returning, Nergal-usêzib was defeated and captured. Sennacherib next turned his attention to Elam, and whilst he was engaged there, Musêzib-Marduk mounted the Babylonian throne. Later, the Elamite king, Umman-menanu, seems to have become the friend of the Assyrians; for he invaded Babylonia, and having taken Musêzib-Marduk prisoner, sent him to the Assyrian king. Babylonia now fell under the rule of the Assyrians for twenty-one years (688–669 B.C.).

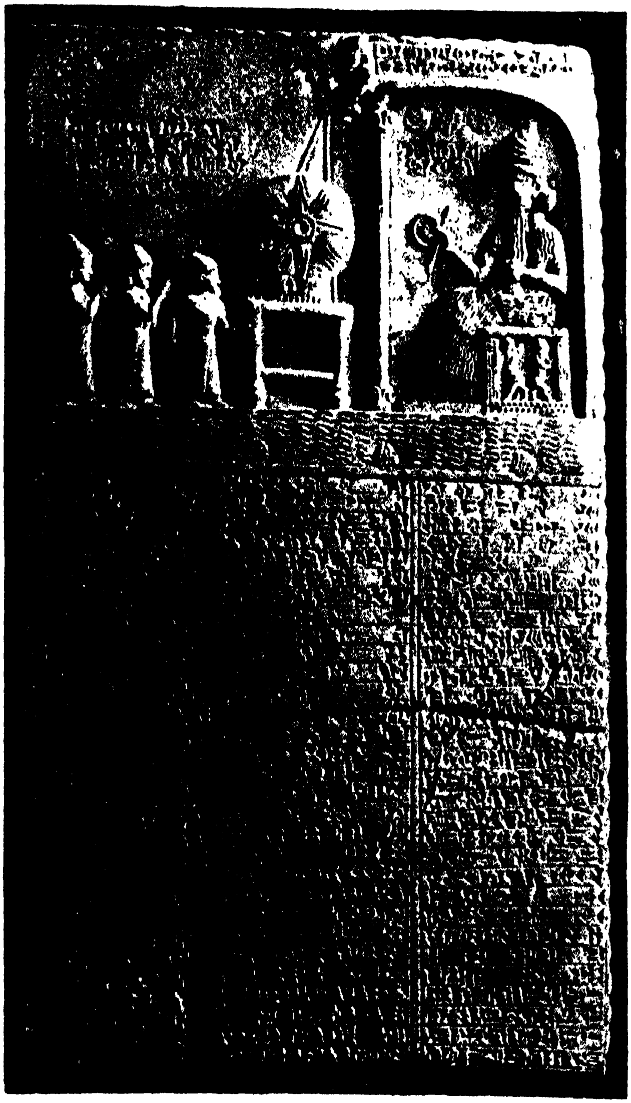


Image of the Sun-God.

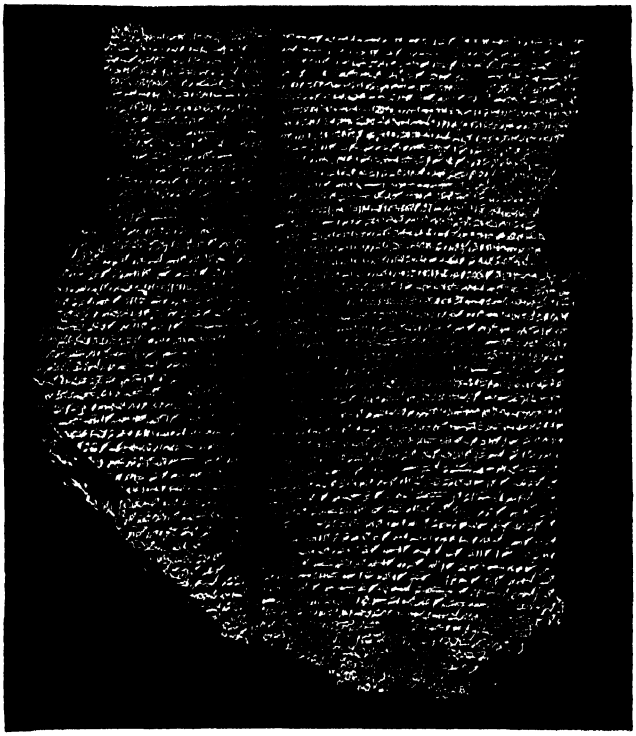
Stone Tablet recording the Restoration of the Temple of the Sun-God at Sippara, by Nabu-pal-iddina, about 900 B.C.

Sennacherib was assassinated in 680 B.C., and his son, Esarhaddon, who ruled Babylonia with moderation, and tried to repair the ravages which his father had made, succeeded him. On his death, in 669 B.C., his son, Samas-sum-ukin (Saosduchinos), came to the throne of Babylonia, apparently in accordance with his father's wish. During his reign the country was invaded by the Elamite king Urtaku, who persuaded Bel-ikisa, with some other Babylonian chiefs, to join him in attacking Samas-sum-ukin and Assur-bani-apli, his brother, the king of Assyria. The result was the deposition of the Elamite king. Samas-sum-ukin, however, did not like being regarded as his brother's vassal, and therefore bribed Umman-igas, the new Elamite king, to join him in throwing off the Assyrian yoke. The result was disaster, for in 648 B.C. the Assyrian army entered Babylon, and Samas-sum-ukin, setting fire to his palace, was burnt to death. He was succeeded by Kandalanu (Kineladanos), who is regarded by some as the same as Assur-bani-apli. The rule of this king lasted twenty-two years, and he was apparently succeeded (625 B.C.) by the Assyrian king Assur-êtil-ilâni, who occupied the throne for at least four years. His successor was Sinsarra-iskun, the Saracos of Syncellus, whose general, Nabopolassar, having been sent to drive back certain barbarians who were said to be invading the country, revolted against his master, and allying himself with the Medes and others, succeeded with them in overthrowing the Assyrian empire. (See ASSYRIA.)

Nabopolassar took for his share of the spoils the kingdom of Babylonia, and made the country the richest and most influential in the then known world. He and his son attacked the Egyptians and defeated them; but the son learning, whilst on this expedition, that his father had died, hastened back to Babylonia to assume the reins of government. The glory of the reign of Nebuchadnezzar II., rightly called 'the Great,' is well known. He overran the states of Palestine, and having captured Jerusalem in 587 B.C., carried away the Jews into captivity. He captured Tyre after a siege of thirteen years (573 B.C.), and defeated and deposed Hophra, king of Egypt, setting on the throne Amasis, who, however, seems to have revolted against his suzerain later on, necessitating another expedition to Egypt to reduce him again to subjection. Nebuchadnezzar is renowned as the restorer or rebuilder of all, or nearly all, the great temples and palaces of Babylon. He died in 562 B.C., and was succeeded by his son, Evil-merodach, who, after a short reign of only two years, was assassinated by his brother-in-law, Neriglissar, who then mounted the throne. The record of the marriage of the daughter of Neriglissar with the high priest of Nebo at E-zida exists, and is preserved in the British Museum. Neriglissar was advanced in years when he came to the throne, and only reigned three years, being succeeded by his son, Labasi-Marduk (Labarosoardochos), who was assassinated after he had been on the throne only nine months, Nabo-na'id (Nabonidos or Labynitus) being thereupon made king (556 B.C.).

Much has still to be discovered ere we know all about this remarkable ruler, to whom students of Babylonian history owe so much. The son of a princely family of Babylon, he was to all appearance learned, well read, and an antiquarian. The accounts of his researches in the foundations of the ancient temples for records of his predecessors are of the highest value. He seems to have given over the direction of the military affairs of the kingdom into the hands of his son Belshazzar. During his reign the renown of Cyrus began to be spread abroad, and the Babylonian chronicle records that this conqueror attacked a petty ruler in the neighbourhood of Arbela. In the year 539 B.C. he began the subjugation of Babylonia, and Gobryas, his general, entered the capital on the 16th of Tammuz of the following year. At this time, to all appearance, Belshazzar was at the head of affairs, and practically king, and he seems to have been killed on the night of the 11th of Marcheswan, 539 B.C., in an attack made by Gobryas. The next year the king of Anzan, as Cyrus is called, found himself completely master of Babylonia, and assumed the reins of government. Babylonia had thereafter no separate existence. From time to time she tried to revolt, but always without success. The inhabitants saw with grief their ancient glories disappearing; and the foundation of Seleucia on the Tigris by Seleucus Nicator (312-280 B.C.) completed the ruin of the city. The Semitic Babylonian language, however, continued to be spoken and used in contracts almost, if not quite, until the Christian era, and the worship of their deities is said to have been carried on at the Birs-Nimrud (the temple known as E-zida) until the 4th century of the Christian era.

Though it is uncertain whether the ancient Babylonians were more civilized than their Egyptian contemporaries, there is but little doubt that they were the pioneers of civilization in the whole of Western Asia before Greece and Rome came to the front. Four thousand years B.C. their system of writing had already been developed, and applied also to the Semitic Babylonian tongue. Fourteen hundred years B.C., as the Tell-el-Amarna tablets testify, its use extended over the whole of Western Asia as far as the Mediterranean and Egypt. (See CUNEIFORM.) Though not a warlike people, the Babylonians possessed more than once what might have been described at the time as a world-wide empire. They were energetic, intelligent, polished in their way, and fond of letters. From 4000 B.C. onwards excellent sculptures and engravings on hard stone exist to testify to their skill and artistic instincts. Representations of musical instruments imply also that the art of harmony was not altogether unknown to them. To this must be added agriculture, mensuration, and mathematics, such as they were; and their legal enactments, codified apparently by Hammurabi, are, in their way, noteworthy productions. In the matter of literature we owe to them no less than three accounts of the creation, two accounts of the flood, one of them put into the mouth of the Babylonian Noah (Ut-napistim or Atra-hasis), who is represented as relating it to the semi-mythical Gilgames (Gilgamos), a primitive king of Erech (*Uruk-suburi*). To these must be added a number of other legends, such as the story of Ura (the pestilence), Etanna, the horse and the ox, with many others—one at least, the story of Sargon of Agadé, being historical.



Account of the Deluge.

(From the Library of Assur-bani-apli at Nineveh.)

It is difficult to judge which was the more predominant characteristic of the Babylonians, their trading instinct or their reverence for their gods, for both are equally marked. They had intercourse by means of trade with Elam on the east, Syria on the west and many other places on the north and south whose names are not recorded. Slavery was common, and contracts concerning the buying, selling, and hiring of slaves are frequently met with. 'Fair Gutian slaves' are spoken of at an early date; and in the time of Cambyses a Babylonian soldier speaks of an Egyptian slave woman and her child, 'the spoil of his bow.' The Babylonians seem at all times, but especially at the earlier period, to have been very prone to litigation, and the large number of tablets of this class which exist show that though the men had generally only one wife, a second was at times taken, often to wait upon the first. Whether a man had children or not, he would, if it seemed good to him, adopt sons or daughters, to whom he was then under legal obligation to give part of his property. These foster children could not deny him except under penalty of loss of all claim to his estate, and some punishment, perhaps slavery. A husband could divorce his wife by paying a fine; and in addition to this she might take away the amount of her dowry. If, however, a woman denied her husband, the penalty was death, generally by drowning, at least in earlier times.

In common with all Semites, the Babylonians were exceedingly religious, and were consequently greatly in the power of their priests, through whom tithes and offerings to their numerous gods were made. Their earliest chief divinity was apparently the god Ea, lord of the deep, possessor of unsearchable wisdom, and creator of all things. When, however, Babylon became the chief city of the united states of Babylonia, Merodach, the god of that city, assumed the first place. He was a reflection of the sun, or the light of day, and was worshipped as he who constantly sought to do good to mankind. His chief title was Bel, 'the lord.' Other divinities were Samas, the sun-god; Sin, the moon-god; Nebo, the prophet or teacher; Nergal (Ura), the god of death and the grave; Beltu (Beltis), consort of Bel or Merodach; Istar, the goddess Venus, consort of Tammuz; Eres-ki-gala, goddess of Hades; and many others. It is noteworthy that the names of most of the deities of Babylonia are not Semitic, but in the language of the early Sumero-Akkadian inhabitants of the country. See Hommel's *Geschichte Babyloniens und Assyriens* (1885); Delitzsch's similar title (1891); Geo. Smith's and A. H. Sayce's *Hist. of Babylonia* (1877); Maspero's *The Dawn of Civilization*, ed. by Sayce (1896), and *The Struggle of the Nations*, ed. by the same (1897); M'Curdy's *History, Prophecy, and the Monuments* (1894, 1896); Radau's *Early Babylonian Hist.* (1900); Pinches' *The O.T. in the Light of the Records*, etc. (1902); and for translations, *The Records of the Past*, 1st ser., ed. by Birch, vols. i., iii., v., vii., ix., xi.; 2nd ser., ed. by Sayce, vols. i.-vi. (1888-92); and, from time to time, in the *Proc. of the Soc. of Bib. Archæol.*, the *Jour. of the Royal Asiatic Soc.*, and the *Trans. of the Victoria Institute.*

Babylonish Captivity. See Israel, History of.

Babyroussa. See Babirusa.

Baca, The Valley of, through which the pilgrims march towards Zion (Ps. 84:6).

Bacarra, tn., 3 m. N. of Laoag, prov. Ilocos Norte, N.W. of Luzon, Philippine Is. Pop. over 13,700.

Bacau, tn., Roumania, cap. of county of same name, on the Bistritza, station on the Bucharest-Jassy Ry.; was a considerable town as early as 1400, and has paper works and a lively trade. Pop. (1900) 16,187, of whom half are Jews.

Baccarat. The origin of the game of baccarat, or baccara—called more familiarly bac—is not known. It became the French gambling game *par excellence* during the latter portion of the reign of Louis Philippe, and still retains its pre-eminence in France. There are two forms of the game—*baccarat à banque* (sometimes called *baccarat à deux tableaux*) and *baccarat chemin de fer*. For a full description see Gambling. It is one of the unlawful games, and is forbidden in most clubs. See Gaming.

Baccarat, tn., Meurthe-et-Moselle dep., France, 16 m. S.E. of Lunéville. It possesses one of the most celebrated artistic glass factories in Europe, founded in 1765, and employing over 2,000 men. Pop. (1900) 7,014.

Bacchæ, also called Mænades and Thyiades, the female attendants of Bacchus. The name was also applied to the priestesses in the Dionysian festivals.

Bacchante, a British first-class cruiser (12,000 tons), flagship of Mediterranean fleet, commissioned at Chatham, Nov. 25, 1902. The ship-name is associated with the capture of Fiume and Cattaro (1813).

Bacchantes, male and female devotees of Bacchus in his festival processions.

Bacchus. See Dionysus.

Bacchylides (*c.* 510-450 B.C.) of Ceos, one of the great lyric poets of Greece, was a nephew of Simonides. He lived for some time at the court of Hiero at Syracuse. Until 1896 only fragments of his poetry were extant, but in that year the British Museum obtained from Egypt a papyrus which contained twenty of his poems, of which six are practically perfect. Fourteen of these poems commemorate victories in the games; of the others, two are pæans, one a dithyramb, and two hymns. Bacchylides's poetry is distinguished by elegance and smoothness; he does not possess the depth and magnificence of Pindar, nor his difficulty of thought and language. Editions: Kenyon (1897), the *editio princeps;* Blass (1898), trans. by Poste (1898).

Bacciochi, Maria Anna Elisa Bonaparte. See Bonapartes, The.

Baccio della Porta. See Bartolommeo, Fra.

Bach, Alexander Anton Stephan, Baron von (1813-93), Austrian statesman; became minister of justice (1848), and minister of the interior (1849). After the death of Schwarzenberg (1853) he became the most powerful politician in Austria, an advocate of reactionary absolutism, and a strenuous opponent of the Slavs and Hungarians. He was ambassador at Rome (1859-67).

Bach, Johann Sebastian (b. Eisenach, Mar. 21, 1685; d. Leipzig, July 28, 1750), musical composer. Johann Ambrosius (1645-95), the father of Sebastian, was court and town musician at Eisenach, and until he died gave his son lessons on the violin. Sebastian, after having been a violinist for a short time in the orchestra of Prince Johann Ernst at Weimar, held successively the posts of organist in Arnstadt (1704), in Mühlhausen (1707), at the court chapel of Weimar (1708), and of capellmeister to Prince Leopold at Köthen (1717). In 1723 he was appointed cantor at the school of St. Thomas, Leipzig, where he also served as director of music at the university and at the churches of St. Thomas and St. Nicholas. These appointments he held until his death. Bach's development of all forms of composition marks an epoch in the history of music. His orchestral works and chamber music gave a great stimulus to those branches of art, and his solo sonatas for violin and for violoncello hold a unique position among compositions for these instruments. Bach was perhaps the greatest organist of his generation, and his numerous productions for the instrument are still unsurpassed. Among his many vocal compositions may be instanced his magnificent Mass in B minor, and the Passions of St. Matthew and St. John. His valuable compositions for the clavier, and his introduction of a new system of fingering, which made each finger of equal importance, have exerted an enormous influence upon the modern art of piano playing; but of still greater moment was the fact that Bach, who tuned his own claviers, invented our present system of equal temperament. His *Wohltemperirtes Clavier* —forty-eight preludes and fugues in all keys—exemplifies the necessity of his method of tuning for keyboard instruments, and as a musical and technical work is considered indispensable to the trained pianist. The most complete edition of his works is that issued at Leipzig by the Bach Society between 1850 and 1900, in 59 folio vols. See his *Life* by Miss Kay Shuttleworth (1873), and the greatest work on the subject, *J. S. Bach*, by J. A. P. Spitta (Eng. trans. 1884-5).

Bach, Wilhelm Friedemann (1710-84), the eldest and most talented son of the above, studied under his father; became organist at Dresden (1733) and at Halle (1746-64). After resigning the latter appointment he led an irregular bohemian life, giving concerts and lessons, and died in Berlin in great poverty.

Bach, Karl Philip Emanuel (1714-88), the third son of Sebastian, studied music under his father, and law at the University of Leipzig and Frankfort-on-the-Oder, where he founded a music academy for the production of his own compositions. In 1738 he went to Berlin, where he became private pianist to the king, until in 1767 he went as musical director to Hamburg, where he remained for the rest of his life. Among his many compositions are sonatas, fantasias, and various pieces for the piano and orchestra, melodies for the Psalms, and the oratorio *The Israelites in the Wilderness.* He wrote also a didactic book of great value, *Versuch über die wahre Art das Klavier zu Spielen* (1753 and 1763, 2 vols.). See Bitter's *Karl Ph. Em. und Wilh. Fried. Bach und deren Brüder* (1868).

Bach, Johann Christian (1735-82), the youngest son of Sebastian; after the death of his father he went to Berlin, and studied the piano under his brother Emanuel. In 1754 he became organist at Milan, whence he removed to London in 1759, and was appointed conductor to the queen. He wrote many compositions for the piano; several operettas, of which *Orione* (1763) had a great success, and another, *La Clemenza di Scipione,* was played as late as 1805. His wife, Cecilia Grassi, an Italian, was *prima donna* at the London opera for some years.

Bacharach, tn., prov. Rhineland, dist. Koblenz, Prussia, on the l. bk. of the Rhine, 30 m. by rail N.W. of Koblenz. In the middle ages the staple market for the wines of the Rheingau. Pop. (1900) 1,902.

Bachelor. See Celibacy and Degrees.

Bachelors' Buttons, a term applied to double flowers of buttercups, and sometimes also to double daisies and other plants, such as the campion, the burdock, the scabious, etc.

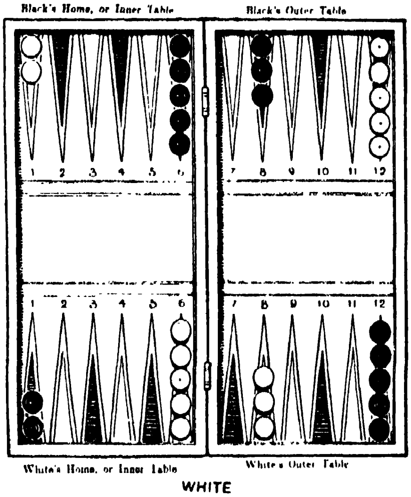
Bächtold, Jakob (1848-97), Swiss man of letters, professor of German language and literature at Zürich (1888). He wrote a useful *Geschichte der Deutschen Litteratur in der Schweiz* (1887-90); a good biography of Gottfried Keller (1892-6); and edited Mörike's *Briefwechsel* (1885, 1890, 1891), and Goethe's *Götz von Berlichingen* (2nd ed. 1887) and *Iphigenia auf Tauris* (2nd ed. 1887).

Bacillus. In 1680, Leeuwenhoek, a Dutch investigator, discovered bacteria, which he called *animalculæ,* because of their movements. A century later a Danish scientist, Müller, named several types, and applied the term *bacillus* to straight, cylindrical, rodlike species similar to those figured by Leeuwenhoek. The tendency now is to restrict the name to a genus of non-motile, rodlike forms; but it is still commonly used for all species, whether motile or not. See Bacteriology.

Back, Sir George (1796-1878), British admiral and Arctic explorer, born at Stockport; entered the navy in 1808; served with Franklin in the *Trent,* in a voyage of discovery to the Arctic regions (1818), and accompanied Franklin on his overland expedition in N. America (1819). In 1825 he again assisted Franklin in his second Arctic expedition. In 1833, as commander, he took charge of the expedition to search for Sir John Ross, in the course of which he discovered the Great Fish or Back R., in Canada. He wrote a *Narrative of an Expedition in H.M.S. 'Terror'* (1838) and a *Narrative of the Arctic Land Expedition .... in 1833-5* (1836).

Backbond, in Scottish law a deed which qualifies and explains an absolute disposition reducing it to a disposition upon trust or in security.

Backergunge. See Bakarganj.



The Game of Backgammon.

Backgammon. This game is played by two persons. Fifteen pieces, like those used for draughts, are placed on each side, the one set dark, the other light in colour. The board is divided into two equal compartments by a raised border called the 'bar,' which runs from one player to the other. It is marked with twelve points (or *flèches*) in alternate colours at either end. These points are of such length that five pieces will rather more than cover them. A box and a pair of dice complete the apparatus. The arrangement of the game at its beginning is shown in the following diagram, which gives the names of the points. The numbers are used only for simplifying the present article.

The object of the game is for each player (1) to move all his men into his own home table, and then (2) to remove them from the board, under conditions to be explained. The line of movement for all pieces is in the direction of their own home table, from their own outer table, the enemy's outer table, and the enemy's home table, those standing in the last named having to pass through the others in the order named. The two sides, therefore, march in contrary directions.

The first move is decided by a throw of the dice. The first player then throws the two dice, and moves his pieces according to the numbers. If he throws 6, 3, he can move one piece to the sixth point in the authorized direction, and another three points; or he can move one piece six points and the same piece three more. He can take the six or the three move first, as he pleases. He *must* move as the dice decide; but if the point at which he aims is occupied, then he cannot move for that half of his throw, which is lost. The other player then casts the dice, and moves accordingly; and so on, by alternate throws of the dice. Thus, White, beginning, throws 4, 3: he may then move one piece from point White 8 to White 4, and another piece from White 6 to White 3. Black then throws 5, 1: he may move a piece from Black 8 to Black 3, and the same piece from Black 3 to

Black 2. If a point at which a player aims has a hostile piece on it, it is 'unguarded,' and the hostile piece (called a 'blot') is removed, and placed on the dividing border, while the player occupies the point. A point on which two or more pieces are standing is 'guarded,' and cannot be occupied. If the player has no vacant or unguarded point to take, he loses the move for that half of his throw. A player who has lost a piece this way cannot move any of his other pieces until he has 'entered' this piece *i.e.* returned him to the game. To do this he throws the dice: if either die shows the number of a vacant or unguarded point in the enemy's home table, he places his captured man upon it, and uses the number of the other die for an ordinary movement. He cannot move while a 'blot' is 'hit' (captured); and till the dice allow him to enter the piece, his throws are lost. Meanwhile his opponent is steadily moving on.

When a player has brought all his pieces into his own home table, he then has to 'bear them off' - *i.e.* to remove them from the board. On each throw of the dice he may either move one or two pieces forward as usual, or may remove from the board one or two of his own pieces that are on points corresponding with one or both of the dice, or may move one and remove another from the board. If he throws a larger number than that of the largest point occupied by a piece, he may remove a piece that is on his highest occupied point. Thus, throwing a 6, and his highest occupied point being 5, he may remove the piece on point 5.

A knowledge of the 'chances' of the dice is an all-important factor in playing backgammon. The player who first 'bears off' all his pieces wins the game. If when he wins his enemy has also begun to 'bear off,' the victory is a 'hit.' If the enemy has not yet begun to 'bear off,' the victory is more glorious, and is styled a 'gammon.' If the enemy has one or more pieces still on the 'bar' (in captivity), or still in the victor's home table, the victory is most glorious, and is called 'backgammon.' See Hoffman's *Card and Table Games* (1898); Bohn's *Handbook of Games* (1884); Berkeley's *Draughts and Backgammon* (1890).

Backhuysen, or BAKHUISEN, LUDOLF (1631 1708), Dutch painter, born at Emden in Hanover; studied under Everdingen and Dubbels, and became famous as a painter of sea-pieces.

Backlash, the shock which occurs in cogwheels or other such gearing when reversed suddenly from forward running to backward.

Backwardation, the stock-exchange term for a sum of money paid to a person who has bought securities for the ensuing account, in consideration of his allowing delivery to be postponed until a subsequent account.

Backwell, EDWARD (d. 1683), chief founder of English banking, was a goldsmith who attained wealth chiefly by the deposit system, in which money was left for safety with goldsmiths (instead of in the Tower), who lent it at higher interest to needy merchants. Backwell had many dealings with Cromwell, Charles II., and the leading merchants and companies of those times. See Pepys's *Diary* (ed. H. B. Wheatley, 1893-9); *Trans. London and Middlesex Archæol. Soc.*, vol. vi. part i. (1883), pp. 191 230.

Bac-Ninh, cap. of prov. of same name, 17 m. N.E. of Hanoi, Tongking. Pop. (1894) 8,055.

Bacolor, tn., prov. Pampanga, Luzon, Philippine Is., 40 m. N.W. of Manila. Pop. 10,000.

Bacon. See PORK.

Bacon, tn., N. coast of Camarines isthmus, Albay prov., Luzon, Philippine Is.; in a fertile region. Pop. 13,000.

Bacon, ANTHONY (1558-1601), eldest brother of Francis, Viscount St. Albans, was educated at Cambridge. There is a large collection of his letters in Lambeth Palace.

Bacon, DELIA SALTER (1811 59), American authoress, published the *Philosophy of the Plays of Shakespeare Unfolded* (1857), one of the first attempts to prove that Shakespeare's works were written by Francis Bacon. See *Delia Bacon: a Biographical Sketch*, by Theodore Bacon (1889); also BACON-SHAKESPEARE CONTROVERSY.

Bacon, FRANCIS (1561-1626), Baron Verulam and Viscount St. Albans, English lawyer, statesman, and philosopher, was born at York House, London. In 1576 he went to France in the *entourage* of Sir Amyas Paulett, the English ambassador, and stayed there until his father's death in 1579 recalled him to England. Then he began to study law at Gray's Inn, and in 1584 started on a parliamentary career as member for Melcombe Regis, in Dorsetshire, and soon became distinguished in the House as an orator. In 1597 appeared the first edition of his *Essays*—consisting of ten short pieces—the work by which he is most popularly known, and one which brought him into notice both in England and abroad. The great blot in his career during the reign of Elizabeth was, according to Macaulay and others, his prosecution of his friend Essex, which they maintain was undertaken 'voluntarily;' but for this there is no proof.

After the queen's death, in 1603, Bacon rapidly rose in fortune and favour. He was knighted in 1603, became Solicitor-general in 1607, Attorney-general in 1613, Privy Councillor in 1616, Lord High Chancellor and Baron Verulam in 1618, and Viscount St. Albans in 1620. But his fall was as rapid as his rise. The Parliament of 1620 took up the question of the obnoxious patents consisting in alehouses and inns, and monopolies of gold and silver thread, in which both the king and Buckingham's family were interested. This led to their abolition, on the initiative of Bacon; and his enemies at once started a crusade against 'the reformer of abuses.' A committee was appointed to inquire into 'the abuses of the courts of justice;' and though Bacon denied that he took 'rewards to pervert justice,' and maintained that he only 'partook of the abuse of the times,' he was condemned by his peers. But the sentence on him was never carried into effect: his imprisonment lasted only four days; his huge fine of £40,000 was remitted; his pardon was passed under the Great Seal—delayed till 1623, because he refused to give up York House, the place of his birth, to Buckingham; a pension of £1,200 a year was granted to him; and he was summoned to resume his seat in the House of Lords in 1624.

It was after he retired from political life that Bacon practically began his literary career as one of the world's great philosophers. To that time his only acknowledged works had been several editions of his *Essays*—rewritten and augmented on every occasion with infinite care—his *Advancement of Learning* (1605), and his *Novum Organum* (1620). The last five years of his life were full of work. In March 1622 he produced his *History of Henry VII.*; in November 1622 his *Historia Ventorum*; in January 1623 his *Historia Vitæ et Mortis*; in October 1623 his *magnum opus*, entitled *De Augmentis Scientiarum*, a Latin translation, with large additions, of *The Advancement of Learning*; in December 1624 his *Apophthegms*; and in 1625 his *Translation of the Psalms*. His last work, *Sylva Sylvarum* (1627), was published posthumously along with the *New Atlantis*, written as early as 1617.

Bacon is honoured as the great master of inductive science. The chief authority on his life and work is James Spedding, who edited *The Letters and Life of Bacon*, in 7 vols. (1862-74), and his *Works*, also in 7 vols. (1857-9). His *Evenings with a Reviewer* (new ed. 1881) is also worthy of perusal.

Bacon, JOHN (1740-99), an English sculptor, native of London. His best-known works are his monuments to the elder Pitt in Westminster and the Guildhall, London; his statues of Dr. Johnson and John Howard in St. Paul's, and of Blackstone at All Souls College, Oxford.

Bacon, JOHN MACKENZIE, REV., M.A., F.R.A.S. (1846-1904). After taking part in three eclipse expeditions, he devoted himself to investigations in acoustics, meteorology, etc., largely in connection with ballooning. Works, *By Land and Sky; The Dominion of the Air* (1902).

Bacon, SIR NICHOLAS (1509-79), Lord Keeper, father of Francis, Viscount St. Albans, was born at Chislehurst, and educated at Cambridge. From 1546 to the death of Edward VI. he was attorney of the Court of Wards, from which he was removed by Queen Mary. On the accession (1558) of Elizabeth he was appointed Lord Keeper of the Great Seal an office which he held for more than twenty years. See Cooper's *Athenæ Cantabrigienses*, i. 389 396 (1858); Whetstone's *Memoir of Sir N. Bacon* (1579; reprinted 1816); and Campbell's *Lord Chancellors* (1845-7; 4th ed. 1856-7).

Bacon, ROGER (1214-94), one of the great pioneers in science and philosophy; studied at Oxford and Paris, and became a Franciscan friar. Accused of dealing in magic, as the result of his scientific discoveries, he was forbidden to lecture at Oxford, and banished to Paris. Here he was imprisoned (1257), and forbidden to write. In 1265, however, Pope Clement IV. desired to see his works. Bacon then wrote his *Opus Majus*, and forwarded it with other works to Clement, who procured Bacon's release and his return to Oxford. In 1271 Bacon made an attack on the monks in his *Compendium Studii Philosophiæ;* whereupon Jerome of Ascoli, the general of the Franciscan order, condemned (1282) Bacon's works, and ordered his imprisonment, which lasted for ten years. About 1292 he returned to Oxford, and died there two years later. The 'Admirable Doctor,' as he was called, was a believer in astrology and the philosopher's stone; but we owe to him important chemical discoveries, the invention of the magnifying-glass, and a rectified calendar. Besides the *Opus Majus* (ed. Bridges, 1897), he wrote a treatise on Old Age (trans. by Richard Browne, 1683), *Speculum Alchemiæ*, and *De Mirabile Potestate Artis et Naturæ*. See *Lives* of Bacon, by E. Charles, in French (1861); by Schneider (1873) and Held (1881), in German; and Prof. Brewer's Preface to Bacon's *Opera Inedita*, in 'Rolls Series' (1859).

Bacon Beetle (*Dermestes lardarius*), a hairy beetle, feeding on cheese, bacon, etc., the larvæ of which attack stuffed specimens in museums.

Bacon-Shakespeare Controversy. The theory that Bacon wrote the literature which passes under the name of Shakespeare was started by an American lady, Miss Delia Bacon, a friend of Emerson, Hawthorne, and Carlyle, in an article in *Putnam's Monthly* in January 1856. This was afterwards expanded into a volume entitled *The Philosophy of the Plays of Shakespeare Unfolded*, published in 1857. In the same year there appeared in London *Bacon and Shakespeare: an Enquiry*, by W. H. Smith; and a large number of books have since been issued both in favour of the theory and against it. In 1884, Mr. W. H. Wyman of Cincinnati published a *Bibliography* of the controversy.

The Baconian theory is that Bacon wrote the plays, and adopted Shakespeare and his name as a mask, as playwriting, if revealed, would have entailed on him social and political ruin. The best books on the subject are the first volume of Donnelly's *Great Cryptogram* (1888) and Edwin Reed's *Francis Bacon our Shakespeare* (1902). See Pitt-Lewis's *The Shakespeare Story* (1904); Bompas's *The Problem of Shakespeare Plays* (1902); Sutton's *The Shakespeare Enigma* (1903).

Baconthorpe, BACON, or BACHO, JOHN (d. 1346), 'the Resolute Doctor,' educated at Oxford and Paris; elected (1329) head of the Carmelite order in England. He advocated the soundness of Averrhoes's doctrines, and, anticipating Wycliffe, held that the priestly power should be subordinate to the kingly. He wrote commentaries on the Scriptures and on Aristotle, treatises on Anselm and Augustine, and many other works.

Bacsanyi, JANOS (1763-1845), Hungarian poet, whose first work was *The Valour of the Magyars* (1785), and who founded the periodical called the *Magyar Museum*. A collection of his poems was published in 1827.

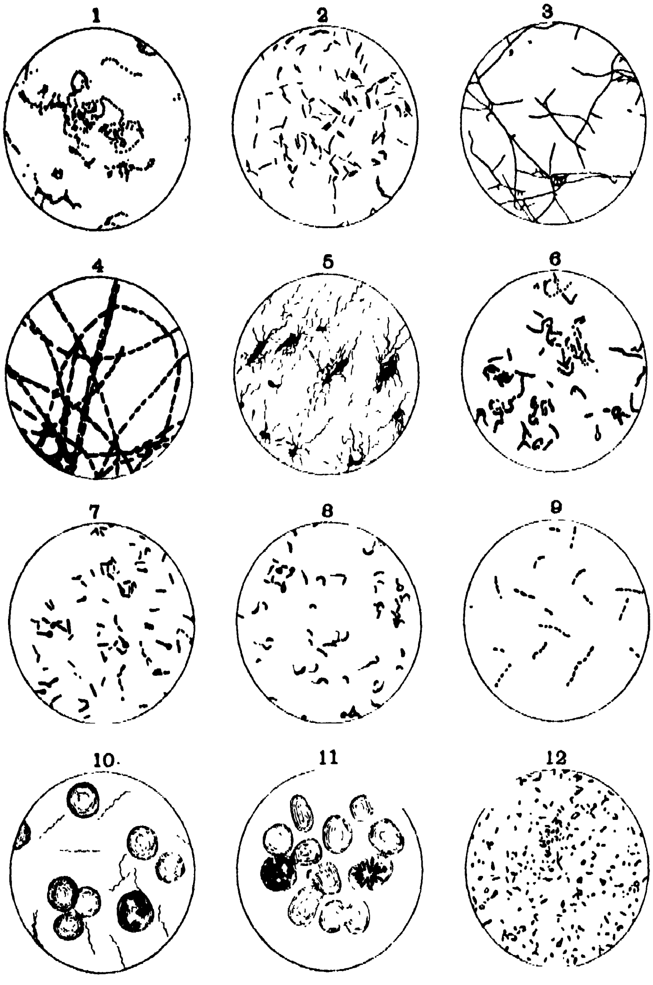
Bacs-Bodrog, co., Hungary, between the Danube and the Theiss, and with the former river as its S. boundary. It belongs to the great Hungarian plains. Area, 4,277 sq. m. Pop. (1900) 604,989, embracing Hungarians, Servians, Slavs, Germans, etc. Chief town, Zombor.

Bacterioids, involution forms of bacteria which produce the tubercles on the roots of leguminous plants.

Bacteriological Treatment of Sewage. See SEWAGE.

Bacteriology. By definition, bacteriology is the science which treats of bacteria (*bacterium*, Low Lat. for 'a rod'), or micro-organisms. The term bacterium was originally a genus name, but is now used quite indefinitely, as are also the equivalent terms of micro-organisms, microbes, germs, all applicable to the members of the group of Schizomycetes, or split fungi. Among these Schizomycetes are included the smallest known organisms, and it is therefore obvious that no science of bacteriology based upon direct observation was possible until optical instruments had reached a relatively high state of development. Indeed, as in many cases the identification depends on staining reactions, it may be said that the rise of bacteriology has largely depended on the development of the coal-tar industry. As long ago as 1680 the Dutch naturalist Leeuwenhoek published a work in which he not only described several species of bacteria, but, what is much more remarkable, noted their rapid multiplication in certain diseases—*e.g.* in diarrhœa in man—and forestalled the modern bacteriologist in his emphasis of their wide distribution and connection with processes of decomposition and putrefaction. After Leeuwenhoek there comes a long gap, until the development and elaboration of the compound microscope gave increased facilities for the study of minute organisms in general. Thus, while Linnæus would have but little to say to micro-organisms, which he did not generically distinguish from other minute plants and animals, O. F. Müller (1786) founded two genera, in which he included many species; and at a later date Ehrenberg (1838), in his great work on infusoria, carried the classification further, and laid the foundations of the existing nomenclature. On the other hand, the question of the relation between bacteria and putrefaction and disease was much longer in receiving the attention of scientists. In 1850 Davaine observed micro-organisms in the blood of animals which had died from anthrax, but it was not until some thirteen years later that, under the stimulus of Pasteur's work on fermentation, he appreciated the significance of his own observations and carried them further.

Elaborate experiments have shown that micro-organisms do not arise *de novo*, but invariably from pre-existing germs. These are universally distributed in earth, air, and water, and are the causes of putrefactive changes, which can be indefinitely postponed if the access of micro-organisms be prevented. Again, they are the causes of many processes of fermentation, and give rise to a large number of diseases. The forms which produce disease, equally with those which give rise to particular types of fermentation, are specific, and can be recognized by a variety of tests.



Common Forms of Bacteria.

1. Streptococcus pyogenes. 2. Tubercle bacilli. 3. Actinomyces. 4. Anthrax bacilli. 5. Typhoid bacilli. 6. Diphtheria bacilli. 7. Tetanus bacilli. 8. Cholera spirilla. 9. Bacillus of plague. 10. Spirilla of relapsing fever. 11. Malarial fever parasites. 12. Influenza b

Most authors are agreed that bacteria should be placed among plants, for in their mode of life they present considerable resemblance to fungi. Like fungi, they are devoid of chlorophyll, and must therefore live either as saprophytes (*sapros*, 'putrid;' *phyton*, 'a plant') on decaying organic matter, or as parasites upon the living tissues of plants or animals. In general terms it may be said that the result of their activity, whether as saprophytes or as parasites, is to reduce complex organic compounds to simpler forms, the energy which is set free in the process being utilized by the organisms as solar energy is utilized by green plants. In their manner of life many saprophytic bacteria recall such fungi as yeast. *Bacillus subtilis*, one of the commonest saprophytic forms, may be obtained in abundance by steeping hay in water. If an infusion be made in this fashion and filtered off from the hay, it will rapidly putrefy; and a drop of the turbid liquid placed beneath the microscope will show innumerable specimens of the bacterium. It consists of a short rod about $\frac{1}{200}$th of a millimetre—*i.e.* 5 μ—in length. The rod is clothed in a substance which is not cellulose, but is apparently of proteid nature, and within this envelope the cavity of the rod is filled by protoplasm, in which a nucleus has not as yet been demonstrated. In the early stages the bacteria are actively motile, swimming freely through the liquid; and it is one of the triumphs of modern research that, despite the minute size of the organisms, the movements have been proved to be due to the action of cilia implanted in the cell membrane. Such cilia are not, however, universally present in micro-organisms. Some of them are indeed entirely non-motile. One of the more modern classifications of bacteria has been based upon the arrangement of the cilia, which vary both in number and in the point of insertion. In the case of *B. subtilis* the actively swarming condition endures for some time, the organisms meanwhile multiplying with great rapidity by transverse division. Eventually, however, a change takes place: the bacteria lose their motility, and, rising to the surface, there form the iridescent scum so familiar on all standing liquids. An examination of this surface film, or zooglœa, shows that it consists of an enormous number of bacteria connected together in long strands, and with greatly swollen cell-walls. The formation of spores then takes place, the protoplasm within each rod contracting into a dense mass, which becomes surrounded by a thick cell wall. These spores are very light, are blown about in dust, and are extraordinarily resistant to heat, poisons, and the other agents which are destructive to the adult forms. In favourable conditions the spore bursts its coat, and begins life anew as a ciliated free-swimming *bacillus*.

The chief variations from this type are variations in form, the cell being sometimes more or less spherical, as in those known as *Micrococci*, and sometimes spirally twisted, as in *Spirillum* or *Spirochæte*. In *Cladothrix*, which, according to some authorities, is a doubtful bacterium, the cells are connected together to form long branched filaments. This organism commonly appears in dirty water, where it forms dense white masses.

In regard to the physiology of bacteria there is much that is supremely interesting. A number of forms, like other organisms in general, are absolutely dependent on the presence of free oxygen for continued existence: such are the bacterium of vinegar, *B. subtilis*, *B. anthracis*, and so on. On the other hand, the forms described by Pasteur as *anaerobic* can only live and flourish in the absence of free oxygen. Of these a typical example is the bacillus of butyric acid (*B. butyricus*), which produces butyric fermentation in various organic substances. In this case the oxygen necessary for all existence is doubtless obtained by the decomposition of complex organic substances during the process of fermentation. Indeed, it is found that while the *aerobic* forms (*i.e.* those requiring free oxygen) are usually killed or checked in their multiplication by being deprived of free oxygen, certain of them at least can be made to flourish without oxygen by supplying them with a fluid in which they are capable of inducing fermentation.

Since bacteria are devoid of chlorophyll, they can obtain the requisite carbon only from complex organic compounds, such as starch, sugar, cellulose, glycerin, and so on. There are, however, possibly some exceptions to this rule, for it is stated that the nitrifying bacteria of the soil can take their carbon from such simple substances as carbonates. For their nitrogen many depend upon albuminous substances; others avail themselves of organic salts of ammonium (*e.g.* ammonium tartrate or lactate), or of nitrogen, containing organic compounds (*e.g.* urea); while the bacteria of the soil can apparently avail themselves of free nitrogen, and some bacteria can, under certain conditions, utilize the nitrates of potassium and sodium. In addition to these food-stuffs, bacteria require certain inorganic salts.

The substances produced by bacteria during their activity are the *toxines* and the *ptomaines*. The first are substances of the nature of albumin, and probably arise by a true secretory process; it is now believed that in the case of many pathogenic bacteria the characteristic symptoms are produced less by the bacteria themselves than by their toxines. Ptomaines, on the other hand, are analogous in their chemical composition to vegetable alkaloids. In some cases they have but little effect on animals into which they may be introduced, but in others they act like the strong vegetable poisons. From the point of view of the bacterium they are probably to be regarded as waste products. As to other products, it may be sufficient to notice that not a few bacteria produce pigments of different types when grown under certain given conditions, these pigments being often of considerable value as a means of recognition.

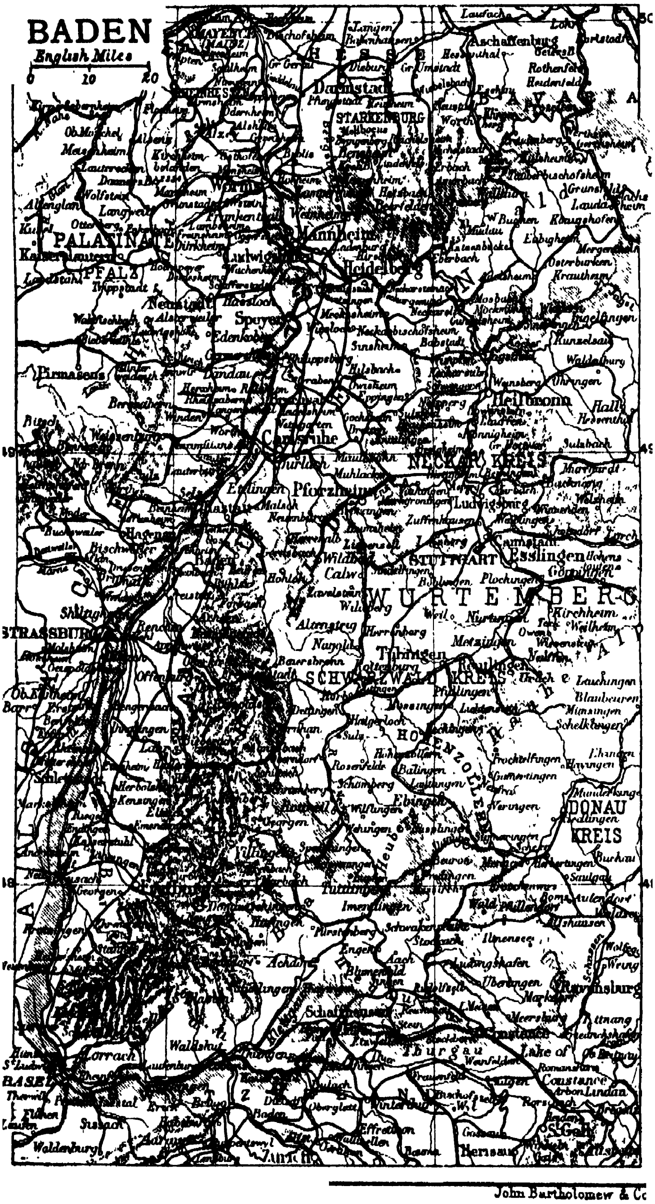
Bacteria being the cause of putrefaction, it is at once obvious that the substances commonly regarded as food preservatives are substances inimical to bacterial life. Such a substance is common salt, which ranks to the bacteriologist as a *feeble* antiseptic, but which, as is familiar to all, will for a time delay putrefaction. Such substances as corrosive sublimate, iodoform, iodine, hydrochloric acid, to mention only a few, are *strongly* antiseptic—*i.e.* they have a markedly destructive action upon micro-organisms. Again, while bacteria or their spores are exceedingly tolerant of cold, some indeed surviving the temperature of liquid air, they are fortunately much less resistant to excessive heat. Most bacteria are killed by a temperature of 60° C., but the spores will tolerate much greater heat than this. In some instances it requires prolonged heating at 100° C. before all spores are completely killed. Light has, generally speaking, an injurious effect upon bacteria.

Of the three sets of agents—heat, light, and chemical agents—which are thus at the disposal of the bacteriologist wishing to ensure the destruction of micro-organisms, the first is the one most commonly employed in *sterilizing*, as it is termed, instruments and apparatus used in bacteriological research. One of the most necessary parts of the equipment of a bacteriological laboratory is, therefore, a means of applying continuous heat to objects which it is desired to sterilize. Small metallic objects, such as needles and pieces of platinum wire, are sterilized by brief exposure to the flame of a bunsen burner; but any well-equipped laboratory contains some form of hot-air or steam sterilizer, in which glass vessels and so forth can be kept for a prolonged period at a high temperature. The first object of the practical bacteriologist is to obtain in this way a test-tube or other vessel in which all germs of life have been destroyed. When plugged with sterilized cotton-wool, such tubes will remain permanently devoid of bacteria. If a sterile medium be introduced into such a vessel—*i.e.* a medium suitable for the growth of micro-organisms, but artificially deprived of those—then the necessary preparations for what is termed a pure culture have been made. The next step is to take a needle sterilized in the bunsen flame, and with it take up a minute portion of a preparation suspected to contain a given micro-organism. The needle is then introduced into the culture medium, and if the experiment is successful, there will appear in the medium a characteristic colony of the introduced bacterium. It may be that the needle bore the spores not of one but of several kinds of bacteria. In this case several distinct colonies will appear, and the process of culture must be repeated until it is found possible to separate these from one another. A culture medium which is very commonly employed is made by dissolving gelatin in water, adding a certain percentage of beef-juice and peptone, and in some cases of sugar, rendering the whole neutral or slightly alkaline with carbonate of soda, and filtering so that a clear jelly is obtained. Test-tubes containing such a jelly with bacterial colonies of varying colour and form, which are prevented from coming into contact with the air by a plug of cotton-wool, are the most conspicuous objects in a modern bacteriological laboratory. For other media, and for details of methods, reference must be made to some of the works cited below. While some bacteria will grow well at the temperature of the room, in spite of the variation of temperature due to the alternation of night and day, others will only form good cultures at a constant and often fairly high temperature. On this account every laboratory should contain some form of incubator, in which the cultures can be kept at a temperature best suited to their characteristics.

It may be sufficient to add to this brief account of bacteriology some notes on the more important forms. The bacillus of tuberculosis is a minute transparent rod, difficult to make out in animal tissues except after staining. It stains but slowly with the aniline dyes, unless there be added to the dye a mordant, such as an alkali or oil of aniline; but if this be done, the stain is remarkably permanent. The best temperature for the growth of cultures is about 38° C., and the most suitable media are those containing glycerin.

A much larger form is *B. anthracis*, the microbe of the much-dreaded anthrax, or wool-sorter's disease. Here the individual rods are about 6 μ—*i.e.* 6 micromillimetres, or $\frac{6}{1000}$th of a millimetre—in length, about twice the length of those of *B. tuberculosis*, and they sometimes cling together in chains which may reach a length of 20 μ. They are readily stained, and form characteristic cultures in gelatin. Such cultures contain toxic substances, which produce the same effects as the organisms themselves if introduced into the blood. Under certain conditions cultures lose their virulence, and the modified organisms from these preparations produce immunity to the attacks of the typical form in animals inoculated with them. But into the difficult question of immunity it is not possible to enter here.

Another deadly micro-organism is the comma bacillus, or cholera bacillus (*Spirillum choleræ*), first shown (1883) by Koch to be always present in the intestines of persons who have died of Asiatic cholera. This form differs from the two preceding in its great motility and in the curved shape. When grown in a gelatin medium, it liquefies the medium, but less rapidly than in the case of a comma bacillus discovered by Finckler in patients affected by British cholera. In spite of the virulence and rapid spread of the disease, experiment shows that the cholera bacillus possesses only low vitality, and, on account of its intolerance of dryness, cannot be disseminated by dust. The great source of danger lies in the dejecta of patients, and in water or food contaminated by those.



See G. M. Crookshank, *A Text-book of Bacteriology* (4th ed. 1896); *Text-book of Bacteriology*, by C. Fränkel (trans. 1891); *Manual of Bacteriology*, by A. B. Griffiths (1890); *Micro-organisms and Disease*, by G. Klein (1886; 3rd ed. 1896); *Manual of Bacteriology*, by R. Muir and J. Ritchie (2nd ed. 1899); *Bacteria and Public Health*, by G. Newman (2nd ed. 1900); *Manual of Bacteriology*, by G. M. Sternberg (1892; 2nd ed. 1896); *Bacteria and their Products*, by Sims Woodhead (1891); *Traité Pratique de Bactériologie*, by E. Macé (4th ed. 1901).

Bactria, Persia. See BALKH.

Bactrites, fossil ammonites with a straight instead of a spiral shell, found in Silurian and Devonian strata.

Baculites, fossil ammonites with straight, conical shells, found in formations from the Neocomian to the Cretaceous, and in great abundance in the baculite limestone of Normandy.

Bacup, munic. bor. (6,400 ac.) and tn., Rossendale div., E. Lancashire, England, on L. & Y. Ry.; lies between Rochdale and Burnley. Cotton spinning and weaving occupy most of the inhabitants. There are stone quarries and coal mines in the vicinity. Pop. (1901) 22,505.

Badajoz, city, cap. of prov. of same name, Estremadura, Spain, 3¾ m. from Portuguese frontier, on railway from Lisbon to Madrid; strong fortress on l. bk. of Guadiana; anc. *Pax Augusta*, one of the principal Roman settlements in Spain. A fine Roman bridge of twenty-eight arches spans the river, and a ruined Moorish castle overlooks the town. Betrayed to the French by the Spaniards in March 1811, it was attacked by Wellington in March 1812, and stormed and captured by the British, who suffered terrible slaughter (5,000 killed), on April 6, 1812; Philippon, the French general, and his whole force, surrendered next day. Birthplace of Godoy (1767–1851) and the painter Luiz de Morales (1509–86). Pop. (1900) 30,899. The prov., the largest in Spain, has an area of 8,750 sq. m., and a pop. (1900) of 520,246.

Badakhshan, a picturesque hill country (area, 8,500 sq. m.; pop. 150,000), forming a part of Afghan Turkestan. It is enclosed on its N. side by the Amu Daria or Panj (Oxus), and on the S. by the Hindu-Kush. The district is watered by the river Panj and its tributaries the Kokcha and Kunduz. The whole country has been long celebrated for its salt, sulphur, iron, gold, rubies, lapis-lazuli, etc. The inhabitants are partly Aryans of the Tajik stock, and speak Persian, and partly Uzbegs. Chief town, Faizabad. See Yule's *Marco Polo* (1871); *Jour. R.G.S.*, 1872, pp. 440–448.

Badalona (anc. *Betulo*), seapt., prov. Barcelona, Catalonia, Spain, 6 m. N.E. of Barcelona, with sugar factories and petroleum refineries. Pop. (1900) 19,240.

Baddeley's Guides. See GUIDE BOOKS.

Baden, a grand-duchy of the German empire (area, 5,821 sq. m.), bordered by the Rhine on the S. and W., Würtemberg on the

E., and Bavaria and Hesse-Darmstadt on the N. The most marked geographical feature of this hilly region is the Black Forest, which has ramifying valleys, many of great beauty, and all finely wooded, 37 per cent. of the surface of the grand-duchy being forest land. The Danube has its sources in the S., and the Neckar crosses the N. extremity. The climate varies greatly according to the elevation. Though the highest summits of the Schwarzwald lie little below the snow-line, the almond and chestnut ripen in the sheltered valleys of the W. Agriculture claims 56½ per cent. of the area. Vineyards covered 43,000 ac. in 1900; the wine averages 12,000,000 galls. annually, valued at £700,000. The country is rich in mineral springs. Several industries are carried on on a large scale, as flour-milling and sawmilling, iron smelting and working, the manufacture of chemicals, cottons and silks, tobacco and cigars, machinery, jewellery (Pforzheim), beer, porcelain, and glass. In 1900 the population numbered 1,867,944 (320·9 per sq. m.), of whom three-fifths were Roman Catholics. Capital, Karlsruhe. Other large towns are Mannheim, Heidelberg, and Freiburg im Breisgau. The grand-duchy has three votes in the Federal Council, and elects fourteen deputies to the Imperial Diet. The existing grand-duchy of Baden is a continuation and development of the ancient duchy of Swabia or Alemannia, principally through the two dynasties of the margraves of Baden-Baden and Baden-Durlach. In 1803 the ruling margrave of the united (1772) dynasties was made an elector of the empire, and in 1806 he proclaimed himself a sovereign grand-duke.

Baden, or BADEN-BADEN, cap. of circle Baden of the above grand-duchy, situated in a lovely valley in the N. of the Black Forest, 23 m. by rail S.S.W. of Karlsruhe, and famous for its mineral waters and baths. The principal edifice is the castle, on the side of a hill (676 ft.) above the town. The healing virtue of the waters was known to the Romans (*Aquæ Aureliæ*), but Baden only came into repute in the beginning of the 19th century; from 1808 to 1872 it was much frequented for its public gaming-tables. At the present time it is visited by over 72,000 persons annually. Pop. (1900) 15,718. See Wörl and Bader's *Geographie und Statistik des Grossherzogthums Baden* (1880); *Das Grossherzogthum Baden in geographischer, naturwissenschaftlicher, etc.* (1885); Weech's *Badische Geschichte* (1890); *Register der Markgrafen von Baden und Hochberg* (1892).

Baden, spa and tn., prov. Lower Austria, 17 m. by rail S. by W. of Vienna; is pleasantly situated amongst the outliers of the Wiener Wald, and is visited annually by some 24,000 persons. Its hot mineral springs (84° to 95° F.), were known to the Romans as the *Thermæ Pannonicæ*. Pop. (1900) 12,447.

Baden, a mediæval tn., canton Aargau, Switzerland, 13½ m. by rail N.W. of Zürich, with celebrated hot springs, known to the Romans as *Aquæ Helveticæ*. From 1426 to 1712 it was practically the capital of the Confederation. Pop. (1900) 6,050.

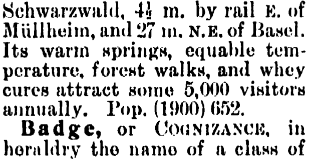
Badeni, CASIMIR FELIX, COUNT (1846), Austrian statesman, born at Surochowo (Galicia), of a noble family, originally Italian. He studied law at Cracow, and in 1888 became governor of Galicia. As Austrian premier (1895) he in 1897 promulgated his famous Ordinance of Languages for Bohemia and Moravia, in which he put the Czech language on an equal footing with the German. This measure, however, aroused the bitterest opposition of the Germans, and occasioned wild scenes of obstruction in the Austrian Parliament, which ended in Badeni's resignation in 1897.

Badenoch, extensive and mountainous district, E. Inverness-shire, Scotland, traversed by the river Spey.

Baden-Powell. See POWELL.

Badenweiler, tn., grand-duchy of Baden, Germany; stands (1,395 to 1,477 ft.) on the W. edge of the Schwarzwald, 4½ m. by rail E. of Müllheim, and 27 m. N.E. of Basel. Its warm springs, equable temperature, forest walks, and whey cures attract some 5,000 visitors annually. Pop. (1900) 652.

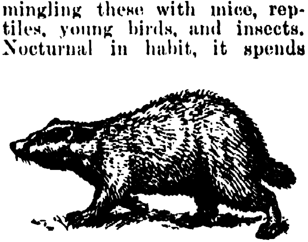
Badge, or COGNIZANCE, in heraldry the name of a class of devices or cognizances occupying a peculiar position in that, though intimately associated with armorial bearings, they are not themselves such; nor is their use governed by the laws of heraldry. The badge is frequently, though erroneously, confounded with the crest, or even with the coat of arms; but though it may partake of the form of a charge or of a crest, it is not borne upon a shield, or, as a crest is, on a wreath, though a shield or a wreath may enter into its composition. An exception, more apparent than real, is found in the badge of the English baronets—*viz.* the 'Red Hand of Ulster,' displayed on an escutcheon, which device is borne by all English baronets in a corner of their paternal shields. This, however, is not a personal badge, but the badge of an order, and is thus borne by royal decree.



Badges.

1. The Red Hand of Ulster. 2. Tudor Rose. 3. Fleur-de-Lys.

Badger (*Meles taxus*), a mammal belonging to the order Carnivora, and to the same family as the otter (Mustelidæ). It is widely distributed on the continent of Europe, and still occurs in parts of Britain. Like the bears, to which it is not distantly related, the badger is omnivorous, depending largely on fruits and roots, but mingling these with mice, reptiles, young birds, and insects. Nocturnal in habit, it spends much of the day in the spacious burrow, which has many exits, and is excavated by preference on the sunny side of a wooded hill. Though naturally inoffensive in its habits, the badger is capable of biting severely when roused. It is hunted with the help of dogs, from which it chiefly seeks to escape by burrowing. The common badger measures 2½ to 3 ft. in length, has short, stout limbs, a pointed nose, and is of a blackish-gray colour, with white markings on the head. It is also known as the 'brock' (see *Twelfth Night*, ii. 5). The sport of baiting a badger in a barrel with dogs, once common in England, was prohibited about the year 1580. Other species occur in Asia.



Badger.

Badger, GEORGE PERCY (1815-88), Oriental scholar and diplomatist, was born at Colchester in Essex. He was primate delegate to the Eastern Churches (1842-4), acted as interpreter in diplomatic missions in Arabia, Persia, etc., and wrote, among other works, an excellent *Eng.-Arabic Lexicon* (1881).

Badghiz, or BADKHIZ, dist., N.W. Afghanistan, fertile along the valleys of the tributaries of the rivers Kushk and Murghab.

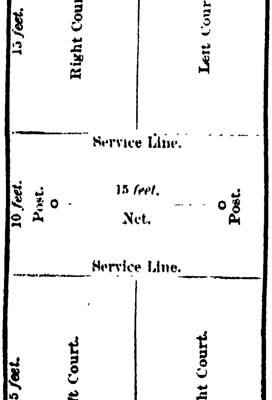
Badham, CHARLES (1813-84), Greek scholar, born in Glasgow, and afterwards a pupil of Pestalozzi. He became professor of classical philology and logic at Sydney University, New South Wales, where he died. His work was chiefly confined to critical editions of Plato.

Badia y Lablich, or LEBLICH, DOMINGO (1766-1818), a Spanish traveller, born at Barcelona, who travelled (1801-7), disguised as a Mussulman, Ali Bei, through Morocco, N. Africa, and Egypt, to Mecca, being the first Christian to visit that city. On his return he joined the French party in Spain, and fled to Paris with King Joseph in 1814. In the same year he published, in Paris, *Voyages d'Ali Bei en Afrique et en Asie* (1814). He died in Syria while on his way to India.

Bad Lands, rough and barren tracts in the west of the United States, deeply trenched by erosion, leaving table-lands or *mesas*; they contain a wonderful series of mammalian fossils. One of these regions is on the White R., another on the Lower Yellowstone and the Little Missouri, a third in S. Dakota and Nebraska.

Badminton. This game resembles lawn tennis, but differs from it in one essential point a shuttlecock is used instead of a ball. As this shuttlecock must be played before it touches the ground, any fairly level piece of turf will serve. The game may be played either in or out of doors, any large public hall or gymnasium suiting the former condition. The number of players varies from two to eight, four being the best number. The players, four or two in number, place themselves and carry on the game as in lawn tennis. The accompanying diagram shows how to mark out a Badminton court, the maximum size of which is 40 ft. by 20 ft.; the minimum, 30 ft. by 15 ft. The posts supporting the net are about 6 ft. high. The net itself is from 5 to 5½ ft. high, and need not be above 2 or 3 ft. wide. The shuttlecock used is about an ounce in weight and 5 in. high. The body is covered with india-rubber, and often has a little lead introduced for out-of-door play—a wind making the shuttlecock of ordinary weight rather flighty. Lawn tennis bats may be, and are generally, used, but the absolutely correct form of bat has a head of about the same size as that used in rackets.

The server places himself in either of his two courts, and serves by hitting the shuttlecock into the diagonally opposite court. His opponent returns it, and then they hit the 'ball' backwards and forwards over the net, never allowing it to touch the ground. If one of the players fails to return the shuttlecock, or infringes one of the rules mentioned hereafter, he is penalized as follows: If he is the server, he loses the service, and his opponent serves, neither party scoring an 'ace;' if he is not the server, the server scores an ace, and continues serving until he loses a stroke. The rules of scoring are, in fact, practically the same as in rackets, the game being 15. Should the score become '14 all,' a player must make two consecutive aces to win. In serving, two consecutive 'faults' put the server 'out'—*i.e.* his opponent serves. A 'fault' is made by breaking any of the following rules:—(1.) The server must stand with both feet in the court served from. (2.) He must hit the shuttlecock over the net without allowing it to touch either that or one of the posts. (3.) The shuttlecock must drop into the court diagonally opposite the one served from. The server serves from both courts alternately. A service which is a fault does not count as such should the server's opponent take the stroke. The commission of any one of the following four offences puts the server's hand out at once: (1) failing to serve the shuttlecock over the net; (2) hitting the shuttlecock twice; (3) sending it outside the boundary of the court; (4) touching it with any part of the body after loosing it for the purpose of serving.



Badminton, GREAT, par. and vil., Gloucestershire, England, 5 m. N.E. of Chipping Sodbury. Near it is Badminton House, the seat of the Duke of Beaufort. In the church Field-marshal Lord Raglan is buried. The place gives its name to the claret cup, the game, and the sporting library (1885-1902). Pop. (1901) 517.

Badminton Club, THE, a London sporting and coaching club at 100 Piccadilly, London, founded in 1876, and consisting of 1,000 members. The entrance fee is ten guineas, and the annual subscription eight guineas.

Badminton Library, THE, a series of 30 vols. (1885-1902) on sports and pastimes; written by specialists, under the editorship of the Duke of Beaufort.

Badoc, tn., w. coast Ilocos Norte, N.W. Luzon, Philippine Is. Pop. 10,861.

Badrinath, peak in Garhwal dist., United Provs. of Agra and Oudh, India, 30° 44′ N. lat. and 79° 31′ E. long.; height, 23,210 ft. above the sea. On one of its slopes is a shrine of Vishnu, which attracts annually some 50,000 pilgrims.

Bæda. See BEDE.

Baedeker, KARL (1801-59), German author and publisher, was the son of a small bookseller in Essen. Starting business in Koblenz in 1827, he issued in 1839 a small guide-book on the Rhine, the first of the admirable series of handbooks in German, French, and English. In 1872 the business was removed to Leipzig.

Bael, or BHEL, also ÆGLÉ, a plant of the orange order. The fruit is used in India as a remedy against diarrhœa and dysentery. The rind yields a perfume, as well as a yellow dye, and a cement is formed from the seeds.

Baena, tn., prov. Cordova, Spain, 30 m. S.E. of Cordova; railway station on line from Jaën to Puente Genil. Pop. (1900) 14,539.

Baensch, FRIEDRICH BERNHARD OTTO (1825-98), German engineer, executed the Kaiser Wilhelm (North Sea-Baltic) Canal (1880-5). Wrote *Studien aus dem Gebiet der Ostsee* (1872), etc.

Baer, KARL ERNST VON (1792-1876), German zoologist and embryologist, was appointed (1817) professor of zoology at Königsberg, and in 1834 librarian of the Academy of Sciences of St. Petersburg. Founder of the science of comparative embryology, he exploded the 'animalculist theory' by his discovery of the true laws of embryonic development of man and the vertebrates, the results of his investigations being expounded in *De Ovo Mammalium et Hominis Genesi* (1827). Next to this, the book which had most influence with his contemporaries was *Ueber Entwickelungsgeschichte der Thiere* (1828-37), to which the *Untersuchungen über die Entwickelungsgeschichte der Fische* (1835) may be regarded as a supplement. See his autobiography, *Nachrichten über Leben und Schriften* (1866; 2nd ed. 1886), and *Life* by Stieda (1878).

Baertsoen, ALBERT (b. 1867), Belgian painter and etcher, a founder of the Munich Secessionists; studied under Roll in Paris. His *Canal Flamand* (1895) is in the Luxembourg, and his *Ropemakers on the Ramparts* in the museum of Ghent. See Muther's *History of Modern Painting* (1895).

Bætica, name of a considerable part of ancient Spain, called after the river Bætis (now the Guadalquivir), which traversed it. During the Roman occupation it contained Hispalis (now Seville), Corduba (now Cordova), Gades (now Cadiz). Before the Roman conquest it was occupied by the Phœnicians and Carthaginians. After they abandoned it it fell into the possession of the Vandals, whence is derived the name of Andalusia.

Baeyer, JOHANN FRIEDRICH WILHELM ADOLPH (1835), German chemist, pupil of Bunsen and Kekulé, became professor at Strassburg (1872), and since 1875 professor at Munich, where he succeeded Liebig; leading authority on the chemistry of indigo, which dye-stuff he was the first to prepare synthetically in 1878; and author of important contributions to theoretical chemistry, especially in connection with the constitution of benzene isomerism, the assimilation of carbon dioxide by plants, and fermentation.

Baeza (anc. *Beatia*), tn., prov. Jaën, Spain, station on railway from Madrid to Cordova. Ancient walled town, with formerly famous university (1533), now disestablished. Important horse fair, May 18. Pop. (1900) 14,379.

Baffa. See PAPHOS.

Baffin, WILLIAM (1584-1622), navigator, and discoverer of the sea which bears his name, was born in London; went to the whale fishing off Spitzbergen (1613-14), and joined Captain Robert Bylot in 1615 on board the *Discovery*, to search for the N.W. Passage by Davis Strait. Unsuccessful in this, he discovered and charted Baffin Bay. His observations, discredited during the 17th and 18th centuries, were verified by Sir John Ross in 1818, and were used by the Franklin expedition. Baffin was killed in the British service at the siege of Ormuz. See *Voyages of William Baffin, 1612-22*, ed. by Markham (1881).

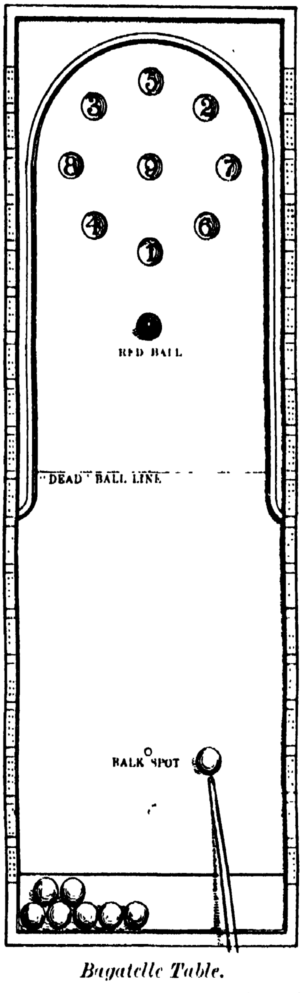
Baffin Bay, or, more correctly, BAFFIN SEA, lies between Greenland and Baffin Land, with the Arctic Circle for its southern limit and 75° N. lat. for its northern. On the S. it communicates with the Atlantic Ocean through Davis Strait, and on the N. with the Arctic through Smith Sound, Kennedy Channel, and Robeson Channel. Lancaster Sound and Jones Sound both lead out of it at the N.W. into the Arctic.

Baffin Land lies between lat. 62° and 72° N., with Lancaster Sound on the N., Baffin Bay and Davis Strait on the E., the Gulf of Boothia and Fox Channel on the W., and Hudson Bay on the S. Its area is over 200,000 sq. m.

Bafulabe, French military post (founded in 1879) in W. Africa, on the l. bk. of the Senegal, 120 m. by rail S.E. of Bakel. Pop. 4,000.

Bagalkot, tn., Bijapur dist., Bombay, India, on the Ghatprakka R., 44 m. S. of Bijapur. Manufactures silk and cotton goods. Pop. (1901) 19,020.

Bagamoyo. (1.) Maritime dist., German E. Africa. Pop. (Persians, Sudanese, Somalis, Abyssinians, and Swahilis), largely reduced by the famine of 1898, was (1900) 69,000, together with Arab and Indian traders. Fruits (mangoes, oranges, lemons, guava, citrons, and papaws) grow well, and copra is exported. (2.) Seaport tn. at the mouth of the Kingani R., German E. Africa; an important trading centre in constant communication with Zanzibar. The harbour is an open roadstead, large vessels lying two miles off. Pop. (1900) 15,000.



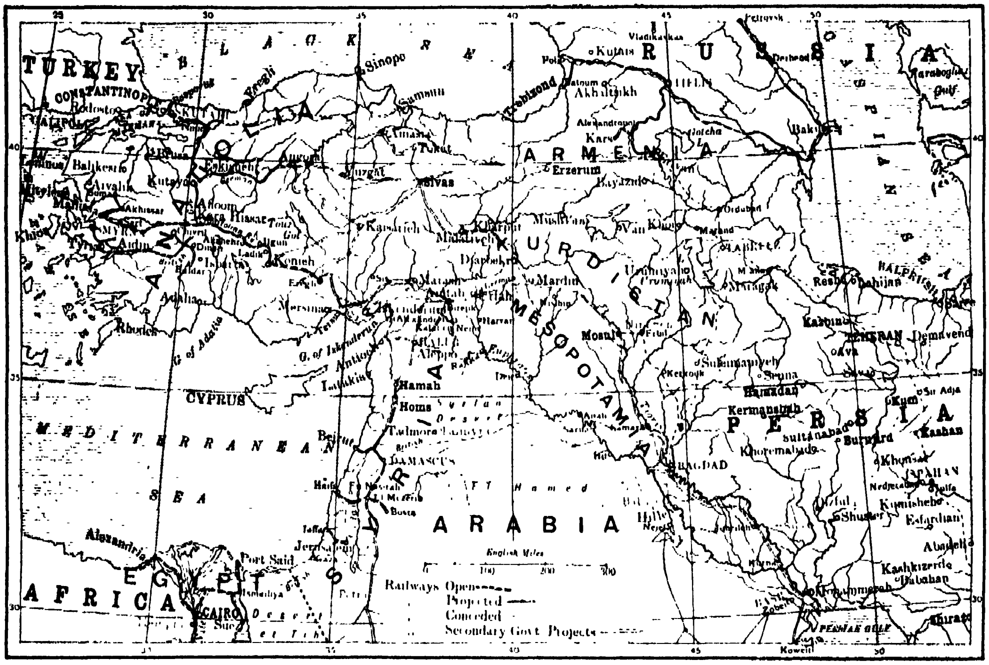
Bagatelle Table.

Bagasse (Fr. 'a slat'), the refuse from sugar-cane after crushing; it is used as fuel.

Bagatelle is played on an oblong table varying in length from 6 to 10 ft., and in breadth from 1½ to 3 ft. At the semicircular upper end of the table are nine holes or cups, numbered from 1 to 9, into which it is the object of the player to drive by means of a cue the nine balls--eight white and one red--that enter into the game. Each white ball driven into a hole counts to the score of the player a number of points corresponding to the number of the hole; the red ball counts double. The red at the beginning of each round is placed on the spot about a foot nearer baulk than the nearest hole; the white balls are played from baulk, the first being played upon the red, and each player in turn plays all the balls, the object being to lodge a ball in every hole. The playing of all the balls by a player is a round, and any agreed-upon number of rounds may be played for the game. In cannon bagatelle three balls only are used, and the holing of a ball counts only when it is preceded by a cannon. The striker's break ends when he fails to cannon. *Cockamaroo*, or Russian bagatelle, is the game in which the ball is driven through and amongst an arrangement of pins, holes, arches, and bells. Other forms of bagatelle go by the names *sans égal* (or French game), Irish cannon game, Mississippi, and *trou madame*.

Bagdad, or BAGHDAD, city, Mesopotamia, Asiatic Turkey, cap. of vilayet of same name, on both banks of Tigris, 220 m. above the outfall of the Shat-el-Arab. Formerly of great importance, the deviation of ancient trade routes to Persia has reduced its transit trade, which is still, however, considerable. But the projected Bagdad railway will probably increase its commerce. The only part of the city of the caliphs that remains is the dome of the tomb of Zobeida, wife of Haroun al-Raschid. The present city is ruinous and neglected. Several holy Mohammedan tombs in the vicinity attract large numbers of pilgrims. Bagdad suffered from the plague in 1773, and again in 1831, when the population was reduced to one-third. Imports: Manchester goods, also continental and Indian cotton cloths, loaf-sugar, coffee, indigo, pepper, and tobacco. Exports: wool, gum, galls, skins and hides, opium, carpets, and dates. Total trade in 1902 was £2,550,250, of which 77¾ per cent. was import trade. River craft ply between Bagdad and Basra, the port of transhipment to ocean steamers. The climate is very trying in summer, and is also subject to great extremes. Pop. about 150,000. It was built out of the ruins of Ctesiphon by Al-Mansur in 763. Subsequently it became the capital of the caliphate, and was enlarged and improved in the 9th century by Haroun al-Raschid (immortalized in the *Arabian Nights*). The city was sacked by Hulaku, grandson of Jenghiz Khan, in 1258, and again by Tamerlane in 1400, and after many vicissitudes, and at least one memorable siege (1627), came into the hands of the Turks (1638). The province (area, 54,500 sq. m.) is in the basin of the Lower Euphrates and Tigris, and includes the ancient Mesopotamia and Babylonia. It has a mixed population (about 850,000) of Persians, Armenians, Turks, Jews, Arabs, and Kurds. See Le Strange's *Bagdad during the Abbasid Caliphate* (1901).

Bagdad Railway. At the end of 1899 the Anatolian Railway Company obtained a concession from the Turkish government for the construction of a railway line from Konieh, the extreme E. point of the Anatolian Ry., to Bagdad and Basra (Bussorah), and thence to the Persian Gulf. The length of the line, including its branches, will be some 1,550 m. It starts at Konieh and goes S.E. to Adana, thence E. to Aintab and Birejik, where it crosses the Euphrates, afterwards further E. to Mosul, and again S. down the r. bk. of the Tigris to Bagdad. Principal branches will be from Aintab to Aleppo, and from Birejik to Urfa. The concession is for ninety-nine years, and the entire line must be completed in eight years. The Turkish government guarantees net receipts to the amount of £500 per kilometre (·621 of a mile) per annum, and £180 per kilometre for working expenses. The railway will be built of the normal gauge of 1·44 metres (4 ft. 8¾ in.), with a single line. In 1903 the British government refused to be a party to the scheme which, according to the convention (signed Mar. 5, 1903), put the railway entirely under German control. A new financial agreement was announced on November 16, whereby the German group controlled 40 per cent. of the capital and the French group 20 per cent. A company was floated at Frankfort, November 25, with a capital of £150,000 to construct the first section (Konieh-Eregli-Bugurlu), and this was completed and opened in October 1904. See Rohrbach's *Die Bagdadbahn* (1902); Pressel's *Les Chemins de Fers en Turquie d'Asie* (1902).



The Bagdad Railway, and other projected Lines in Turkey in Asia.

Bagehot, Walter (1826–77), English economist and journalist, was born at Langport, in Somersetshire. Though called to the bar in 1852, he joined his father in the business of banker at Langport. Taking to literature, however, he became a contributor to and one of the editors of the *National Review* from 1855 until the close of its career. From 1858 to the end of his life he was also editor of the *Economist*, a journal founded by his father-in-law, the Right Hon. James Wilson. Bagehot's essays are brilliant in style; his most important work is *Lombard Street* (1873; new ed. 1895), a fresh and lucid description of the money market. Next to it in popular estimation is *The English Constitution* (1867; new ed. 1872). *Physics and Politics* (1869) is an attempt to apply the principles of natural selection and inheritance to political society. After his death two volumes of *Literary Studies* (1879) and one of *Economic Studies* (1880) were published. Though he belonged to the school of Ricardo, Bagehot took an independent view of many economic tendencies. See the Memoir prefixed to his *Literary Studies*, and the *Economist* for March 1877.

Bagelen, a residency of central Java, E. Indies, on the S. coast. Area, 1,323 sq. m. Pop. (1896) 1,464,403.

Baggara, a people of Arab origin in the Nile valley, in the Anglo-Egyptian Sudan, and in the S. of Dar Fur. They are Mohammedans. These people helped to form the backbone of the dervish armies against which the Egyptians and British fought in the various Sudan wars of the years 1881–99.

Baggesen, Jens Emmanuel (1764-1826), Danish author, who wrote also in German. In 1813 he began a literary feud with Oehlenschläger, the chief Danish representative of the rising tide of romanticism. Baggesen was a satirical humorist of the first rank, and a perfect master of his native tongue. His best works are *Labyrinthen eller Digtervandringer* (1792-3), a description of his travelling impressions; his polemical poems, *Gjengangeren* and *Per Vrövler* (1816); *Parthenais oder die Alpenreise* (1804); a humorous epic, *Adam und Eve* (1826). See collected *Danish Works* (new ed. 1845-8); *German Works* (1836); and a new ed. of his *Poetiske Skrifter* (ed. Arland, 1889, etc.); A. Baggesen, *Jens Baggesens Biografi* (1843-56); Arentzen, *Baggesen og Oehlenschläger* (1870-8).

Bagdad: Ahmet Kiaia Mosque, Bab-el-Khadem Gate.
(From Sketch by Eug. Flandin.)

Baggs, Charles Michael (1806-45), English Roman Catholic bishop, educated at Sedgeley Park and the English College at Rome, where he became professor of Hebrew, vice-rector, and rector, in succession to Wiseman. He was appointed bishop in 1844, and vicar-apostolic of the west of England at Bath.

Baghal, Bagul, or Baghul, a hill state in the Punjab; area, 124 sq. m. Pop. (1901) 25,720.

Baghelkhand, tract of country under the Central India Agency; comprises the native states of Rewa, Nagode, Maihar, Sohawal, and Kothi.

Bagheria, or Bagaria, decayed tn. of Sicily, prov. Palermo, 8 m. by rail S.E. of Palermo, and 2 m. from the N. coast of Sicily. Pop. (1901) 18,329.

Baghirmi, or Bagirmi, territory (sultanate), Central Africa, within the French military territory of Lake Chad (since 1900); is fairly fertile, and is inhabited by the Barmaghé (Mohammedans). Its area is about 71,000 sq. m. Pennisetum, sorghum, and sesamum are cultivated. Massenia is the capital. Pop. over 1,000,000.

Baghistan. See Behistun.

Bagimont's Roll, so called after the Italian Bajimont de Vicci, who was sent by the Pope (1274) to assess the Scottish benefices for the purpose of collecting a tithe for the crusade, remained the basis on which these livings were taxed until the reformation. The roll has been published in *Archæologia*, vol. xvii. (1813).

Bagnacavallo (anc. *Tiberiacum*), old tn., prov. Emilia, Italy, about 11 m. W. of Ravenna, with ancient walls and a fine cathedral. Pop. (1901) 15,176.

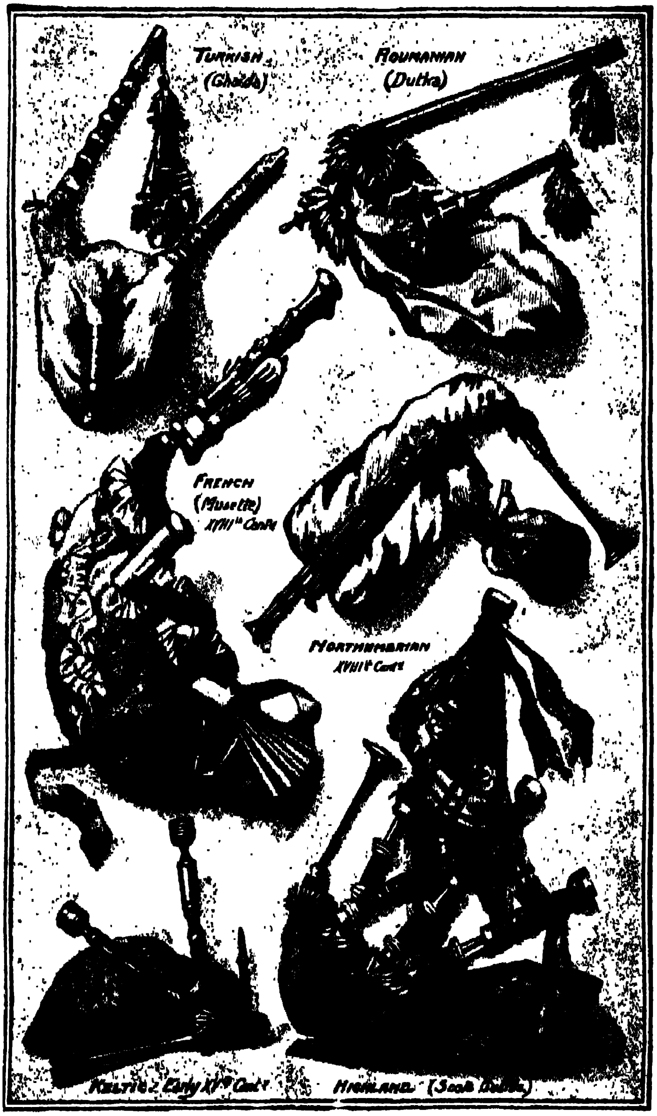
Bagnara Calabra, tn., prov. Reggio di Calabria, Italy, on the W. coast, 15 m. by rail N.E. of Reggio; founded by Robert Guiscard; suffered from an earthquake in 1783. Pop. (1901) 11,136.

Bagnères ('baths'). (**1.**) B. de Bigorre (Lat. *Aquensis Vicus*), dist. tn., dep. Hautes-Pyrénées, France, 12 m. S. of Tarbes, on l. bk. of the Adour, with hot mineral springs (90°-124° F.); visited annually by some 20,000 persons. Pop. (1901) 86,701. (**2.**) B. de Luchon (Lat. *Aquæ Onesiæ*), dist. tn., dep. Haute-Garonne, France, 72 m. S.W. of Toulouse, with sulphur springs (62°-151° F.); is visited by some 36,000 persons annually. Pop. (1901) 3,260.

Bagnes (Fr.; Ital. *bagno*, pl. *bagni*), French convict prisons established at Toulon (1748), Brest (1750), Rochefort (1767), etc., on the abolition of the galleys. They were done away with in 1852, the convicts being thenceforward transported to French Guiana and New Caledonia. See Zaccone's *Hist. des Bagnes* (1875); Brissac's *Souvenir de Prison et de Bagne* (1881); also Victor Hugo's *Les Misérables* (1862).

Bagni. (**1.**) B. di Lucca, vil., prov. Lucca, Italy, 11 m. N. of Lucca, with springs impregnated with sulphate of magnesia and carbonate of lime (100°-136° F.). They have been known and visited since the 13th century, and figure in Heine's *Reisebilder*. Pop. (1901) 13,685. (**2.**) B. di San Giuliano, mineral baths in Italy, 5 m. N.E. of Pisa; famous in antiquity, and still used; temp. 80·5°-104° F. Pop. (1901) 20,899.

Bagno. (1.) B. A RIPOLI, residential suburb, with baths, of Florence, Italy. Pop. (1901) 15,936. (2.) B. IN ROMAGNA, tn., N. slope Etruscan Apennines, prov. Florence, Italy, with hot springs (105°-110° F.) containing natron. Pop. (1901) 9,601.



Bagpipes of Various Lands.

Bagpipe, a musical reed wind instrument of unknown origin, but believed to have been in existence before the Christian era, and at various times has been in use in nearly every European country. It was known in Britain and Ireland as early as the 12th century, and at present is most used in the Scottish Highlands. The most familiar forms of the instrument are the Scottish or Highland, Irish, and Border or Northumbrian. In each the pipes are in connection with a wind-bag. In the Scottish form the wind is supplied from the lungs of the player, but the others have bellows. The pipe upon which the melody is performed is called the 'chanter,' and is fitted with a double reed. The other pipes, called 'drones,' which sound simultaneously with the chanter, have a single reed, and produce only one note each; but these pipes can be tuned to certain intervals, thus producing a continuous and unvarying accompaniment to the melody. The Highland bagpipe has a compass of nine notes, from G on the second line of the treble stave to A, the ninth above; but the notes do not form any diatonic scale, some of the intervals being less than whole and more than half tones. The Irish bagpipe has a compass of from ten to twelve notes; the Northumbrian has fifteen, including two chromatic intervals. The Scottish and Irish—the latter having longer tubes and softer reeds than the former—have three drones, the two smaller being frequently tuned to the low A of the chanter, and the large pipe to the octave below; but other methods of tuning are also in use. The bagpipe used in the British army is the Highland; but the Northumbrian, which has a fourth drone, is the sweetest-toned and smallest instrument of the three. Pipers, when playing, constantly embroider the notes of the melody with a kind of ornamentation called 'warblers.' Five or seven of these short notes are in frequent use, but as many as eleven may be introduced between two consecutive notes of a melody. Music for the bagpipe is very abundant, and consists of laments, pibrochs, marches, strathspeys, and reels. See Manson's *The Highland Bagpipe* (1901).

Bagratidæ, or BAGRATIDES, a dynasty of Armenian rulers, of whom the first was Ashod I. 'the Great,' who was recognized as sovereign prince of Armenia by Haroun al-Raschid in 885 A.D. The Bagratides were overthrown by the Seljuks towards the end of the 11th century, though a branch line ruled over Little Armenia until 1375. Another branch ruled in Imeritia, in Georgia, down to 1810.

Bagration, PETER IVANOVITCH, PRINCE (1765-1812), a Russian general, descendant of the Bagratidæ. He entered the army in 1782, became colonel at the siege of Oczacow (1788), and served with Suwaroff in Poland (1794), in Italy (1799), when he captured Brescia, and fought in the disastrous campaign in Switzerland. In the war of 1805 he covered the retreat of Kutusoff's army before Murat, and distinguished himself at Austerlitz in 1805, and at Eylau and Friedland in 1807; took part in the war in Finland (1808) and in Turkey (1809). In 1812 he was commander of the Russian army of the west; was defeated at Mohilev (July 25), and was mortally wounded at Borodino.

Bagshot Beds. The Bagshot Beds are important members of the Eocene of the Thames basin, where they rest upon the London Clay. They are shallow marine and fresh-water deposits, consisting of red, green, and yellow sands, layers of flint pebbles, and occasional thin seams of pipeclay. The Bagshot Beds are divided into three series, of which the Lower is united with the London Clay to form the Lower Eocene, while the Middle and Upper Bagshots constitute the Middle and Upper Eocene of the London area. The Bagshot Beds are not very fossiliferous, but they have yielded shells of such genera as Turritella, Corbula, Nummulites, Cardita and Ostrea, and teeth of sharks (Lamna, Otodus, Carcharodon). See Whittaker's *Geology of London*.

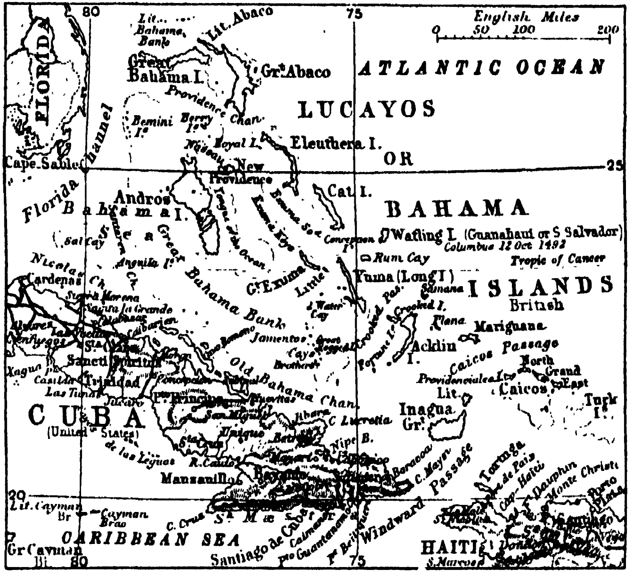
Bagshot Heath, a sandy tract of England, in the cos. Surrey and Berks; once a royal hunting ground; 50 sq. m. in area; 460 ft. above sea-level. In coaching days a haunt of highwaymen.

Bagster, SAMUEL (1772-1851), publisher of Bibles, chiefly polyglot, and New Testaments in Syriac and Hebrew. He also issued the famous *English Hexapla* (1827), besides Bibles, psalters, and lexicons in many languages. His firm still exists, under the title of Samuel Bagster and Sons, Paternoster Row.

Baguet, or BAGUETTE (architectural), a small, round, convex moulding, called a *bead* when plain, and a *chaplet* when carved and enriched.

Bagul. See BAGHAL.

Bahamas, or LUCAYOS, the most N. group of the W. Indies, extending 780 m. between Florida and the E. end of Santo Domingo. They include 670 islands and islets, called cays or keys, and embrace an area of 5,450 sq. m., with a pop. in 1901 of 53,735. They are covered with low, rounded hills of wind-blown shell and coral sand. The principal inhabited islands (about twenty) are New Providence, Great Abaco, Harbour I., Eleuthera, Mayaguana, Ragged I., Rum Key, Exuma, Long I., Long Key, and the Biminis, all ports of entry, and the Great Bahama, Crooked I., Acklin I., Cat I., and Watling I., Berry I., Andros I., and Turks and Caicos Is. On New Providence, with 12,500 inhabitants, is Nassau, the capital and only town of importance. It was notable during the American civil war as the headquarters of the blockade-runners. Turks and Caicos Is. were separated politically from the Bahamas in 1848, and made a dependency of Jamaica. Grand Turk is the capital. The climate is agreeable and healthy. In the winter months, from November to May, the temperature varies from 60° to 75°, and in the rest of the year, constituting the warm season, from 75° to 85°. The islands have some reputation as a winter resort. They are historically interesting as the first land sighted by Columbus, the honour being claimed for Cat I., for Watling, Mariguana, Great Turk, and for Samana (Atwood Cay); modern opinion is that Watling was the spot. The islands were permanently occupied by British troops for the first time in 1718, and since then have been under the flag of Great Britain. The soil, though not rich, is suitable for the cultivation of small fruits, vegetables, pineapples, oranges, and cocoanuts. Their only market, the United States, is impeded by tariffs. Sponge fishing is carried on, and shells, pearls, and ambergris are obtained. Fibre (sisal hemp, *Agave rigida*, var. *sisalana*) cultivation is rapidly increasing. The chief centre of industry is Abaco. Value of exports (1902), £207,601; of imports (1902), £306,098. The Bahamas have regular mail connection with New York and Florida. See Stark's *The Bahama Islands* (1898).



The Bahamas.

Bahar. See BIHAR.

Bahawalpur, native state, Punjab, India. Area, 17,285 sq. m. Pop. (1901) 720,877. The capital of the state bears the same name, and is situated 2 m. from the S. bank of the Sutlej. It has a silk factory. Pop. (1901) 18,546.

Bahia. (1.) State of Brazil, skirting the Atlantic, and stretching inland so as to occupy the middle and N. parts of the São Francisco valley. The state is mountainous. Diamonds are obtained from the mines of Sincora and Lençes. Agriculture (sugar, cotton, coffee, cocoa, and tobacco) is the chief occupation of the large negro population. Area, 164,640 sq. m. Pop. 1,920,000. (2.) BAHIA, or SÃO SALVADOR DA BAHIA, cap. of above, and the see of a Roman Catholic archbishop, stands partly on the shore and partly on the cliff behind the Bahia de Todos os Santos (All Saints Bay). It contains some fine buildings, such as the cathedral, the archiepiscopal palace, and the treasury. It is the second seaport of Brazil. Exports: coffee, cocoa, tobacco, sugar, hides, and piassava fibre. Founded in 1510, it was from 1549 to 1763 the capital of the country. Pop. 174,421.

Bahia Blanca, tn., prov. Buenos Ayres, Argentina, 447 m. by rail S.S.W. of Buenos Ayres; situated 6 m. from its port on the Atlantic, now called Ingeniero White, where the Great Southern and Bahia & N.W. Rys. have constructed moles, now accessible to vessels drawing 28 ft. Pop. (including port) about 10,000.

Bahia Honda ('deep port'), seaport in Vinar del Rio, Cuba, 53 m. W. of Havana. Pop. (1899) 1,278.

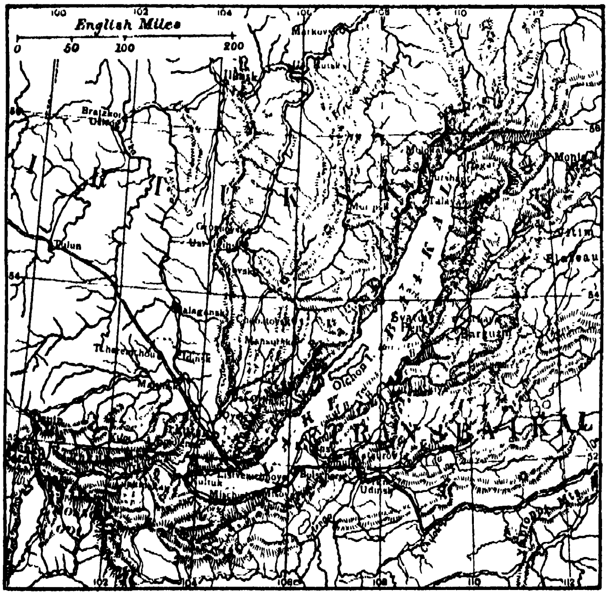
Bahr, Arabic term connoting river or lake - *e.g.* Bahr-el-Abiad (White River).

Bahr, HERMANN (1863), Austrian critic and journalist, was one of the leaders during the 'nineties of the revolt against naturalism in German literature; directed with others the 'Free Stage' in Berlin; has written dramas, romances, and works of literary criticism, the best being of the last class—*e.g.* *Renaissance, neue Studien zur Kritik der Moderne* (1897); *Wiener Theater* (1899); *Bildung* (1900); and *Premieren* (1901).

Bahr, Johann Christian Félix (1798-1872), German philologist, born at Darmstadt, and educated at Heidelberg, where he became professor of classical philology in 1821. He published *Geschichte der Römischen Litteratur* (2 vols. 1828-32), with three supplements, issued in 1836, 1837, and 1840; also an edition of Herodotus (1830-5).

Bahraich, chief tn., Bahraich dist., Oudh, India, 65 m. N.E. of Lucknow. The shrine of Masaud is visited by Mohammedans and Hindus. Pop. (1901) 27,304.

Bahramghat, tn., United Provs. of Agra and Oudh, India, on the r. bk. of the Gogra R., here spanned by a bridge of boats; 39 m. by rail N.E. of Lucknow.



Lake Baikal.

Bahrdt, Karl Friedrich (1741-92), German Protestant theologian, professor of Biblical philology at Leipzig (1766), of philosophy at Erfurt (1768), and of theology at Giessen (1771), all of which he had to relinquish on account of his profligacy and the debased sentiments expressed in his *Translation of the New Testament* (1772-5). On settling (1779) at Halle he was shunned by the university professors, but made the acquaintance of J. H. Everhard, who led him to extreme rationalism. During the last ten years of his life he kept an inn. In his *Letters on the Bible* (1782) he anticipated the mythical theory of Strauss; and his *Letters for Truth-seeking Readers* (10 vols. 1784-6) are pervaded by a low moral tone. See his *Autobiography* (1790-1).

Bahrein Islands, group off Arabian coast, Persian Gulf, placed under British protection in 1867, the largest (Bahrein or Aval I.) being 27 m. long by 10 m. broad, and containing the capital, Manameh (pop. 8,000). The seat of government is at Moharek, on an island (pop. 22,000) of the same name. Pearl fishing is the chief industry, pearls being exported to the average annual value of about £500,000. A fine breed of white asses is reared. Pop. of group, 68,000.

Baiæ, an ancient tn. in Campania, Italy, on a bay W. of Naples. It was the favourite watering-place of the Romans under the late republic and empire (see Horace, *Ep.* i. 83). It was at Baiæ that Cæsar, Pompey, and Crassus formed their famous triumvirate (60 B.C.); here also the Emperor Hadrian died (138 A.D.).

Baiburt, or Baibut, tn., Armenia, Asiatic Turkey, 70 m. N.W. from Erzerum, with manufactures of carpets, arms, cutlery, etc. Pop. 6,000 to 8,000.

Baidyabati, a munic. and mrkt. tn. on the Hugli R., Hugli dist., Bengal, India, 15 m. N.W. of Calcutta, with manufactures of jute and hemp rope. Pop. 17,174.

Baikal Lake, one of the largest fresh-water lakes in the world (400 m. long, with a maximum breadth of over 50 m., and area of 13,500 sq. m.), in S. Siberia, stretching N. from the Sayan Mts. to the watershed of the Lena. The surface lies 1,651 ft. above the ocean, and its depth is most remarkable, a sounding of 791 fathoms having been made in the S. The Buryats catch large quantities of fish in the lake, especially salmon and gwyniad (*Coregonus*), and seals resembling the *Phoca fœtida* of northern seas. Formerly the lake was the only break in the continuity of the Siberian Railway. A line, however, was carried across the ice during the winter of 1903-4. By Sept. 25, 1904, the Circum-Baikal Ry., running from Baikal round the southern end of the lake to Myssovaya (163 m.), was completed at a cost of six million pounds.

Baikie, William Balfour (1825-64), Scottish explorer, was a native of Orkney, on which country he published a bibliography (1847), contributing also to its zoology in *Historia Naturalis Orcadensis* (1848). He served as surgeon-naturalist with the *Pleiad* expedition (1854) up the Niger R. In his second expedition (1857) the ship was wrecked, and Baikie remained up country for seven years, studying the Haussa and Fulfulde languages (on which he published a monograph, 1861). See his *Narrative of an Exploring Voyage up the Rivers Kwora and Binue* (1856).

Bail. A person on arrest for an offence may generally be released on producing one or more persons who will answer for his appearance at the trial. Such persons are said to go bail for the accused, and they agree to pay to the crown a certain sum in the event of his non-appearance. A person summarily arrested, if not brought before a court within twenty-four hours, must be admitted to bail by the police officer unless there is good reason to the contrary. The King's Bench Division, or a judge in vacation, may also admit to bail for any crime. In Admiralty proceedings, where a ship or cargo is arrested, the owner may have it released on giving bail. In Scotland the law is principally regulated by the Bail (Scotland) Act, 1888, but the Lord Advocate and the High Court of Justiciary have discretionary powers unaffected by it.

Bailen, tn., prov. Jaën, Spain, 22 m. by rail N. of Jaën; mines and foundries of galena. Famous for its breed of Andalusian horses. Pop. (1900) 7,420.

Bailey, the whole of the other buildings and courts of a castle as distinguished from the keep.

Bailey, Old. See Old Bailey.

Bailey, Nathan (d. 1742), English lexicographer, master of a boarding school at Stepney, London; wrote the *Universal Etymological Eng. Dict.* (1721-7; 30th ed. 1802), and edited the *Dictionarium Britannicum* (1730).

Bailey, Philip James (1816-1902), English poet, born at Nottingham; called to the bar in 1840. His reputation rests wholly upon *Festus*, a poem which created a sensation in 1839 (Fiftieth Anniversary ed. 1889). There is a selection entitled *A Festus Treasury*, edited by Albert Broadbent (1901). See also *Blackwood's Mag.* for April 1850, and *Athenæum* for Sept. 13, 1902.

Bailey, Samuel (1791-1870), English economic and philosophical writer, was born in Sheffield. After giving up his cutler's business, he twice contested Sheffield unsuccessfully as a philosophical Radical (1832, 1834). His writings are chiefly (1) economic, in one of which—on *Value* (1825)—he criticises Ricardo and others for confusing intrinsic value with exchange value; and (2) philosophical, the most valuable being *Letters on the Philosophy of the Human Mind* (1856-63) and *Theory of Reasoning* (1851). Bailey was a determinist, utilitarian, and nominalist.

Bailey, Solon Irving (1854), American astronomer, was born in Lisbon, New Hampshire. Associate professor of astronomy at Harvard, he founded a branch of the Harvard observatory in the southern hemisphere, at Arequipa, in Peru, in 1889, and in 1893 established on the summit of El Misti (19,000 ft.) the highest scientific station in the world.

Bailie. (**1.**) A magistrate of a Scottish burgh, generally elected by the council from the councillors. He has criminal jurisdiction as to police offences, and civil jurisdiction as to debt and possessory questions within the burgh. (**2.**) Bailie to give sasine, the person who appeared for the superior at the ceremony of giving sasine. (**3.**) The bailie of Holyrood, or of the abbey, an official appointed by the Duke of Hamilton as hereditary keeper of Holyrood House, Edinburgh, and having jurisdiction as to civil debts within the precincts of the sanctuary. See Green's *Encyc. of the Law of Scotland*, ed. J. Chisholm (1896-1900).

Bailiffs are of several kinds. (**1.**) Sheriffs' bailiffs, who are either (*a*) bailiffs of hundreds, summoning juries, collecting fines, etc., in the hundreds; or (*b*) bound bailiffs, whose duty is mainly to serve writs and levy executions. As the sheriff is responsible for their conduct, they are 'bound over' to perform their duties. (**2.**) County court bailiffs, governed by the County Courts Act, 1888, serve under the high bailiff, and are removable by the judge for misconduct. No distress for rent may be levied except by a county court bailiff. In France there were bailiffs of royal and of private domains. In addition to administering the estates under their charge, they also often presided over the feudal courts of the lordship, and eventually became, owing to their ignorance and pretension, a common butt of the satirical comedy of the day.

Bailiwick, the district over which the jurisdiction of a bailiff or sheriff extends.

Baillairge, Charles P. Florent (1827), worked as an engineer before devoting himself to architecture. He has designed numerous buildings for his native city, Quebec, including the Laval University, the Music Hall, and a number of churches; the Monument des Braves de 1760 is also his work. Partly responsible for the design of the Ottawa Parliament buildings, he has also built (1893) the Charles River aqueduct.

Bailleul, tn., 18 m. N.W. of Lille, dep. Nord, France; has manufactures of woollens, linens, lace, etc. Pop. (1901) 13,530.

Baillie, Lady Grisell (1665-1746), Covenanting heroine and song-writer, eldest daughter of Sir Patrick Hume, afterwards first Earl of Marchmont, was born at Redbraes Castle (now Marchmont House), Berwickshire. She is remembered for her pathetic lyric, *Werena my heart licht I wad dee*, and the fragment, *The ewe-buchtin's bonnie*, to which Thomas Pringle added several stanzas. See *Memoirs of George Baillie of Jerviswood and of Lady Grisell Baillie*, by their daughter, Lady Murray of Stanhope (1693-1759).

Baillie, Joanna (1762-1851), Scottish dramatist and poet, born at Bothwell, Lanarkshire. She went to London in 1784, and in 1790 published anonymously a volume of miscellaneous poems, entitled *Fugitive Verses*. Her first series of *Plays on the Passions* was issued in 1798, followed by a second in 1802, and a third in 1812. These, and *The Family Legend*, produced in Edinburgh in 1810, constitute her chief works as a dramatist. Some of her songs—such as *Woo'd an' married an' a'*; *Up, quit thy bower*; and *Saw ye Johnnie comin'?* became popular. She was visited at Hampstead, where she lived from 1806 to her death, by, among other literary celebrities, Sir Walter Scott (third canto of *Marmion*). Her *Collected Works* appeared in 1851, with a prefatory memoir. See Rogers's *Scottish Minstrel* (1870); Mitford's *Recollections of a Literary Life* (1859); Thackeray's *Book of Sibyls* (1883).

Baillie, Matthew (1761-1823), physician and anatomist, brother of Joanna Baillie, was born at Shotts, Lanarkshire, and studied medicine in London, under his uncle, William Hunter, the great anatomist, whom he succeeded (1783) as lecturer on anatomy. He was appointed physician to George III. about 1810. His *Morbid Anatomy* (new ed. 1833) was a standard work; and he also wrote *Lectures and Observations on Medicine* (1825). See his Life, prefixed to his works, by James Wardrop (1825).

Baillie, Robert (1599-1662), Scottish theologian, born in Glasgow; an Episcopalian strongly opposed to Laud; a Covenanting chaplain, member of Westminster Assembly, professor of divinity (1642) and principal of Glasgow University (1660). Scholar, able controversialist, and author of many books on current religious errors, Baillie will be remembered for his *Letters and Journals* (1637-62; best ed. Bannatyne Club, 1841-2), of great value for a knowledge of the times, and especially of the 1638 and Westminster Assemblies. Baillie did for Scotland what Pepys and Evelyn did for England. See Carlyle's *Miscellanies*, vol. vi. (1872).

Baillie, Robert (d. 1684), of Jerviswood, a Scottish patriot, was arrested for complicity in the Rye House plot, condemned, and hanged at the Market Cross of Edinburgh. See Burnet's *Hist. of his own Times* (1723-34).

Baillot, Pierre Marie François de Sales (1771-1842), French violinist, was born at Passy, near Paris; received his musical training at Paris and at Rome. He is regarded as a founder of the French violin school.

Bailly, Jean Sylvain (1736-93), French astronomer and politician, born in Paris; author of *Histoire de l'Astronomie* (1785; new ed. 1805). On the outbreak of the French revolution he was elected first president of the National Assembly and mayor of Paris (1789). His action in firing upon the mob in the Champ de Mars (July 17, 1791) destroyed his popularity. In July 1793 he was arrested by the Jacobins, condemned, and executed (Nov. 12). See his *Mémoires d'un Témoin de la Révolution* (1804); *Eloge de Bailly*, by Arago (1836); Nourrisson's *Trois Révolutionnaires: Turgot, Necker, Bailly* (1885).

Bailment is the delivery of goods in trust on a contract, express or implied. The goods may be delivered to be kept gratis for the bailor, to be used gratis or for hire by the bailee, or for the bailee to do something to them gratis or for reward. A gratuitous bailee is liable only for gross negligence. A bailee who receives an article on loan for his own benefit must use the greatest diligence. A fraudulent bailee is guilty of larceny. See Larceny Act, 1861.

Baily, Edward Hodges (1788-1867), English sculptor, a native of Bristol, attracted the attention of Flaxman, in whose studio he worked for seven years (1807-14). For his *Eve at the Fountain* (1818) and other works he was elected R.A. in 1821. Baily's work was chiefly on domestic subjects (*e.g. Motherly Love; Group of Children*) and portrait statues—*e.g.* those of Wellington, Nelson (Trafalgar Square), Byron, C. J. Fox, and Lord Mansfield. To him are also due the sculptures on the Marble Arch, London.

Baily, Francis (1774-1844), English astronomer, practised as a stockbroker in London from 1799 to 1825. On his retirement from business he devoted himself to astronomy; discovered Baily's Beads; founded the Astronomical Society (1820); revised the star catalogues of Flamsteed, Lalande, Lacaille, and others; reformed the *Nautical Almanac;* and repeated, in his own house, the 'Cavendish' experiments to determine the earth's density. He wrote a biography of Flamsteed (1835). See Herschel's *Memoirs of F. Baily* (1845); *Dublin Rev.*, vol. xviii. p. 75.

Baily's Beads, discovered by the preceding at the solar eclipse, May 15, 1836; the crescentic line of bright points or beads into which the edge of the sun's disc appears to be broken, at the moment when it is lost at one side of the moon, and at the moment when it emerges at the other.

Bain, Alexander (1818-1903), professor of logic at Aberdeen (1860-80); was educated at Marischal College (M.A. 1840); professor of mathematics and natural philosophy at Glasgow (1845). Chief works: *The Senses and the Intellect* (1855; new ed. 1894); *The Emotions and the Will* (1859; new ed. 1899); *Manual of Eng. Composition and Rhetoric* (1866; new ed. 1887-8); *Logic, Deductive and Inductive* (1870); *Education as a Science* (1879); *Biography of James Mill;* and *Personal Recollections* (1882). The distinguishing features of his psychology were that he eliminated metaphysics, based his analyses upon physiological states and processes, and made subtle use of the mental laws of association, and thus largely determined the direction and methods of modern British psychology. He knew Mill well, and read his *Logic* in manuscript, discussed the whole work in detail with him, and supplied him with many illustrative examples drawn from the experimental sciences. See J. S. Mill's *Dissertations and Discussions* (1874).

Bainbergs, plate armour for the protection of the legs, introduced during the 13th century; worn over chain-mail.

Baines, Edward (1774-1848), English journalist, was a Leeds printer who became proprietor of the *Leeds Mercury* (1801). M.P. for Leeds (1834-41), he advocated Catholic emancipation, parliamentary reform, factory legislation, and abolition of church rates and civil disabilities. Baines published *History of County of York* (1822-3); *History of County Palatine of Lancashire* (1868-70); *History of the Wars of the French Revolution* (1824); and *History of the Reign of George III.* (1823). See *Life* (1859) by his son.

Bairaktar, or Bairakdar, Mustapha Pasha (1755-1808), grand-vizier of the Ottoman empire, entered the army, and became pasha of Rustchuk. When the Janissaries revolted, deposed Selim III., and put Mustapha IV. upon the throne, Bairaktar marched upon Constantinople, defeated the Janissaries, overthrew Mustapha, and made Mahmud II. Sultan, he himself becoming grand-vizier. He attempted to disband the Janissaries, but they again rebelled, demanded the restoration of Mustapha, and killed Bairaktar.

Bairam, a Mohammedan feast falling immediately after Ramadan, or the month of fasting, and extending over one to three days. The second Bairam, a feast falling seventy days later, commemorates Abraham's sacrifice of Isaac.

Baird, Sir David (1757-1829), British general, entered the army in 1773, and in 1780 fell in India into the hands of Hyder Ali, whose prisoner he remained from 1780-4. He led the storming column against Seringapatam (1799) in the second war with Tippoo, commanded the Indian troops which co-operated with Hutchinson in driving the French from Egypt, and assisted at the capture of Alexandria in 1801. Knighted in 1804, he led the successful expedition against the Dutch at the Cape (1805-6), commanded the first division at the siege of Copenhagen (1807), and the right wing at Corunna (1809), where he was wounded. He was raised to the baronetcy in 1810. See *Life* by Theodore Hook (1832); Sir Robert Wilson's *Campaign in Egypt* (1802); Napier's *Peninsular War*, vol. iii. (1893).

Baird, James (1802-76), Scottish coalowner and ironmaster, M.P. for the Falkirk Burghs (1851-7), devoted himself to educational and religious questions. He founded (1871) the 'Baird Lectures,' to further orthodox teaching; and the 'Baird Trust' of the Church of Scotland, to which he gave (1873) £500,000, in order to promote the spiritual welfare of that country. See *Kings of British Commerce* (1876), and Baird's *Bairds of Auchmedden* (1870).

Baird, Spencer Fullerton (1823-87), American naturalist, born at Reading, Pa.; became professor of natural sciences there (1845), assistant secretary of the Smithsonian Institute at Washington (1850), secretary (1878), and from 1874 was United States commissioner of fish and fisheries. He did much to further the zoological and archæological exploration of the United States, and laid the foundation of the National Museum (1857) of the Smithsonian Institute. At the same time, he worked along with Audubon, Agassiz, and other zoologists. He wrote *The Birds of America* (1860), in collaboration with John Cassin; *The Mammals of N. America* (1859); *Hist. of American Birds* (1874-84), in conjunction with Dr. Brewer and Professor Ridgway.

Baireuth. See Bayreuth.

Bairnsdale, tn., Victoria, Australia, 170 m. by rail E. of Melbourne; is in the centre of a district whose pop. (1901) is about 15,000. Pop. of town (1901) 3,000.

Baitul. See Betul.

Baize, a rough woollen cloth with a nap on one side, used for linings, coverings, and curtains.

Baja, tn., co. Bacs-Bodrog, Hungary, on the r. bk. of the Danube, 37 m. by rail W. of Maria Theresiopel, with an imposing castle, and a large trade in fruit, grain, and figs. Pop. (1900) 20,065.

Bajaur, or Bajaor, dist. (area, 375 sq. m.) under British protection, N.E. Afghanistan, N. of Kabul R. and W. of the Swat R.

Bajazet or Bayazid I. (1347-1403), Sultan of the Turks, succeeded his father, Murad I., in 1389, and began his reign by murdering his younger brother Yakub. Bajazet took possession of Bulgaria, Servia, Macedonia, and Thessaly, and his swift subjugation of Asia Minor gave him the name of Ilderim, or 'Lightning.' In 1396 he defeated, at Nikopol, the Hungarians, Poles, and French under King Sigismund of Hungary. The Greek empire was in danger at his hands, when Timur the Mongol attacked his possessions in Asia Minor, and gained a victory over him at Angora in 1402. Bajazet was captured, and travelled in a litter with Timur's camp; which gave rise to the traditional story, used by Marlowe and others, that he was imprisoned in a cage.—Bajazet II. (1447-1512) succeeded his father, the Sultan Mohammed II., the conqueror of Constantinople, in 1481. A peace-loving monarch, the builder of mosques and bridges, and the patron of learning, he was in 1512 forced by the Janissaries to abdicate in favour of his more martial son Selim. See Gibbon's *Decline and Fall of the Roman Empire* (vol. vii. 1900).

Bajimont. See BAGIMONT'S ROLL.

Bajmok, tn., prov. Bacs-Bodrog, Hungary, 13 m. S.W. of Maria Theresiopel. Pop. (1900) 7,576.

Bajocco, or BAIOCCO, a small silver or copper coin current (1592-1867) in the Papal States, value about ½d.

Bajus, or DE BAY, MICHAEL (1513-89), Roman Catholic theologian, born at Melin, in Hainault; studied at Louvain, and, as professor of theology there (1552), took an active part in the Council of Trent. A disciple of Augustine, he was taxed with heresy: eighteen of his propositions were censured by the Sorbonne (1560), and seventy-six condemned by Pope Pius V. (1567). Bajus made a public apology, but did not renounce his opinions, which eventually developed into Jansenism. He became chancellor of his university (1578). His works were published at Cologne (1696). See Linsenmann's *Michael Bajus und die Grundlegung des Jansenismus* (1867).

Bajza, JOSEPH (1804-58), Hungarian poet and critic, was director of the national theatre at Pest (1837), and wrote and (partly) translated the *Hist. Library* (1843-45), the *Modern Plutarch* (1845-7), *Universal Hist.* (1847), and published a volume of lyrics in 1835. He also edited Kossuth's paper, *Kossuth Hirlapja* (1848-50).

Bakacs, THOMAS (d. 1521), Hungarian statesman and cardinal, was successively secretary to King Matthias Corvinus, chancellor to Ladislaus II., cardinal primate of Hungary (1500), and papal legate.

Bakarganj, dist., Dacca div., Bengal, India, in the Ganges-Brahmaputra delta. Area, 3,645 sq. m. Pop. (1901) 2,291,752.

Bakau. See BACAU.

Bakchiserai. See BAKHCHI-SARAI.

Bakehouse Regulations Acts. See FACTORIES AND WORKSHOPS.

Bakel, a fortified post of W. Africa (fort built 1820), in the French colony of Senegal, on the l. bk. of the Senegal, 550 m. by rail S.E. of St. Louis. Pop. 3,000.

Baker, SIR BENJAMIN (1840), English civil engineer, joint-designer (1882) with Sir John Fowler of the Forth Bridge, and joint engineer of the Nile reservoir. He is also the inventor of the pneumatic shield. He was knighted in 1890.

Baker, HENRY (1698-1774), English scientist and poet, was born in London. After completing his apprenticeship as a bookseller, he instituted a highly successful method of instructing deaf-mutes. He devoted himself to the study of natural science and the writing of verses (the *Universe*, 1808), and he was latterly associated in journalism with Defoe. He wrote *The Microscope made Easy* (1743) and *Employment for the Microscope* (1753), and in 1744 was given the Copley medal for experiments on the crystallization of salt. He founded the Bakerian lecture of the Royal Society. See Wilson's and Lee's *Lives of Defoe*.

Baker, JOHN GILBERT (1834), English botanist, assistant curator of the herbarium at Kew (1866); lecturer on botany at the London Hospital and to the Apothecaries' Society (1882). He has published monographs on ferns (2nd ed. of Hooker's book, 1883), *British Roses* (1869), *Ferns of Brazil* (1870-80), *Flora of Mauritius and Seychelles* (1877), and *Flora of the English Lake District* (1885); has written *On the Geographical Distribution of Ferns* (1868), and edited Watson's *Topographical Botany* (2nd ed. 1883).

Baker, SIR RICHARD (1568-1645), English historian, was educated at Oxford; author of a once popular *Chronicle of the Kings of England* (1643).

Baker, HON. SIR RICHARD CHAFFEY (1842), first president of Federal Senate of Australian Commonwealth (1901), a native of S. Australia, was successively attorney-general (1870), minister of justice and education (1884), and president of Legislative Council (1893-1901), and was knighted in 1895.

Baker, SIR SAMUEL WHITE, (1821-93), English author and explorer, who, after exploring the Blue Nile and tracing the course of the White Nile, in 1864 reached the great fresh-water lake to which he gave the name of Albert Nyanza. On his return to England he was knighted. In 1869-73 Baker commanded an expedition organized by the Khedive of Egypt for the suppression of the slave trade and the annexation of the equatorial regions of the Nile basin. He subsequently (1879) made a complete exploration of Cyprus. Baker was the author of the following works: *The Rifle and the Hound in Ceylon* (1854); *Eight Years' Wanderings in Ceylon* (1855; new ed. 1890); *The Albert Nyanza* (1866); *The Nile Tributaries of Abyssinia* (1867); *Ismailia*, a narrative of the expedition of 1869-73 (1874); *Cyprus as I saw it in 1879* (1879); and *Wild Beasts and their Ways* (1890). In 1895 a *Memoir* of him was published by T. D. Murray and A. Silva White.

Baker, THOMAS (1656-1740), antiquary, fellow of St. John's College, Cambridge, resigned his living in the church (1690) as a nonjuror, and wrote a *History of St. John's College* (ed. Professor Mayor, 1867). See Walpole's *Life of Baker*.

Baker, VALENTINE (1827-87), known also as BAKER PASHA, soldier, brother of Sir Samuel White Baker, joined the British army in 1848, and served in the Kaffir war (1852-3), in India, and in the Crimea (1855). He became a major-general in the Turkish army in 1877, and served in the Russo-Turkish war. He organized and commanded (1882-7) the Egyptian gendarmerie for the Khedive, and was disastrously routed at the first battle of El Teb (1884) by the tribesmen of Osman Digna. He wrote *Clouds in the East* (1876), and *War in Bulgaria* (1879).

Bakewell, mrkt. tn., Derbyshire, England, 10½ m. S.S.E. of Buxton, with cruciform church containing monuments of the Vernon and Manners families. It has chalybeate springs, and a woollen factory established by Arkwright. Black marble and chert are quarried. Chatsworth House (3 m. N.E.), the seat of the Duke of Devonshire, and Haddon Hall (2 m. S.E.), are in the vicinity. Pop. (1901) 2,850.

Bakewell, ROBERT (1725-95), English agriculturist, famous for his improvement (from 1755) of farm stock, especially the Leicestershire breed of sheep, the Dishley cattle, and a breed of black horses. See *The Husbandry of Three Celebrated British Farmers* (1811).

Bakhchi-Sarai, tn., Crimea, Russia, once cap. of the khanate of Krim, in valley of Choruk, 20 m. S.W. of Simpheropol; contains the ancient palace (1519) of the Tartar khans. In 1854 it was the headquarters of the Russian army for the relief of Sebastopol. Tobacco is cultivated in the neighbourhood. Pop. (1897) 14,650.

Bakhmut, tn., Ekaterinoslav gov., Russia, 125 m. E. of Ekaterinoslav city. The district corresponds with the Donetz coal-mining region. Pop. (1897) 19,400.

Bakhtegan, or NIRIS, salt lake, 50 m. E. of Shiraz, prov. Farsistan, Persia.

Baking. See BREAD, COOKERY, OVENS.

Baking Powder, a powder composed of tartaric acid and bicarbonate of soda, and generally mixed with flour; used as a substitute for yeast in raising bread and cakes.

Bakony Wald, a broad, hilly region of Hungary, stretching S.W. from the elbow of the Danube above Budapest, parallel to Lake Balaton, for 50 m., and forming a division between the great *pusztas* (plains) on the E. of the Danube and the plain of the Raab. Alt. 2,000-2,340 ft.

Bakshish, or BACKSHISH (Pers. 'a gift'), a word used throughout the East for a gratuity or 'tip' for services rendered; though it is demanded, often with threats.

Baku. (**1.**) Russian gov. of the E. Caucasus, including the plains of the lower Kura and Aras, and the Talish Mts. The chief crops are wheat, millet, maize, and rice; saffron, madder, and cotton are also grown, and silk is produced. The coast fisheries are important, but the main industry is in the neighbourhood of the town. Area, 15,176 sq. m. Pop. (1897) 789,659. (**2.**) Chief tn. of above, at head of a bay (finest natural harbour on the Caspian Sea) on the S. side of the Apsheron peninsula; owes its importance to the petroleum wells in the neighbourhood. Total number of wells (1900), 1,321, with 1,495 boring, deepening, or under repair; oil produced (1902), 10,261,200 tons. Natural gas issues from the ground at Atesh-ga ('place of fire'), a very ancient resort of fire-worshippers, and elsewhere S. of Baku. The oil refineries (the Black Town) are 2 m. E. of Baku proper, on the shore of the bay. Baku is connected by rail with Batum (598 m., also pipe line), Poti, and Petrovsk (273 m.). Steamers ply to Astrakhan for the Volga, to Krasnovodsk, the terminus of the Transcaspian Ry., and to Enzeli, in Persia. Baku was wrested from Persia by the Russians in 1806. Labour riots occurred in January 1905, during the progress of which some hundreds of oil towers were burned. Five persons were killed and twenty-six wounded before order was restored. See Marvin's *The Region of Eternal Fire* (1883); 'Baku Petroleum District' in *Engineering Mag.* (xv. 1898). Pop. (1860) 13,381; (1897) 112,253.

Bakunin, MICHAEL (1814 76), Russian revolutionist and anarchist, was born in the gov. of Tver. After serving for a short time in the Imperial Guard, he studied philosophy at Berlin (1841), thence went to Dresden, and later (1847) to Paris, where he became acquainted with George Sand and the socialist Proudhon. A little later he took an active part in the revolutionary movements at Prague and Dresden, and being arrested in Saxony (1849), was eventually delivered up to the Russian government, which banished him in 1855 to Siberia. Thence he escaped (1860) to Japan, and came by way of America to England (1861). His chief writings are *Dieu et l'Etat* (3rd ed. 1895; Eng. trans. 1894); *Appel aux Slavs* (1888); and *Révolution Sociale et la Dictature Militaire* (1871).

Bala. (**1.**) Market town, N.E. Merionethshire, Wales, 12 m. S.W. of Corwen, with Calvinistic Methodist theological college. Pop. (1901) 1,544. (**2.**) Lake (Llyn Tegid), largest in N. Wales, 4 m. long by 1 m. wide, an expansion of the river Dee.

Balaam, a seer or soothsayer whom Balak, king of Moab, called from his home in Pethor, by the Euphrates, to curse Israel, and thereby arrest its apparently irresistible march towards Canaan. The story of his journey, of the angel, visible at first only to his ass, and the beast's remonstrance with its master, is well known. But the most remarkable fact about Balaam, a non-Israelite, is the dignified and truly prophetic oracle which he pronounced regarding Israel, in place of the curse desiderated by Balak. It is very difficult to gain a clear conception of Balaam's character: in Num. 22-24 he does not go beyond Jehovah's word, and it is not quite obvious what his transgression really was; but nearly every other reference to him in Scripture, particularly in the New Testament, speaks of him with opprobrium, and holds him up as a warning example of those who love the hire of unrighteousness—*i.e.*, possibly, prostitute divinely-bestowed talents for worldly reward and he was slain while fighting on the side of the Midianites against Israel (Num. 31:8, 16; Micah 6:5 8; Rev. 2:14, etc.).

Bala Beds, or CARADOC GROUP, a geological formation, named from Bala, in Merionethshire. They form the uppermost subdivision of the Lower Silurian or Ordovician formation. At Bala they are mostly sandstones, grits, and shales, with a fossiliferous limestone, the Bala limestone, and a few thin ash beds. They abound in trilobites, brachiopods, and graptolites. In the N. of Wales volcanic rocks of Bala age are largely developed, and are the cause of much of the picturesque scenery of that region. Snowdon is built up of slate and sandstone, with lava flows and ash beds of the Bala series, and thick intrusive sheets. Rocks of this period occur also in Cornwall, in the Lake District (Coniston limestone), and in the S. of Scotland (Lowther shales). See Harker's *Bala Volcanic Rocks of Wales* (1889); Sir Arch. Geikie's *Ancient Volcanoes of Great Britain* (1897).

Balæna. See WHALE.

Balæniceps ('whale-headed'), or SHOEBILL, a stork with an exceedingly broad and long beak, found on the Upper Nile.

Balænoptera. See RORQUAL.

Balafré, LE. (**1.**) A nickname of Francis, Duke of Guise (1519-63), from a sword-cut which he got in the face whilst fighting the English near Boulogne (1545). (**2.**) A nickname of Ludovic Lesly, uncle of Quentin Durward, in Scott's novel (1823) of that title.

Balaghat ('above the Ghats'), the elevated table-land of Berar, India, which lies between the E. and W. Ghats.

Balaguer, VICTOR (1824-1900), Spanish politician, poet, and historian. He became an active Radical politician and advocate of the rights of Catalonia, fled to France in 1866, and threw himself into the Provençal literary movement. In 1868 he became a leader in the Cortes, and minister of colonies in 1886. He is chiefly known by his Catalan poems (*Poesias Completas*, 1874, and *Obras Poeticas*, 1880), more particularly the collection known as *Trovador de Montserrat* (1850), etc., and tragedies (*Tragedias*, 6th ed. 1891), his *Historia de los Trovadores* (1878 80), and especially his *Historia de Cataluñ.*

Balak-hissar. See BALIKESRI.

Balakirev, MILI ALEXEIEVITCH (1837), Russian musical composer, born at Nijni Novgorod; appeared with great success as a pianist in St. Petersburg in 1855; was conductor of the Russian Musical Society from 1867-70, and, later, director of the imperial orchestra. He has severely criticised Rubinstein and Tchaikovsky. His works are: music to *King Lear*; *Tamara* and *Russia*, both symphonies; *Islamey*, an Oriental fantasia for the piano; a very interesting collection of Russian popular songs (1866); and many overtures with Russian, Spanish, and Czech (Bohemian) themes.

Balaklava, or BALACLAVA, port and health resort, S.W. coast of Crimea, Russia, in 44° 30′ N. lat., 8 m. S.E. of Sebastopol. Chiefly memorable for the action of Oct. 25, 1854, and the charge of the Russian guns by the Light Brigade (Six Hundred). In 1854 6 it was the headquarters of the British force.

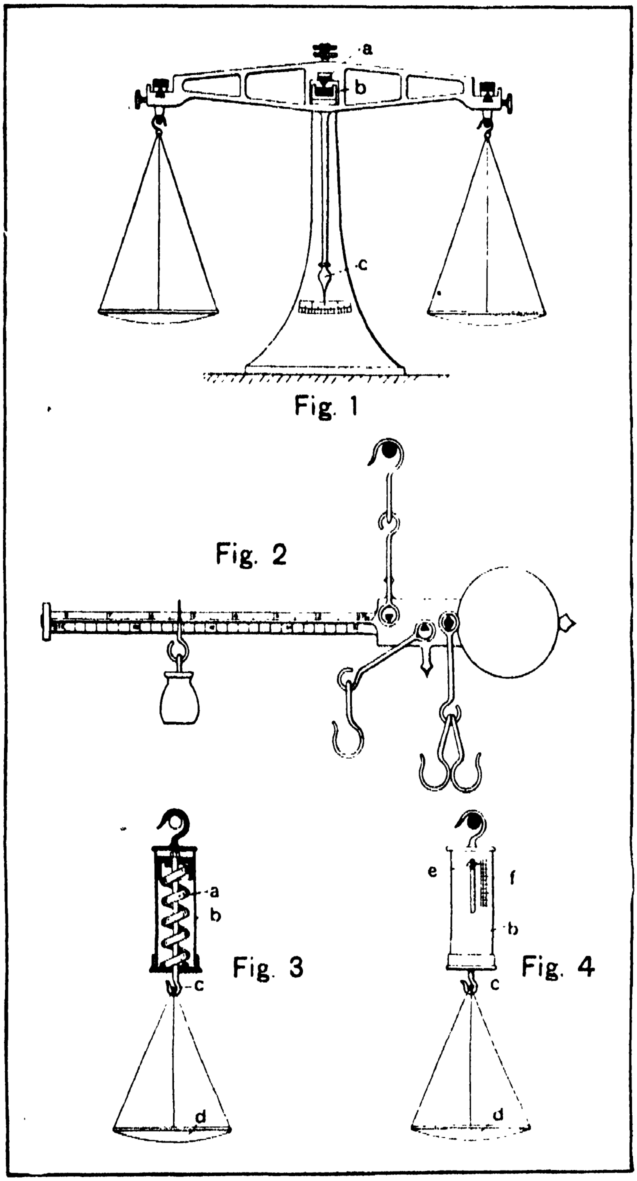
Balalaika, a musical instrument very much used in Russia for the accompaniment of popular songs. It is a stringed instrument, with, generally, two strings, and resembles a guitar.

Balance, an instrument for determining the relative weights or masses of bodies, usually by reference to certain standard units (pounds, ounces, grams, etc.). There are many varieties of balance. The ordinary balance consists of a lever of the first kind, called the beam, which is supported on a fulcrum in the middle, and from the extremities of which are hung two scale-pans, one for the weights, the other for the object to be weighed. In order that the beam shall be able to oscillate freely on its support, the fulcrum consists of a steel or agate prism, or 'knife-edge,' with its sharp edge at right angles to the direction of the beam, and resting on a plane of polished steel or agate, thus reducing friction to a minimum. Further, to ensure that the arms of the beam shall keep at absolutely the same length irrespective of their movements, the scale-pans are hung from hooks containing planes, which rest on similar knife-edges at the ends of the beam. Frequently a needle or pointer is fixed to the centre of the beam in such a way that one end oscillates along the arc of a circle, and comes to rest in the line of direction from the fulcrum to the centre of gravity of the beam, or swings evenly on each side of that line, when the balance is horizontal.

The following are the requirements of a good balance: (1.) The two arms of the beam must be precisely the same length, otherwise unequal weights in the scale-pans will be necessary to produce equilibrium of the lever. (2.) The balance should be in equilibrium when the scale-pans are empty. (3.) The centre of gravity of the beam, when horizontal, should be in the same vertical line with the knife-edge of the fulcrum, and a short distance underneath the latter, in order to ensure that the beam, when at rest, shall assume a position of stable equilibrium. (4.) The balance should be delicate — *i.e.* should answer to the least alteration of the weights in the scale-pans. This is effected (*a*) by making the arms of the balance long, while their weight is reduced as far as the necessary rigidity will permit; (*b*) and by having the centre of gravity but little below the knife-edge of the fulcrum; while (*c*) due attention must be given to diminishing friction by having the knife-edges of the supports as sharp, and the bearings as hard, as possible.

A balance to be used in the processes of chemical analyses must possess extraordinary delicacy, even to one ten-thousandth of a gram or one one-thousandth of a grain. In order to prevent the wearing away of the knife-edges of the fulcrum and of the scale-pans as much as possible, the whole beam, and the pans from the beam, are raised off their bearings, when not in use, by means of a screw; and to protect the balance from dust, moisture, air currents, or other disturbance of conditions, it is invariably, even when in use, kept within a glass case, one side of which is movable.

Of the numerous special modifications of the balance only two require separate notice—the Roman balance and the spring balance. The Roman balance, or steelyard, consists of a bar of steel suspended near one of its ends, from which hangs the object to be weighed, while along the longer arm moves a weight used as a counterpoise. As the counterpoise is on the longer arm, a much smaller weight can balance a heavy object, and thus its use obviates the necessity of heavy weights — an advantage which leads to its employment in cases when it is necessary to move the weighing apparatus from place to place, or when the objects to be weighed (carts, wagons, etc.) are very heavy. The spring balance, or Salter's balance, has for its essential part a cylindrical coil of spring wire in a vertical case. From the lower end of the coil depends a hook supporting a scale-pan, and on the front of the case is an index-finger, which moves up and down a slot according to the strain put on the spring by the varying weights in the pan. A graduated scale is placed along the side of the slot, and the index at once shows the weight of any object put in the scale-pan. The spring balance becomes unreliable when frequently used. See Glazebrook and Shaw's *Practical Physics* (1893).



Common Form of Balance.

Fig. 1. Ordinary balance—*a*, knife edge, and *b*, polished plane, of steel or agate; *c*, pointer. Fig. 2. Steelyard. Figs. 3 and 4. Spring balance, interior and front view—*a*, spring; *b*, case; *c*, hook; *d*, scale pan; *e*, index-finger; *f*, scale.

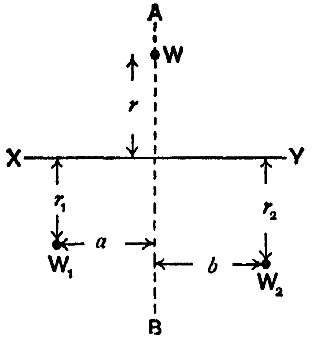
Balance of Power, a political principle implying such a distribution and opposition of forces among the nations forming part of one system that no state or combination of states shall endanger the rights or independence of any other state. It was this that Henry IV. of France and his great minister Sully had in view when, in 1603, they proposed the establishment among the European states of a *République très Chrétienne;* it underlay the arrangements of the treaty of Westphalia (1648), which was mainly directed against the growing power of the house of Hapsburg; and, again, it led to the European coalition against the aggressions of Louis XIV. of France, which received their final check in the treaty of Utrecht (1713). For the same reason Napoleon met with the desperate opposition of Europe, led by Britain; and the settlement effected by the peace of Vienna (1815) was based on calculations of the balance of power. To it also was due the coalition of Britain, France, Sardinia, and Turkey against Russia, which resulted in the Crimean war (1854). The influence of the same principle was operative in the Berlin Congress of 1878; and it may be traced in recent international arrangements, in which the power of the Triple Alliance (Germany, Austria, and Italy) has opposed to it that of the Dual Alliance (France and Russia), in the growing movement towards an English-speaking confederacy for the mutual protection of its members against foreign interference, and in the alliance of Britain and Japan for reciprocal support in the Far East. See Dilke's *The Present Position of European Politics* (1887); Hume's *Essays*, ii. 7.

Balance of Trade. See TRADE.

Balance Spring. See HOROLOGY.

Balancing of Machinery. In most machines the inertia of the moving parts originates forces which tend to cause the frame of the machine to vibrate as a whole. Such a machine is said to be unbalanced, and in the case of high-speed machinery it is often necessary to balance these forces wholly or partially by means of suitably disposed weights. A perfectly balanced machine, if hung up and set in motion, would not vibrate as a whole. Machines such as dynamos, turbines, and centrifugal pumps, whose moving parts consist of rotating masses symmetrically situated about the axis of rotation, are naturally in balance, and only require adjusting for errors due to slight lack of symmetry in the different parts; but in machines such as the steam-engine, having unbalanced reciprocating masses, it is impossible to obtain perfect balance as regards all the forces, and in practice a compromise has to be arrived at.

(1.) *Balance of Rotating Masses.*—Suppose it is required to balance a single weight W rotating about a shaft XY, and at a distance r from it.



This cannot be done by a single weight, since in practice it could not be placed opposite to W. Two weights, W_1 and W_2, will be required, in the plane of W and XY, and placed so that (a) the centre of gravity of W, W_1, and W_2 is on the axis XY; (b) the moments of the centrifugal forces of the three weights, about any axis perpendicular to XY, must balance. The first of these conditions ensures that there shall be no resultant centrifugal force parallel to AB, and is fulfilled if $W_1r_1 + W_2r_2 = Wr$. The second condition ensures the absence of a centrifugal couple tending to twist the machine about an axis perpendicular to the plane of the paper. Taking moments about AB as a convenient axis (any axis perpendicular to XY will do), the second condition will be fulfilled if $W_1r_1a = W_2r_2b$. It is obvious that this condition could not be satisfied by a single weight unless it were placed opposite to W.

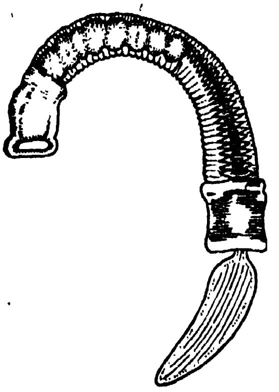
(2.) *Balancing of Reciprocating Parts.*—It is impossible to balance completely the reciprocating parts of an engine by means of revolving weights. If the connecting rod were infinitely long, then it would be possible by means of revolving weights to balance the piston rod, crosshead, and connecting rod, so far as regards forces in the plane of the engine; but the weights required to do this would produce an unbalanced centrifugal force in a plane perpendicular to the plane through the cylinders and crank shaft. In practice a compromise has to be effected, only from a half to three-quarters of the reciprocating mass being balanced in many cases.

In locomotives it is usual to balance the horizontal forces and couples. The balancing of the first prevents the engine from exerting a tugging action on the train, and balancing the second prevents oscillation; but the effect of the unbalanced vertical forces is to produce a hammer below on the rails, which has to be endured, as being the lesser evil. Some locomotive engineers balance the whole of the horizontal forces in this way, but often, in order to reduce the hammer below on the rails, only three-fourths of the reciprocating masses are balanced. The balance weight is usually cast on the driving wheels.

In inside cylinder engines, the coupling rods may be made to exert a considerable balancing effect by placing them in the proper position. In outside cylinder engines, where one end of the coupling rod is connected with the crank pin, the rod has to be considered as part of the reciprocating masses.

Balanga, tn. on the W. side of Manila Bay, Luzon, Philippine Is.; cap. of Bataan prov. Pop. (1898) 9,000.

Balanoglossus, a small (1-6″) worm found in sand and mud in the English Channel, the Mediterranean, and various other seas. Though insignificant in appearance, it has acquired much zoological importance from the fact that it is found to possess distinct gill-slits, like those of the lower vertebrates, and, more doubtfully, some other vertebrate characters. It has in consequence been placed in a class by itself—Hemichorda or Enteropneusta—and by some zoologists has been regarded as near the line of vertebrate ancestry. See Willey's *Amphioxus and the Ancestry of Vertebrates* (1894).



Young Balanoglossus (showing rudimentary gill-slits).

Balanophoraceæ, an order of fungus-like leafless plants in the sub-class Apetalæ, found in the equatorial zone, consisting of about forty species, all of them parasitic on the roots of trees.

Balapur, tn., Akola dist., Berar, India, 12 m. S.W. of Akola. Pop. (1901) 10,486.

Balashov, or Balashev, tn., Saratov gov., Russia, cap. of a dist., 84 m. w. of Saratov city. Grain trade. Pop. (1897) 11,245.

Balasinor, trib. Mohammedan state, Gujarat, Bombay, India. Area, 189 sq. m. Pop. (1901) 32,618. Also cap. tn., 23° N., 73° 24' E. Pop. (1901) 8,530.

Balasor, dist. at the N.E. angle of the Orissa div., Bengal, India; produces rice, and salt is manufactured by a crude process. Area, 2,068 sq. m. Pop. (1901) 1,071,197. The chief town and port, Balasor, 118 m. S.W. of Calcutta, was one of the earliest English settlements in E. India (1642). Pop. (1901) 20,880. There is an isolated peak of the same name (6,762 ft.) in the Western Ghats, Malabar dist., Madras.

Balas Ruby, or Precious Spinel, a precious stone, consisting of alumina and magnesia, which occurs in small crystals with eight triangular faces (octahedra), and is a little softer than the true ruby. The colour is red of various shades, the deeper being sometimes known as ruby spinel, and the lighter as balas ruby, though blue, violet, yellow, and colourless varieties are known. Burma and Ceylon are the principal sources of supply. See Streeter's *Precious Stones* (1898); Kunz's *Gems and Precious Stones of N. America* (1892).

Balata, a substance resembling gutta-percha, of a dirty reddish-brown colour, with a rather greasy feel, and obtained as an exudation from a tree in Venezuela and Guiana. It is sometimes made a substitute for gutta-percha, but is mainly used in conjunction with it, especially for driving-belts for machinery, composed of strong canvas coated with balata and gutta-percha. See Brannt's *India-rubber, Gutta-percha, and Balata* (1900).

Balaton, Lake, or Plattensee, a lake in the W. of Hungary, 47 m. long (N.E. to S.W.) and 7 m. to 9 m. broad; alt. 426 ft.; depth, 13 ft. to 36 ft. The lake has been thoroughly studied in every aspect—physical, biological, and anthropological—by the Hungarian Geographical Society.

Balausta, an old term for the fruit of the pomegranate.

Balayan, seapt. and bay, Batangas prov., on S.W. coast of Luzon I., Philippine Is. Pop. (1898) 24,747.

Balbi, Adriano (1782-1848), Italian geographer, a native of Venice, visited (1820) Portugal, and published *Essai Statistique sur le Royaume de Portugal et d'Algarve* (1822; 3rd ed. 1850), *L'Atlas Ethnographique du Globe* (1826), and an *Abrégé de Géographie* (1832; 8th German ed. 1893), which summarized all the geographical knowledge of his time.

Balbi, Gasparo, a Venetian jewel-dealer of the 16th century; travelled frequently to Aleppo, and once to India, where he remained from 1579 to 1588. He published (*Viaggio nelle Indie Orientali,* 1590) the first description of India beyond the Ganges.

Balbinus, Decimus Cælius, Roman emperor (prob. A.D. 238–239), was an aged senator who, along with Maximus, was appointed emperor on the death of Gordian and his son in Africa. The Prætorians put them both to death.

Balbo, Cesare, Count (1789–1853), Italian statesman and author, born at Turin. After acting under Napoleon as auditor of the Council of State, Paris, he entered the Piedmontese army, and took an active part, as a moderate liberal, in the establishment of a monarchy under the house of Savoy, his chief opponent being the republican Mazzini. He published *Storia d'Italia* (1830), *Vita di Dante* (1839); but his reputation as an author rests on his *Speranze d'Italia* (1843; 5th ed. 1855), in which he advocated the unity of Italy. See *Life* by Ricotti (1856).

Balboa, Vasco Nunez de (1475–1517), Spanish discoverer, born at Xeres, in Estremadura; accompanied Rodrigo de Bastidas in his voyage of discovery to the western seas (1501); discovered the Pacific Ocean (1513), and took possession of it in the name of the Spanish king. Jealousy on the part of his enemy Pedrarias Davila (whose daughter he had married) led to his execution.

Balbriggan ('town of Brecan'), mrkt. tn. and seapt. (small harbour), Balrothery par., Co. Dublin, Ireland, 21 m. N.E. of Dublin; long noted for the manufacture of fine hosiery. There is also a linen factory. Pop. (1901) 2,236.

Balbus, L. Cornelius, a Spaniard of Gades (Cadiz), who served under Pompey the Great against Sertorius, and received from him the Roman citizenship. In 56 B.C. he was prosecuted for having assumed the rights of a citizen contrary to law; was defended by Cicero, whose speech on the occasion is extant; and was acquitted. Cæsar entrusted him with his affairs at Rome during the civil war, and in 40 B.C. Augustus made him consul.

Balcarres. See Crawford and Balcarres, Earls of.

Balcescu, Nicolae (1819-52), Roumanian author, who greatly promoted the study of Roumanian history in the *Magazinul Istoric pentru Dacia:* he took a prominent part in the revolution of 1848, and died an exile at Palermo. His chief work is *Istoria Românilor sub Mihaiu-Viteazul* (1887).

Balchen, Admiral Sir John (1670–1744), British naval officer, made captain in 1697; was in command of the *Chester* in 1707 when she was captured while protecting a fleet of merchant ships. In 1709 he was again captured, while in command of the *Gloucester*, by Duguay Trouin's squadron. At Cape Passaro, in 1718, he was in command of the *Shrewsbury*. He was lost while returning in the *Victory* (110 guns), with about 1,200 souls, on the Casquet rocks, off Alderney, on Oct. 4, 1744.

Balcony, platform outside a window or windows, enclosed by balustrade or parapet, and usually supported on consoles or brackets. The balcony became popular in Southern Europe during the middle ages, and formed a feature of Renaissance architecture. The stone balconies of Italy are famous; they were usually uncovered, but those of France are sometimes canopied. The chalets of Switzerland and Germany owe much of their picturesqueness to their balconies. The iron balconies now common do little for the grace and dignity of a building. The term balcony is also applied to that part of a theatre between the dress circle and the gallery.

Baldachin. (**1.**) A canopy of silk cloth borne over the head of a dignitary (*e.g.* the Pope), especially in the East, sometimes also over the eucharist when carried processionally. (**2.**) The canopy of metal or stone, sometimes called *ciborium*, supported by pillars or suspended over the high altar, in the Eastern and Roman Churches, from which is suspended a vessel containing the host. That in St. Peter's at Rome is over 126 ft. high.

Balder, or Baldr, the central figure of one of the most significant of the Scandinavian myths, was the son of Odin and Frigg, the brother of Thor, and the husband of Nanna. When Balder complained to his mother that he suffered from evil dreams, Frigg exacted an oath from all nature, animate and inanimate, not to harm Balder, but did not require this pledge from the mistletoe, which was too young to take the oath. As Balder was now immune from harm, the gods amused themselves by throwing their darts at him. But Loki, who had found out about the mistletoe, persuaded Höd, the blind god of war, to shoot a dart made from that plant. The arrow pierced the heart of Balder, and he fell dead, his wife also dying of grief. At the request of Hermodr the Nimble, Hel promised to send Balder back to Asgard again if all nature should weep for him—an offer frustrated by the refusal of Thöck, the step-daughter of Loki. A fine poem by Sydney Dobell on the story of *Balder the Beautiful* appeared in 1854.

Baldissera, ALESSANDRO (1838), Italian general, born at Venice; entered the Italian army from the Austrian (1866). In 1888 he was appointed commander-in-chief of the Italian forces in Eritrea. After the death of John of Abyssinia he was recalled (Dec. 1889); but after the disaster at Adua he was again sent out to Africa, to replace General Baratieri (Feb. 1896), and opened negotiations for peace, which was concluded at the end of the year.

Baldmoney (*Meum athamanticum*), the only species of its genus (order Umbelliferæ), is found throughout Britain, but is not common. The flowers are yellowish white; the leaves look like dark-green feathers. The whole plant is strongly aromatic.

Baldness, or ALOPECIA, is the falling off of hair, of the beard and eyebrows as well as of the scalp. Alopecia may be congenital; commonly it is senile, and due to failing nutrition. Premature alopecia may begin at any age. The cause is often seborrhœa. A sharp attack of this disease is usually accompanied by other symptoms, such as greasy skin, oversweating, etc. Baldness often follows a severe illness such as enteric fever. It is a common result of erysipelas and of syphilis. Alopecia areata is a form of premature baldness due to the falling out of the hair from the follicles in an apparently healthy skin, resulting in patches of baldness surrounded by healthy hair; the margins of the patch show hairs in actual process of atrophy, due to a specific micro-organism. *Treatment.*—Wash the scalp frequently with a soap lotion; then, when the hair becomes brittle and the skin dry, an oil, to which sulphur, resorcin, or a salt of mercury has been added, should be rubbed into the skin. Ringworm, which is highly contagious, is often mistaken for some other cause of baldness. Bald spots in the young should therefore be shown early to a medical man. The light treatment is now being tried for alopecia, with encouraging results. See works cited under SKIN, DISEASES OF.

Baldric, a belt worn from either shoulder, and crossing the body diagonally; used as an ornament, or to sustain a sword, dagger, or horn.

Baldung, HANS (1476-1545), called also GRÜN or GRIEN, German painter and engraver. His best works are engravings on copper, marked by exaggeration and fantastic ornament. Of his paintings, in which the influence of Dürer is discernible, the chief are his *Coronation of the Virgin*, *The Crucifixion*, etc. (1513-16), which form the altar-piece of Freiburg Cathedral; the *Adoration of the Magi* (1507), now in Berlin; *Dance of Death* (1517), in Basel; a *Madonna* (1530), in Vienna; *Youth and Old Age*, in Liverpool. Reproductions of his drawings and paintings were issued by Terey in 1894-5 and 1897.

Baldwin, the name of nine counts of Flanders, of whom the most important are: BALDWIN I. (d. 879), surnamed *Bras de fer* ('Iron Arm'), who founded the countship; BALDWIN V. (d. 1067), *Le Débonnaire*, who was regent of France during the minority of Philip (1060-7), and assisted William of Normandy in his conquest of England; and the BALDWIN IX. mentioned below as first Latin emperor of Constantinople.

Baldwin I. (1058-1118), first Latin king of Jerusalem. Having taken part in the first crusade with his eldest brother, Godfrey of Boulogne, he succeeded, on the death of the latter in 1100, to the government of Jerusalem. He was succeeded by his cousin, BALDWIN II., who reigned from 1118-31. BALDWIN III., who reigned from 1143-62, was the pattern of all knightly graces. After his death the Latin kingdom grew weak before the attacks of Saladin. BALDWIN IV., the Leper, son of Amalric, who reigned from 1173-83, resigned in favour of his nephew, BALDWIN V., a child six years old, who was poisoned by his mother in 1187 to make way for her second husband.

Baldwin I. (1171-1205), first Latin emperor of Constantinople, took part, as ninth count of Flanders, in the fourth crusade, and in 1202 assisted Alexius to recover Constantinople from the usurper Alexius Angelus. Disappointed of the promised rewards, the Latins sacked the city and proclaimed Baldwin emperor (1204). He was taken prisoner by John, king of Bulgaria, while besieging Adrianople (1205), and died in captivity. His nephew, BALDWIN II. (1217-73), was proclaimed emperor of Constantinople in 1228, Jean de Brienne being regent during his minority. He was driven from Constantinople in 1261 by Michael Palæologus.

Baldwin, EVELYN BRIGGS (1862), American Arctic explorer; accompanied, as meteorologist, the Peary N. Greenland expedition (1893-4), the Wellman expedition to Franz Josef Land (1898-99), and was the organizer and leader of the Baldwin-Ziegler Polar expedition (1901), which, through internal dissensions, accomplished nothing, and returned to Norway in 1902. He is author of *Search for the N. Pole* (1903), and *Auroral Observations, Franz Josef Land* (1898-9).

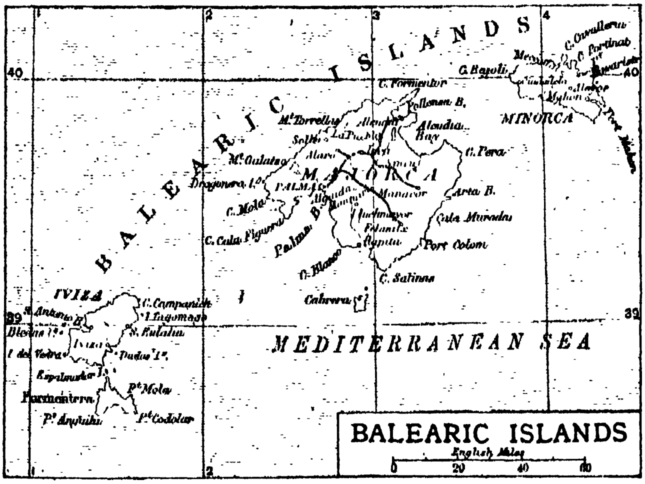
Baldwin, JAMES MARK (1861), American psychologist, born in Columbia, S.C.; studied in Leipzig, Berlin, and Tübingen; was professor of philosophy at Lake Forest University, Illinois, from 1887-9, and at Toronto University from 1889-93, when he was appointed to the professorship of psychology at Princeton. His chief works are *German Psychology of To-day* (1886), *Mental Development in the Child and the Race* (1895), and *Social and Ethical Interpretations in Mental Development* (1898).

Baldwin, ROBERT (1804-58), Canadian statesman, born in Toronto. He became a lawyer (1825), a member of the Upper Canada Assembly (1829), solicitor-general (1840), and premier and attorney-general of Upper Canada (1842-3 and 1848-51). He is regarded as the founder of the Reform party.

Baldwin Locomotive Works, North Bridge Street, Philadelphia, U.S.A., one of the leading railway engine-shops of the world, with an annual capacity of 1,500 locomotives. The works were founded by Matthias Baldwin, who built his first locomotive in Philadelphia in 1833.

Bâle, or BASEL (the common English form *Basle* is wrong). (**1.**) Canton, N.W. Switzerland, originally consisting of the city of Bâle; entered into full membership of the Confederation in 1501, and was divided (1833) into two portions—Urban Bâle and Rural Bâle. Area, 177 sq. m. Pop. (1900) 180,724, mainly German-speaking and Protestant. Rural Bâle is chiefly agricultural, but has 56 sq. m. of forests and 1,140 acres of vineyards. The N. frontier of the canton is formed by the Rhine. (**2.**) Capital of above, second in population and probably the richest of Swiss towns; consists of Great Bâle on S. bk. and Little Bâle on N. bk. of the Rhine. The former contains a 14th-century minster, a 15th-century town hall, and a university (founded 1460, and with about 500 students); the latter has a silk-ribbon industry. Metal and chemical industries; extensive works for obtaining electric power from the Rhine, and an important railway centre. Here Erasmus lived and died (1536). Anciently called Robur, the town took the name of Basilia in 374 A.D. Here were signed in 1795 two treaties of peace—(1) On April 5, whereby Prussia ceded to France all her territories on the l. bk. of the Rhine; (2) on July 22, whereby France restored the *status quo* of Spain, and received part of Santo Domingo. The Bâle Confession of Faith of the Swiss Reformed Church was promulgated here in 1534. The earthquake of 1356 destroyed most of the city. The great church council of Bâle (see below) sat in the choir of the minster. Pop. (1900) 109,161.

Bâle, COUNCIL OF (1431-43), was the last of the three reforming church councils held in the 15th century; but its decisions are not accepted by the canonists at Rome. It was summoned by Pope Martin V., but met under his successor, Eugenius IV. The chief object was to find some common ground for reconciliation with the Hussites, by promoting internal reforms in the church. Its reforming zeal was obnoxious to the Pope, who ordered it to dissolve. Eventually it came into such bitter opposition to the Pope that it voted his suspension from the functions of his office in 1438, declared him a heretic in 1439, and later in the same year elected a rival pope, Felix V. Its last session was held in 1443, by which time its power and influence had dwindled away; and in 1449, after the death of Eugenius and the resignation of Felix, the schism was ended by the general acceptance of Pope Nicholas V., who confirmed the acts of the council. See *Concilium Basiliense* (ed. Haller, 1896–1900).



Bale, JOHN (1495-1563), bishop of Ossory, was born at Cove, near Dunwich, in Suffolk, and held the living of Thornden, in Suffolk. Before 1534 he had adopted extreme Protestant opinions and taken a wife. From 1540 till after the death of Henry VIII. Bale lived in exile in Germany. Under Edward VI. he was made rector of Bishopstoke, and in 1552 bishop of Ossory. On the accession of Mary he fled to Basel, where he lived till 1559. He wrote the first literary history of England, *Scriptorum Illustrium Majoris Britanniæ Catalogus* (1548-59), and in English a number of interludes and morality plays, the most important being the historical play of *King John*. *Select Works of Bishop Bale* were published by the Parker Society in 1849, and his *King John* by the Camden Society in 1838. See Cooper and Thompson's *Athenæ Cantabrigienses* (1858-61).

Balearic Isles ('Slingers' Islands'), a prov. of Spain, consisting of Majorca, Minorca, Iviza, Formentera, and some smaller islets, in Mediterranean, 125 m. E. from the coast of Catalonia-Valencia. Originally dependencies of the Phœnicians and Carthaginians, they were conquered by the Romans in 123 B.C., by the Moors in 798 A.D., and by Jayme of Aragon (1229-32). From 1232 to 1344 they constituted the kingdom of Mallorca. Minorca was in British possession from 1713 to 1783. The inhabitants of these islands rendered valuable service as slingers in the ancient Carthaginian and Roman armies, and they get their name (Sp. *Baleares*) from the Greek *ballein*, 'to throw.' The climate is very fine; soil for most part sterile; mines rich, but little worked. There are busy manufactures similar to those of Catalonia, and the export trade is active. There is constant communication by steamer with Barcelona and Valencia. Cap. Palma. Area, 1,936 sq. m. Pop. (1900) 311,649. See *Die Balearen in Wort und Bild* (7 vols. 1869-90), a magnificently illustrated work by the Archduke Ludwig Salvator of Tuscany; Bidwell's *The Balearic Islands* (1876); Vouillier's *Les Iles Oubliées* (1893).

Baleen. See WHALEBONE.

Balestier, CHARLES WOLCOTT (1861-91), American novelist and journalist, born at Rochester, N.Y.; died at Dresden, Germany. He wrote a number of novels—*e.g.* *Benefits Forgot* (1894)—and collaborated with Rudyard Kipling, his brother-in-law, in *The Naulahka* (1892), published posthumously.

Balfe, MICHAEL WILLIAM (1808-70), Irish operatic composer, was born at Dublin. As a baritone vocalist, he was engaged (1826) by Rossini for the Italian opera at Paris. In 1835 he settled in London, and began to produce a long series of English operas, including *The Maid of Artois* (1836), *The Bohemian Girl* (1843), *The Daughter of St. Mark* (1844), *The Rose of Castile* (1857), *Satanella* (1858), and *Il Talismano* (1874). Balfe, who has been styled 'the English Rossini,' had a rich vein of melody which distinguishes all his compositions. A number of his songs, such as *Come into the Garden, Maud*, and *Killarney*, are still very popular. See *Lives* by Kenney (1875) and Barrett (1882).

Balfour, ARTHUR JAMES (1848), son of the late Mr. James Maitland Balfour of Whittinghame, Haddingtonshire, Scotland, and Lady Blanche Cecil, sister to the late Marquis of Salisbury, was educated at Eton and at Trinity College, Cambridge, of which he was made an hon. fellow in 1902. He entered the House of Commons, as member for Hertford, at the general election of 1874, and continued to represent that constituency until 1885. In 1878 he acted as Lord Salisbury's private secretary at the Berlin Congress. On July 12, 1902, on the retirement of his uncle, Lord Salisbury, he became prime minister and Lord Privy Seal, with the office of First Lord of the Treasury. Mr. Balfour was introduced to official life only so recently as 1885. Although he had at that date been a member of the House for eleven years, he had not hitherto actively interested himself in its affairs. He had an association, more or less occasional, with the historic 'Fourth Party,' but up to within twelve months of his first official appointment he was regarded 'at best as a parliamentary *flâneur*, a trifler with debate.' At the general election of 1885, which placed the Conservative party in power, Mr. Balfour was returned as member for E. Manchester (and again in 1886, 1892, 1895, and 1900). The Marquis of Salisbury then formed his first administration, and made his nephew President of the Local Government Board. Fourteen months later, when Lord Salisbury was again successful at the polls (1886-92), Mr. Balfour became Secretary for Scotland. Sir Michael Hicks-Beach was Chief Secretary for Ireland, but he retired, through ill-health, in March 1887, and Mr. Balfour was appointed to the office, and retained his seat in the cabinet. The period was one of great political excitement, disaffection, and unrest in Ireland. Mr. Balfour applied himself to the task of 'restoring the reign of law and order,' as he expressed it, with extraordinary vigour and resolution. His administration of the Crimes Act (passed in 1887) was of the most drastic, thorough-going character. Members of Parliament were put into prison (at the beginning of the session of 1888 nine Irish representatives were in jail), the Land League was 'proclaimed,' the 'Plan of Campaign' was declared an illegal conspiracy, meetings were suppressed and dispersed, and acts of disorder or lawlessness were repressed with an iron hand. All this provoked the bitter hostility and resentment of Mr. Parnell and his followers —who conceived for the chief secretary the sobriquet of 'Bloody Balfour'—and led to some of the stormiest and most exciting scenes the House of Commons has ever witnessed. But at least two remedial measures were passed into law by Mr. Balfour which have been of the greatest benefit to the country. These were the Light Railways Act (1889), and the Act creating the Congested Districts Board (1890); while his organization and administration of the Zetland Relief Fund (1891) extorted grateful recognition even from his bitterest political opponents. The other chief incidents of his secretaryship were the Parnell Commission (1888), the downfall of Mr. Parnell after the disclosures in the O'Shea divorce case (1890), and, as a direct consequence, the disruption of the Irish party. Mr. W. H. Smith, who had been First Lord of the Treasury and leader of the House of Commons since the meeting of Parliament on Jan. 27, 1887, died on Oct. 6, 1891, and Mr. Balfour was promoted to this responsible position, which he filled until the dissolution in 1892. In Lord Salisbury's third administration (1895-1900)—in the interval the alliance with the Liberal Unionists had been effected—Mr. Balfour resumed the leadership of the House of Commons as First Lord of the Treasury; and he was continued in this office when, in Oct. 1900, the general election, fought on the question of the S. African war, again gave the Unionist party an overwhelming majority. Mr. Balfour, who formed his first government in August 1902, was the principal minister in charge of the English Education Bill of that session, by which school boards were abolished, and both elementary and secondary education were placed under the control of the local authorities; and of the London Education Bill of 1903, which transferred the work of the school board to the county council. In 1903, when Mr. Chamberlain resigned and raised the fiscal question, Mr. Balfour expressed agreement with his proposals, but held that the country was not ripe for the taxation of food. Subsequently he committed the government to a policy of retaliation, and repudiated the title of protectionist. (See Tariff Reform.) In 1904 he spoke frequently and strongly on the Licensing Bill, the most important measure of the session. During the same year he presided at the British Association meeting at Cambridge, and delivered an address, 'Reflections suggested by the New Theory of Matter.' He is the author of *A Defence of Philosophic Doubt* (1879), *Essays and Addresses* (1893), and *The Foundations of Belief: being Notes introductory to the Study of Theology* (1895), and *Economic Notes on Insular Free Trade* (1903). Mr. Balfour is an enthusiastic golf player.

Balfour, Edward Green (1813-89), surgeon-general in the British army, born at Montrose. His great achievement is *The Encyclopædia of India* (1857), in five volumes.

Balfour, Francis Maitland (1851-82), Scottish embryologist, brother of the Right Hon. A. J. Balfour, was appointed lecturer on animal morphology at Cambridge (1876). In 1882 a special professorship was instituted for him, but an Alpine accident cut short his promising career. His fame rests on his work, *Comparative Embryology* (1880-1), though he also wrote *On the Development of Elasmobranch Fishes* (1878), and, with Michael Foster, *Elements of Embryology* (2nd ed. 1883).

Balfour, Gerald William (1853), President Local Government Board (1905), younger brother of the Right Hon. A. J. Balfour, entered Parliament at the general election of 1885, for the central division of Leeds (re-elected 1886, 1892, 1895, 1900). In the third Salisbury administration (1895-1900) he was made Chief Secretary for Ireland, without a seat in the cabinet. His policy aroused great resentment among the Irish landlord party. His Land Bill (1895) had a stormy passage, and local government was extended to Ireland in 1898, when a large grant was made to the landlords under the Tithe Rent Charge Bill (1900). Mr. Gerald Balfour's establishment of a department of agriculture and technical instruction met with the approval of all parties in Ireland (1899). In 1900, on the formation of Lord Salisbury's fourth government, he was transferred to the English Board of Trade, with a seat in the cabinet. The principal legislative results of his occupancy of this post were a reform of the Patents Acts (1902); the Port of London Bill (1903), by which the London docks were transferred from private ownership to a public trust; and the Sugar Convention Bill (1903), to give effect to a convention entered into at Brussels for the abolition of foreign sugar bounties.

Balfour, Isaac Bayley (1853), professor of botany at Edinburgh University since 1888, son of John Hutton Balfour, who held the same chair (1845-79), was educated at Edinburgh; elected to the chair of botany at Glasgow (1879), where he remained until appointed Sherardian professor of botany at Oxford in 1884. He has published monographs on the flora of Rodriguez (1879) and of Socotra (1888), and edits (since 1887) the *Annals of Botany.*

Balfour, Sir James (d. c. 1583), of Pittendreich, Scottish lawyer and statesman, son of Sir Michael Balfour of Mountquhanie, Fifeshire. For his share in the plot against Beaton he was sent (1547) with John Knox to the French galleys. On his return (1549) he became one of the most shameless political intriguers of his time, frequently betraying both Queen Mary's party and that of her opponents. He succeeded in securing the execution of Morton for the murder of Darnley, in which he himself was almost as deeply involved as Bothwell. In 1561 he was appointed lord president of the Court of Session. He had a partial connection with Balfour's *Practicks, or A System of the most ancient Law of Scotland.*

Balfour, Sir James (1600-57), Scottish Lyon King of Arms, antiquarian and historian, was the eldest son of Sir Michael Balfour of Denmiln, Fifeshire. His *Annals of Scotland*—mainly valuable for their genealogical details and their account of contemporary events—were published in 1837. See *Memoir* by James Haig (1825).

Balfour, John (d. 1688), third Lord Balfour of Burleigh, is sometimes confused with John Balfour of Kinloch, the Covenanter, the principal actor in the assassination of Archbishop Sharp in 1679 —the latter having been wrongly designed 'John Balfour of Burley' by Scott in *Old Mortality.* He succeeded his father in the title in 1663. See Anderson's *Scottish Nation.*

Balfour, John Hutton (1808-84), Scottish botanist, was born at Edinburgh; graduated M.D. in 1832. He founded the Botanical Society of Edinburgh in 1836, and in 1840 began to deliver lectures on botany in that city. In 1841 he succeeded Hooker as professor of botany at Glasgow, and in 1845 succeeded Graham in Edinburgh, becoming also regius keeper of the Royal Botanic Gardens and queen's botanist for Scotland.

The Right Hon. A. J. Balfour.

(Photo by Beresford.)

Balfour of Burleigh, LORD (1849). Alexander Hugh Bruce, in whom the attainted title of Baron Balfour of Burleigh (created 1607) was restored by Act of Parliament in 1869, is a representative peer for Scotland, elected in 1876. In the Marquis of Salisbury's second administration he succeeded (1889-92) the Earl of Onslow as parliamentary secretary to the Board of Trade. In the Unionist government of 1895-1900 Lord Balfour of Burleigh became Secretary for Scotland, with a seat in the cabinet, and was continued in that office when the Marquis of Salisbury was again returned to power in October 1900, and on the formation of Mr. Arthur Balfour's first administration in July 1902, but resigned his position in September 1903, in consequence of differences existing in the cabinet on the question of fiscal reform. The principal legislative fruits of his secretaryship have been the codification and amendment of the Public Health Acts of Scotland (1897), the establishment of the Congested Districts Board for Scotland (1898), and an important reform of the procedure relating to the promotion of Scottish private bills (1899). The administrative results include a reorganization of the system of imperial grants for education, the transfer of science and art grants from South Kensington to the Scotch Education Department, and the systematizing of the inspection of higher education in Scotland. Lord Balfour has been associated, either as chairman or member, with many of the most important royal commissions (*e.g.* of the Metropolitan Water Supply Commission in 1893-4) which have sat since 1874, and has acted as arbiter in such considerable disputes as those between the London and North-western Ry. Co. and the Manchester Ship Canal Co., the Great Central Ry. Co. and the Eyre Estate, and St. Bartholomew's Hospital and Christ's Hospital.

Balfrush, BALAFRUSH, or BARFRUSH (Pers. *Barfurush*), tn., Persia, prov. Mazanderan, separated from the cap., Teheran (95 m. S.W.), by the Elburz Mts. It is an important commercial (provincial) centre, with a considerable trade in silks and cotton. Pop. 50,000 to 60,000.

Bali, or LITTLE JAVA, island (Lesser Sunda group) of Dutch E. Indies, immediately E. of Java. Its centre consists of volcanic mountains 7,500 to 10,500 ft. (Gunong Agung). Its climate, vegetation, and native population resemble those of E. Java. Dutch rule was established in 1849. The Siboga expedition (1899) ascertained that a submarine threshold, only 1,020 ft. from the surface, connects Bali with Lombok, thus disposing of the well-known 'Wallace's line.' Area, 4,063 sq.m. Pop. (1899) 1,044,757. See *Scot. Geog. Mag.*, 1900, pp. 44-46.

Bali, or BALLY, tn. on the Hugli, 4 m. N. of Howrah, Bengal, India. Pop. (1901) 18,662.

Balihri, tn., Jabalpur dist., Central Provinces, India; once a flourishing city, 24 m. in circumference, and filled with temples to which pilgrims flocked from all parts of India.

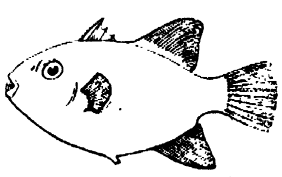
Balikesri, BALAK-HISSAR, or BALIK-SHEHR, tn., 75 m. S.W. of Brusa, Asia Minor, on a fertile plain; has a large fair on August 15. Pop. 15,000 to 20,000.

Balin and **Balan,** two brothers, knights, who came to Arthur's court. Balan went away on an adventure; but Balin, remaining behind, overheard a love passage between Lancelot and the queen, and rode away, mad with the discovery. The two brothers met abroad, and, not recognizing one another, fought, and slew each other. See Tennyson's *Idylls of the King* (1869), Swinburne's *The Story of Balin* (1896), and Malory's *Morte d'Arthur* (Globe ed. 1868).

Balinag, tn., prov. Bulacan, Luzon, Philippine Is. Pop. (1898) 11,122.

Baliol, THE FAMILY OF, a wealthy family owning in Normandy the lands of Bailleul, Nyvelle, Harcourt, and other fiefs, prior to the Norman conquest. GUIDO DE BALIOL, who crossed with William I., received from William Rufus large estates in Durham and Northumberland, and his successors took an active part in Border warfare. One BERNARD DE BALIOL (fl. 1135-67) did homage with David I. of Scotland to the Empress Matilda, daughter of Henry I. (1135), but joined King Stephen's party (1138). He was taken prisoner at Lincoln (1141).—JOHN DE BALIOL (d. 1269) was regent of Scotland during Alexander III.'s minority, and founded Balliol College (1263). He married Devorguila, one of the daughters of Alan of Galloway, constable of Scotland, by Margaret, eldest daughter of David, Earl of Huntingdon, brother of William the Lion. JOHN DE BALIOL (1249-1315), king of Scotland, was third son of John de Baliol. On the death (1290) of Margaret, the Maid of Norway, grandchild of Alexander III., he claimed the throne of Scotland in right of his maternal grandmother, Margaret, eldest daughter of David, brother of William the Lion. Edward I. of England, a self-nominated arbiter, adjudged the throne to Baliol, and he was crowned at Scone (1292). The allegiance that he swore to Edward as overlord soon became intolerable, and after a revolt he was compelled to abdicate, and was imprisoned (1296); liberated (1299); died at Castle Galliard, Normandy (1315).—His son, EDWARD DE BALIOL (d. 1363), king of Scotland, invaded Scotland at the head of the barons displaced by Bruce, and, landing at Kinghorn, Fife, defeated and slew the regent Mar at Dupplin Moor (1332), and was crowned at Scone; did homage to Edward III., to whom he subsequently surrendered ancient Lothian; compelled to take refuge in England from Scottish patriots under Sir Andrew Murray and Earl of Moray (1334); restored by Edward III.'s aid (1335); surrendered the kingdom of Scotland to Edward III. (1356) in return for a pension of £2,000; and died at Doncaster (1367), the last of his race.

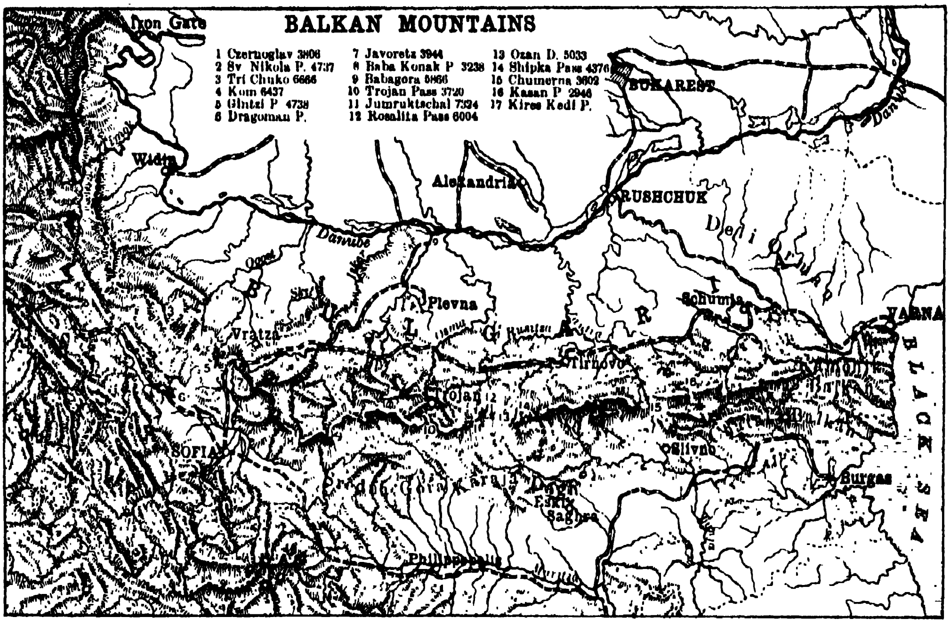
Balistes, FILE-FISH, or TRIGGER-FISH, a genus of bony fish, including tropical or sub-tropical forms, which have the dorsal fin supported by three spines. The first spine is very strong, is roughened like a file, and is locked to the second so that the two can only be raised simultaneously. The body is covered with small, rough scutes, and eight strong teeth are present in both jaws. The diet consists of hard-shelled molluscs and corals.



Balistes.

Balize. See BELIZE.

Balkan Peninsula, or ILLYRIAN PENINSULA, the most easterly of the three great Mediterranean peninsulas of S. Europe, stretching southwards from the Danube and its tributary the Save as a broad quadrilateral, having the Black Sea on the E., the Sea of Marmora and the Ægean Sea on the S.E. and S. respectively, and the Adriatic on the W. The Bosporus connects the Sea of Marmora with the Black Sea, and the Dardanelles continues the waterway to the Ægean Sea. The peninsula of the Chalcidice is mountainous and deeply indented. The coasts of the secondary peninsula formed by the Greek extension are lofty and mountainous, and deeply cleft by long indentations, forming good harbours. The Adriatic coast is flat to the mouth of the Drin; thence N. to Fiume it is mountainous, and scalloped into a complicated series of peninsulas, with a parallel fringe of islands, due to the 'drowning' of a folded mountain region.



The term Balkan Mountains (anc. *Hæmus; cf.* Cape Emine) is loosely applied to the whole mountain region of the N., but specifically to the range (Turkish, *Khoja* or *Koja*) which sweeps round from the Iron Gates of the Danube, where it is continuous with the Carpathians, first S., then E. to Cape Emine, on the Black Sea, shutting in the lower plain of the Danube on the S. The section which occupies E. Servia consists of limestone ridges rising to 6,500 ft., alternating with ranges of crystalline schist yielding iron, lead, and copper ore. The Central Balkans form a long and nearly uniform ridge running E., with dome-like summits, reaching in Yumrukchal 7,790 ft., and clad on the flanks with forests of oak, beech, and fir. Bordering this central ridge on the N., and continuing the mountain region E. after the main ridge has disappeared, are the E. Balkans, with gradual slopes to the N., but steep declivities to the S., sinking to a series of intermont basins, the most important being that of Sofia, from which the Isker R. flows N. to the Danube, breaking through the Balkans in a narrow gorge. South of these basins are several mountain masses, such as the Anti-Balkans, which overlook the valley of the Maritsa, the most considerable stream of Turkey proper. On its way to the Ægean Sea this river circles round the E. extremity of the gigantic wall of the Rhodope Mts., buttressed by the peaks of Muss-Alla (9,615 ft.) and Rila Dagh (8,790 ft.), between which rises the great syenite mass of Vitosa (Vitosha), 7,515 ft.

Important factors in the political, social, and economic development of the peninsula are the passes, many of which are mere tracks for baggage animals. The great historic highway ('Diagonal Furrow') from Belgrade, on the Danube, to Constantinople, follows the valley of the Servian river Morava to the basin of Sofia, and then proceeds along the valley of the Maritsa. At one point near the basin of Sofia the mountains approximate so closely that the Romans were able to barricade it with a thick wall (Trajan's Gate). The modern railway which follows this route avoids the gorge by ascending a side valley. Communication with the upper valley of the Nisava (Nishava), the principal tributary of the Morava, is facilitated by the Pass of Dragoman (2,380 ft.); the Pass of Vladaja (2,980 ft.) gives access to the valley of the Struma, the Pass of Güveshevo to the valley of the Vardar, the Pass of Ginci (Gintsi) to the Danube at Lom Palanka, the Baba Konak Pass to Plevna. The Shipka Pass, strategically important, crosses the Balkans, and connects Kazanlik with Tirnova. The two highest passes over this range are the Rabanica (6,285 ft.) and the Rosalita (6,160 ft.).

The west of the peninsula is occupied by the broad folds of the Dinaric Alps, the main chain of which (N.W. to S.E.) separates Dalmatia from Bosnia and Herzegovina. The chains show the peculiar features of the karst region, the loftiest peak being Mt. Dinara (6,010 ft.), a dazzling mass of hippurite limestone.

The proximity of the mountains to the W. coast makes the rivers short, rapid, and useless for transport. On either side of the Chalcidice peninsula are the Vardar and the Struma, which flow to the Ægean Sea, and have built up deltas, but are of little use for navigation, the Maritsa being the only navigable stream. The only river entering the Black Sea is the Danube.

The centre and the E. coast as far S. as the Bosporus have a climate intermediate between that of Central Europe and the S. of Germany—the winter temperature often sinking below zero F.; the summer temperature resembling that of the S. of France. June is the wettest month, but rain is fairly general throughout the year. The Ægean coast has a Mediterranean climate; and the Adriatic coast, with its heavy rainfall, has a January temperature 7° F. higher than that of the E. coast. The higher inland parts have a semi-continental climate, with a considerable range between the summer and winter mean. In Bosnia snowfalls and frosts sometimes occur as late as the middle of May at 1,500 ft. Typical Mediterranean vegetation is luxuriant along the whole W. coast, poorly developed in the S., and wanting in the interior, where the flora of Central Europe is predominant. The wolf and the bear are found in the mountains; the jackal, the buffalo, and the Oriental fat-tailed sheep in the S. plains.

The Balkan Peninsula (omitting Greece) is occupied by five states (since 1878): (1) Dalmatia, Bosnia, Herzegovina, politically attached to Austria; (2) Montenegro, a small but independent principality; (3) Kingdom of Servia; (4) Principality of Bulgaria; (5) Turkey. See Fischer's *Die drei südeuropäischen Halbinseln*, in Kirchhoff's *Unser Wissen von der Erde* (1893); E. de Laveleye's *La Péninsule des Balkans*, 2 vols. (Eng. trans. 1887); Reclus's *Géographie Universelle*, vol. i. (1876); Tuma's *Die östliche Balkanhalbinsel* (1886); and Lux's *Die Balkanhalbinsel* (1887).

Balkh, or BACTRIA. (1.) Province of Afghan Turkestan, Central Asia, subject to the Ameer of Afghanistan; extends 250 m. E. to W. between 63° and 69° E., and for 120 m. N. to S. between 37° and 35° N. Its climate is unhealthy. The Bactrian camel gets its name from this province. (2.) Capital of prov., on the Balkh R.; once 'the mother of cities' and a centre of trade between India, Persia, China, and Central Asia, now in ruins. It is a place of great antiquity, famous as the cradle of Zoroastrianism; indeed, Zoroaster is said to have been born and to have died at Balkh (anc. *Bactra*). Between the 7th and 12th centuries it was a centre of Buddhism, and seems (from Sven Hedin's and Stein's discoveries) to have extended its influence as far as the now sand-buried cities of E. Turkestan. It was sacked by Jenghiz Khan in 1220. The capital was removed to Mazar-i-Sherif, 10 m. E., in 1877. Pop. about 15,000, mostly Uzbegs.

Balkhan Mountains, GREAT and LITTLE, a calcareous chain on the E. side of the Caspian, S. of Aji Daria Bay, between 39° and 40° N. lat. The highest point towards the S. extremity of the range is about 3,300 ft.

Balkhash, a slightly salt lake lying above sea-level between 45° and 47° N. lat. and 73° 30′ and 79° 20′ E. long., in Russian Central Asia. Its circumference is 1,060 m.; length, 340 m.; extreme breadth, 53 m. (in the northern part never more than 15 m.). Its depth never exceeds 66 ft., and consequently, though its area is thirty-two times that of the Lake of Geneva, its volume is only twice as great. Its area has greatly decreased in recent times, but its elevation (900 ft.) is too great for it to have formed one water with the Aral.

Balkis, the name given in the Koran to the Queen of Sheba.

Ball, GAMES OF. That these are of high antiquity is shown by their mention as part of the daily life of the Greeks and Romans in classical times. The balls used in Greece were usually of leather, and hollow. The Romans used, among other kinds, balls stuffed with hair (*pila*). Forms of football and polo appear to have been known in quite early times. Lawn tennis is the lineal descendant of the *jeu de paume*, which was so popular an amusement at the French court. The American game of lacrosse originated among the American Indians; and football is so widespread that its origin is impossible to trace. See special articles on the various ball games.

Ball, JOHN (d. 1381), a priest who fomented the insurrection of Wat Tyler, was hanged, drawn, and quartered at St. Albans. See C. E. Maurice's *Eng. Pop. Leaders* (1872-5).

Ball, JOHN (1818-89), became Under-Secretary of State for the Colonies (1855); was first president of the Alpine Club (1857); published the *Alpine Guide* (1863-8; new ed. 1903), and wrote various works on the Alpine flora and glaciers, and *Notes of a Naturalist in S. America* (1887). See *Jour. of Botany* (1889), and bibliog. in *Annals of Botany*, vol. iii. (1889).

Ball, JOHN THOMAS (1815-98), Irish lawyer, born in Dublin; M.P. for Dublin University (1868); solicitor-general (1868) and attorney-general (1868 and 1874) for Ireland; lord chancellor of Ireland (1875-80), and vice-chancellor of Dublin University (1880-95). He was author of *The Reformed Church of Ireland* (1886), and *Hist. Rev. of the Legislative Systems in Ireland* (1888), praised by Lecky for its 'clearness and its perfectly judicial impartiality.'

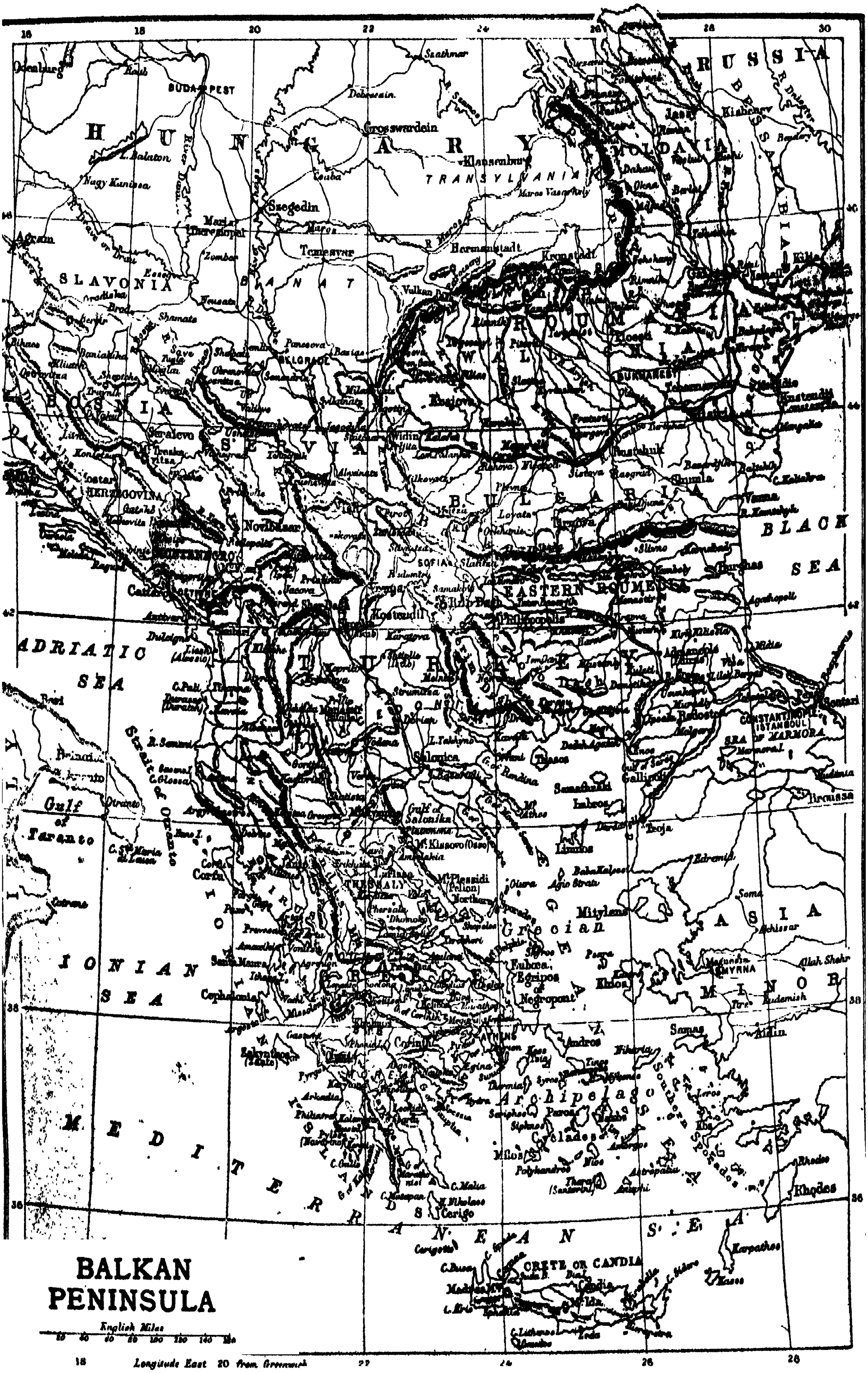
Ball, SIR ROBERT STAWELL (1840). After graduating at Trinity College, Dublin, he was appointed, in 1865, astronomer to the Earl of Rosse; in 1867, professor of applied mathematics to the Royal Irish College of Science; and in 1874, astronomer-royal of Ireland. Sir Robert became widely known by his power of popularizing science, and by the publication of *Atlas of Astronomy* (1892), *Story of the Heavens* (1885), *Time and Tide* (1889), *Story of the Sun* (1893), *Treatise on Theory of Screws* (1900), etc. In 1892 he was appointed Lowndean professor of astronomy at Cambridge University and director of the observatory, and in 1897 president of the Royal Astronomical Society. He was knighted in 1886.

Ball, THOMAS (1819), American sculptor, after meeting with some success as a singer and painter, devoted himself to sculpture about 1852. From 1865 to 1897 he resided in Florence. Among his works are the statue of Daniel Webster in the Central Park, New York, and the statue in bronze of Washington in the public garden of Boston. In 1891 he published *My Threescore Years and Ten*.

Ballachulish, a straggling village, Argyllshire, Scotland, on S. shore of L. Leven, 16 m. S.W. of Fort William, and extending to the wild and historic Glencoe. Famous slate quarries, opened in 1760. Railway from Connel completed 1903. Pop. (1901) 1,143.

Ballad (Fr. *ballade*) is derived, according to Littré, from *baller, danser*. Thus, etymologically speaking, the ballad was originally a song chanted as an accompaniment to the dance. This fact gives to ballads a primeval antiquity and a non-literary origin; that is to say, the dance songs of early peoples were not composed by professional minstrels, who did not exist in primeval stages of society. We are acquainted with no race more primitive than the Australian aborigines, whose stone implements are on the line between the Palæolithic and the Neolithic. This people, in its corroborees, magical, religious, or secular, accompanies the dance with song. These ditties, if admired, are transmitted, as part of the dance, across the continent, reaching tribes to whom the words of the song are partially or wholly unintelligible. The song also accompanies the dance among other savage peoples, American and African, and it holds its old place in the dance games traditional among English children; while we have abundant mediæval evidence of the existence of the dance song in Scotland, France, and Europe generally. (See Léon Gautier's *Les Epopées Françaises*, 2nd ed. 1865-8.) The ballad, like the popular tale (*märchen*), is, as a dance song, an invention of the folk, with savage origins and direct modern survivals.

The word 'ballad,' however, has long lost the special sense of a dance song. As early as 1568 the poems in fourteen lines each, said to have been addressed by Mary Queen of Scots to the Earl of Bothwell, were spoken of indifferently as 'sonnets' or 'fond ballads.' Knox talks of the 'ballatis' made against the four Marys; and if the famous ballad of *The Queen's Marie*, or Mary Hamilton, be a survival of one of these, then the word, about 1564, was used, on this occasion, of a popular narrative poem, whether written by a man of the people, a courtier, or a Puritan. The early 'gude and godly ballatis' are popular songs, travestied for purposes of religious edification in the time of



BALKAN
PENINSULA

Knox. The ballad, in short, is a popular form of verse, often adapted, during the last four centuries at least, to the purposes of educated men of letters. The verse, as a rule, runs in this measure,—

> **'The king he writ a letter then,**
> **A letter which was large and long;**
> **He signed it with his own hand,**
> **And he promised to do him no wrong.'**

The precise date of the evolution of this form of verse is of no great importance as regards the question, 'Are the ballads of popular or of literary origin?' All races have had their purely popular dance songs and other songs, composed for the people by members of the people, not professional minstrels. Before the extant forms of ballad verse arose, there must have been other shapes of popular songs, to which the now familiar shape succeeded.

Many writers on the old ballads regard them as, in origin, the composition of professional minstrels, not courtly attendants on kings and earls, but wanderers with viol and rebec, who chanted at street corners or in rural halls and cottages. These minstrels (whose historical existence is certain) are supposed to have vulgarized and degraded the literary romances and heroic poems on knightly deeds. It is denied, even with mockery, that ballads were composed 'by the people for the people,' and it is pointed out that 'the people' (of modern European cities) have not the necessary taste and culture for the task.

There is some truth, but perhaps more of error, in this argument. It is true that several old ballads are vulgarizations of known literary romances. An example is *King Arthur and King Cornwall* (Child's *English and Scottish Ballads*, new ed. 1882, part ii. pp. 274-288). Here we find 'apparently an imitation, or a traditional variation, of Charlemagne's Journey to Jerusalem, a *chanson de geste*.' Now a *chanson de geste* is a long, formal literary French epic, which, with other elements, has been Anglicized, vulgarized, and abbreviated (by a professional minstrel, probably) into the ballad of *King Arthur and King Cornwall*. There are many such examples, especially in the Arthurian ballads. As far as all this goes nothing can well be more certain than the literary and professional origin, and relatively degraded character, of this class of romantic ballads. But when we examine the contents of the *chanson de geste*, and of the ballad of similar character, we find that the ideas on which both are based, the ideas which both have in common, are often popular and ancient. The general notion of a story, the ground idea, may occur in *The Arabian Nights;* the perilous tasks are the theme of *märchen* (popular tales) even among the rudest and remotest tribes of savages. Before the time of Homer, and long before the time of Pindar, this theme had been borrowed by professional Greek minstrels from Greek popular tradition, a form of which occurs in the native mythology of remote Samoa.

Now, it must be remembered that this is the usual course of evolution in literature. First we have the purely popular elements or factors. These are ideas, often of magic, and concerning animals gifted with human personality, or romantic incidents based on savage manners. These ideas occur equally in the tales of savages, in Greek and Scandinavian epic, in rustic popular tales, and popular ballads. The notions, like the particles of glass in the kaleidoscope, fall into innumerable combinations; but the notions, the story roots, the incidents and situations, are in many cases the flowers of savage fancy. As civilization advances, these story roots are inherited by the peasantry, among whom they even now survive in rural districts of England and Scotland. By-and-by a clan of professional bards and minstrels is developed. They go for their materials to the great popular stock of story roots, which they weave into rhapsodies, lays, epics, romances, *chansons de geste*, and so on, attributing adventures, whose heroes were originally anonymous, to legendary or historical personages—Jason, Odysseus, Charlemagne, Arthur, Sigurd, and so on. Then a poor wandering but still professional and rudely literary minstrel may take hold of, abbreviate, and vulgarize the new aristocratic lay, epic, romance, or *chanson de geste* to suit the taste of his humble audiences. The result will be a ballad, like *King Arthur and King Cornwall*, degraded from an aristocratic *chanson* or romance. But the *fond*, the story roots, is of perhaps primeval popular origin.

Once more, it frequently occurs that while a given set of primeval story roots, or even a given sequence of these in a definite order, is borrowed by Homer, Pindar, a romance writer, or an author of *chansons de geste*, and is adapted to familiar legendary or historical characters, the same story (without the embellishments, and without the newly-added attribution to Charlemagne, Arthur, or Sigurd) survives, as a mere *märchen* or popular tale, among the people. If, then, a man of the people, a rhymer, takes up the old popular *märchen* and versifies it as a ballad, we shall possess (1) the artistic, literary, aristocratic epic or romance; (2) the inartistic, unprofessional popular ballad; (3) the popular tale, which is the origin of both the others. Thus the literary composition and the ballad will possess the same foundation, situation, and incidents, but the ballad (unlike the case of *King Arthur and King Cornwall*) will *not* be a degradation of the professional artistic poem or romance; it will be merely a popular versification of a popular tale which has also been used by some artistic poet. A scientific criticism ought, therefore, to analyze the romantic ballads in the late Professor Child's vast collection, and distinguish between ballads degraded by humble professional minstrels and artistic romances and ballads based by some non-professional rhymer on data of *märchen* not now known to exist in the form of artistic romance. The class of ballads clearly derived direct from peasant *märchen* may also be contrasted with artistic romances and lays which have the same basis. The results will probably be capable of statement thus:—

Primeval Märchen.
|
Popular Ballad. Artistic Romance.
|
Ballad degraded
from Artistic
Romance.

In certain cases, in Africa (Zanzibar), as in Scotland and France, and among the Red men of North America, there exists the combined *volkslied märchen*, the narrative told in alternating passages of verse and prose. The famous *cante-fable* of *Aucassin et Nicolete* is the only surviving example of the mediæval artistic and literary use of a form popular once of old in Scotland, as it still is in Africa and elsewhere. See Steere's *Swahili Tales* (2nd ed. 1889); Miss Fletcher's *Indian Story and Song from N. America* (1900); R. E. Dennett's *Folklore of the Fjort* (1898).

Among romantic ballads which do not seem to be degradations of literary and professional compositions may be noted *Clerk Sandars*, *May Colvin*, *The Wife of Usher's Well*, *Tamlane*, *The Bonny Hind*, *The Elphin Nourice*, *Willie's Lady*, and many others. *Thomas the Rhymer*, the Arthurian ballads, and others, seem more probably to be vulgarizations of romances which, in the last resort are often based on popular data. A reader who wishes to understand the come and go, the warp and woof of influences popular and artistic in the ballad can hardly do better than read Professor Child's introduction to that of *Lord Bateman* or *Susie Pye.* Here we have ancient story roots of nearly universal diffusion, we have an early mediæval literary element, and we can trace the ballad to its very dregs in the *modern* popular versions of the workhouse and the tavern in the slums.

The method of criticism of ballads here indicated is that of the whole neglected study of popular literary origins. The method has been applied to the epic and to the drama, but, as a rule, critics of the history of epic and drama have not been familiar either with European peasant poetry or with the oral literature of savage and barbaric races. Yet this knowledge is as indispensable to the student of the evolution of literature as the knowledge of savage and barbaric institutions is to the student of the growth of human society. Meanwhile theories of the ballad which rest only on a knowledge of artistic and professional literature cannot be adequate, cannot hold their ground. Nobody can dogmatize about the share of the folk in the ballads unless he is widely read in the oral literature, in verse and prose, of Red men, Africans, Australians, Maoris, and European peasants.

We have spoken of romantic ballads. The next largest and most important species is that of the historical ballad. A resounding event like the battle of Otterburn would inevitably become the subject of popular song, as, much earlier, we know, did the defeat of the rear-guard of Charlemagne, under Roland, at Roncesvalles. The historical ballads, in their earliest oral form, are lost; what we possess are but echoes, contaminated with many modernisms in their passage through the lips of several generations of reciters. We cannot go to the ballads for history, only for historical legend. We cannot be certain whether the ballad of *Johnnie Armstrong* is the source of Pitscottie's account of that hero, or whether Pitscottie is the source of the ballad, or whether both rest on similar local traditions. Events of the 14th century and early 15th leave their traces in ballads, but the ballad may have been vastly altered in the course of recital. The ballad-maker always introduces romantic motives, love affairs, and domestic treasons, which probably never occurred, while the persons of the story are socially promoted. Local, clannish, and family jealousies find expression, and ancient story roots are accommodated to the tale, and fitted with local habitations beside Ettrick or Yarrow. Examples of all these contaminations occur in *Tamlane*: in the snatch on the slaying of the Knight of Liddesdale; in the fragment on the judicial murder of the Douglases under James II.; in *Mary Hamilton* (where a French waiting-woman becomes the queen's Marie, and an apothecary wears the shadowy crown of King Henry—*i.e.* Darnley); in *The Bonny Earl Moray;* in late things like *The Outlaw Murray*, *Philiphaugh*, *Bothwell Brig*, the lay of *Robin Og Macgregor*, and so on, till the death of the popular ballad. It is impossible to be dogmatically certain as to how much *Kinmont Willie* owes to Sir Walter Scott. *Auld Maitland* (a ballad on an affair of the 13th century) is rejected as a forgery by Professor Child. But popular ballads on the theme existed, beyond doubt, in the 16th century. The only conceivable forger is James Hogg, about 1802; and at that date how could Hogg, an utter rustic, get access to manuscript materials lying in Edinburgh University library? The space filled by this article would not be too long for an attempt to solve the mystery of *Auld Maitland*, and the attempt would be inconclusive. *Jamie Telfer* is only less puzzling; and a volume would scarcely hold the learning on the Robin Hood ballads. The student will soon discover that many variants of ballads, especially in England, have lost pith and merit in the hands of lowly hacks who prepared them for the broadsides of the cheap press.

While there are many interesting collections Ramsay's, Percy's, Sir Walter Scott's the amateur of ballads can only find full information in the ten volumes of Professor Child of Harvard University. He died, and left no introduction expressing his general ideas on the subject of the problems of the ballad. 'No scholar has had the hardihood,' says his biographer, Mr. Kettridge, 'to do what is undone. But we trust that we need not say,

> "The unfinished window in Aladdin's tower
> Unfinished must remain."'

Professor Child's volumes present most of the materials for the accomplishment of his task, which it would be pious for an American *savant* to undertake. Though the writer of this article expresses opinions independently evolved, he inclines to the belief that they vary little from those casually indicated in the notes and introductions of Professor Child, to whom he was able to offer some facts, and some variants of ballads. For opinions opposed to those here expressed, see T. F. Henderson's *Vernacular Scottish Literature;* for other views, Professor Gummere's *The Beginnings of Poetry*, containing many references to continental criticism.

Ballade, a poem divided into one or more triplets, each formed of seven or eight lined stanzas, the last line being a refrain common to each stanza. In the ballade of eight lines there are only three rhymes, thus—A, B, A, B; B, C, B, C. An *envoi* is usually attached. Its four lines repeat the rhymes of the last four lines of the stanza. This form was almost predominant in French literature from the 14th to the 16th century. Modern English poets who have revived the *ballade* are Swinburne, Austin Dobson, and Andrew Lang.

Ballagi, MORITZ (1815-91), Hungarian philologist and theological writer, while studying theology at the Tübingen University, became a Protestant, and in 1851 was appointed professor of theology at Budapest, where he founded, in 1858, the *Protestant Journal*, which became the leading Protestant paper in Hungary. He is, however, more important as a philologist, his chief works being *Ausfürliche theoretisch-praktische Grammatik der Ungarischen Sprache* (8th ed. 1880), *Vollständiges Wörterbuch der Ungarischen und Deutschen Sprache* (5th ed. 1882), and a *Collection of Hungarian Proverbs* (2 vols. 1855).

Ballance, JOHN (1839-93), New Zealand premier; of Irish parentage, emigrated to New Zealand, where he founded and edited the *Wanganui Herald.* He served in the Maori war (1867), and entering Parliament (1875) was treasurer (1878-9), minister for lands and native affairs (1884), leader of the Liberal opposition (1889), and prime minister in 1891. He especially distinguished himself by his advanced finance, including progressive land and income taxes.

Ballanche, PIERRE SIMON (1776-1847), French philosopher, born at Lyons. He became a member of the Academy (1841). His best works are *Palingénésie Sociale* (1828) and *Vision d'Hébal* (1832). His system received the name of 'Ballancheism.' See *Life* by Ampère (1848); Sainte-Beuve's *Portraits Contemporaines*, vol. ii. (1847); *Revue des Deux Mondes*, vol. ii. pp. 410-456.

Ballantine, JAMES (1808-77), Scottish poet and artist, born in Edinburgh, studied glass-painting, upon which he wrote a treatise (1845), and was entrusted, after competition, with the stained-glass windows of the House of Lords. Some of his lyrics—the most popular of which are *Ilka blade o' grass keps its ain drap o' dew*, and *Castles in the Air*—appeared in his well-known *Gaberlunzie's Wallet* (1843), and others in *The Miller of Deanhaugh* (1845).

Ballantine, William (1812–87), serjeant-at-law, born in London; called to the bar (1834); appointed serjeant (1856); engaged in the Müller murder trial, the Tichborne case, the Gaikwar of Baroda defence. He wrote *Experiences of a Barrister's Life* (1882), and *The Old World and the New* (1884).

Ballantrae, fishing vil., S.W. Ayrshire, 13 m. s.w. of Girvan; a summer resort, and formerly a smugglers' haunt; familiarized through R. L. Stevenson's novel *The Master of Ballantrae*. Pop. (1901) 511.

Ballantyne, James (1772–1833), the printer of Sir Walter Scott's works, was a solicitor and then a printer in his native Kelso and in Edinburgh, whither he removed in 1802. The firm of James Ballantyne and Co., which included Scott, James Ballantyne, and his brother John (1774–1821), whom Scott nicknamed 'Rigdumfunnidos,' became involved in the bankruptcy of Constable and Co., publishers, by which Scott's finances were wrecked. James Ballantyne was a man of some literary ability, and Scott, who named him 'Aldiborontiphoscophornio,' owed a good deal to his critical suggestions while the Waverley Novels were passing through the press. See *History of the Ballantyne Press* (1871).

Ballantyne, James Robert (d. 1864), Orientalist, was superintendent, from 1845, of the Sanskrit College established at Benares; librarian, India Office, London (1861). He made a large number of translations from Sanskrit, and did much to establish more intelligent relations between Indian and European thought. See his *Christianity and Hindu Philosophy* (1859), and *The Practical Oriental Interpreter* (1843).

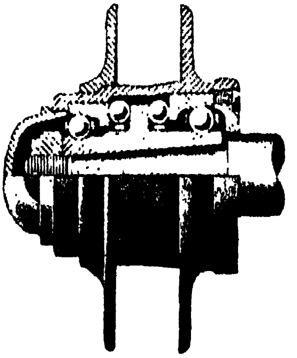
Ballantyne, Robert Michael (1825–94), writer of stories for boys, nephew of Scott's James Ballantyne, was born in Edinburgh, and died in Rome. He served as a clerk of the Hudson's Bay Fur Company at Rupert I. (1841–7), and held a position in the printing and publishing firm of Thomas Constable, Edinburgh (1848–55). He devoted himself to writing in 1855, and published over eighty vols. See his *Personal Reminiscences of Bookmaking* (1893).

Ballarat, or Ballaarat, the second city of Victoria, Commonwealth of Australia, in the counties of Grant and Grenville, 76 m. w.n.w. of Melbourne, is a well-built city. Owing to its elevation (1,438 ft.) its climate is exceptionally cool and healthy. The land around is fertile; large crops of potatoes and oats are grown, and sheep are pastured. Gold-mining (alluvial leads and quartz reefs), however, is the chief industry, the deepest mine being the South Star (2,520 ft.); the output is estimated at £70,000,000 since 1851. The discovery of gold at Golden Point in October 1851, and the Ballarat riots of 1854, are the main facts in its history. Ballarat is the see of an Anglican and a Roman Catholic bishop. Pop. (1901) 43,710.

Ballast. See Ship; Yacht; Railway.

Ballater, vil. in W. Aberdeenshire, Scotland, on l. bk. of the Dee, 43½ m. w.s.w. of Aberdeen; present terminus of Deeside Ry.; owes its origin, in 1770, to the Pannanich mineral wells in the vicinity. The rugged Pass of Ballater lies ¾ m. from the village. The bracing air of the district makes it a favourite summer resort. Pop. 1,247.

Ball Bearings, a device for reducing friction, usually applied to the shaft or axle of a rotating wheel or disc, as in the cycle, and consisting of a series of fine hardened and perfectly true steel balls, usually one-eighth inch in diameter and upwards. Each ball is separate, and rotates with the shaft. Sometimes the balls run in a channel or 'ball race,' sometimes between coned surfaces. In vehicles of heavier load rollers are used in place of balls.



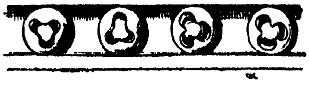
Ball Bearings.

Hub of motor car showing two outer rows of balls taking the journal bearing load, and two inner taking the end thrust in both directions (Hoffmann and Co.'s patent).

Ball-cock. See Cistern.

Ballenstedt, tn., duchy Anhalt, Germany, at the E. end of the Harz Mts., 13 m. by rail s.w. of Aschersleben, the summer residence of the Duke of Anhalt. Pop. (1900) 5,423.

Ballet, a dramatic representation, consisting of dancing and pantomime, regulated by the strains of music, and generally accompanied by scenery and decoration. The ballet was introduced into France from Italy about 1580 by Baltasarini, under the patronage of Catherine de' Medici, and improved by Rinuccini. Richelieu invented splendid effects, and engaged Louis XIII. himself as a dancer in one of the ballets at St. Germain. Louis XIV. was also an active ballet dancer in his youth. The famous ballet masters of his time were Chicanneau, Noblet, St. André, and Magnus. But the ballet as an exclusively dancing establishment came into being with the foundation in 1669 of the Académie Royale de Musique et de Danse in Paris. Lulli, the composer, director of the opera, paid great attention to the ballet, and to him has been attributed the introduction of rapid dancing, in opposition to the solemn and deliberate steps favoured by the court in the early part of the reign of Louis XIV. Quinault, the opera poet, who decorated his pieces with dance and pantomime, had also much to do with making the incidental ballet a recognized part of opera performance, with his great ballets *Armida* and *The Triumph of Love*. But the true creator of the later power of the ballet, as an independent entertainment, was Jean Georges Noverre, who wholly parted it from opera about 1776, shut the mouths of the dancers, and set the ballet very high on its own toes as a five-act play of music, dance, and pantomime. The ballet was introduced into England from France by two female dancers named De Subligny and Sallé, the latter of whom achieved great success at Covent Garden Theatre in 1734 as Ariadne and Galatea. Although the *ballet d'action* has never been really naturalized in Britain, it was for many years a prosperous entertainment at the Italian Opera House. Since 1870 the ballet has lost much of its importance, and except in Paris and Vienna, where a portion of the subsidy granted by the state is expressly devoted to the encouragement of dancing, it is no longer recognized by operatic managers as an indispensable feature of their programme. See Menestrier's *Des Ballets Anciens et Modernes* (1682); Noverre's *Lettres sur . . . les Ballets* (1807); A. Pougin's *Dict. Hist. du Théâtre* (1885).



Ball-flower Ornament.

Ball-flower, an ornament in Gothic architecture of the 13th and 14th centuries, in which the petals of a sculptured flower enclose a ball, instead of pistils or stamens. There are some fine specimens at York and Hereford.

Ballia, tn., Ghazipur dist., United Provinces of Agra and Oudh, India, 70 m. N.E. of Benares. A bathing festival, largely attended, is held in November.

Ballin, ALBERT (1857), German merchant, born in Hamburg; joined (1880) the staff of the German steamship company, the Hamburg-America Line; was soon elected to the board, and later on became its managing director. It is owing to his business capacity and organizing talent that the company has been brought to its present supreme position in German shipping.

Ballina, mrkt. tn. and seapt., cap. of Co. Mayo, prov. Connaught, Ireland, 20 m. N. of Castlebar. It is beautifully situated on the Moy, and has considerable trade in corn. There are an important salmon fishery and a large salmon-curing establishment. The town was taken by the French under Humbert in 1790. Pop. (1901) 4,505.

Ballinasloe, mrkt. tn., Co. Galway, prov. Connaught, Ireland, on railway from Dublin to Galway, 15 m. E. of Athlone, on both sides of the Suck, here joined by a branch of the Grand Canal; has corn mills, coach factories, and agricultural implement works. A great fair (horses, cattle, and sheep), lasting four days, is held annually in October. Near the town is Garbally Park, the seat of the Earl of Clancarty. Pop. (1901) 4,904.

Ballinrobe, mrkt. tn., Cos. Mayo and Galway, prov. Connaught, Ireland, 4 m. from mouth of Robe in Lough Mask, and 17 m. S.S.E. of Castlebar.

Balliol College, Oxford, was founded in 1263 by John de Baliol (d. 1269), father of John de Baliol, king of Scotland. Several of the existing buildings date from the 15th century; a Gothic chapel by Butterfield was added in 1856-57, and a hall by Waterhouse in 1876. Its benefactors include John Snell (d. 1679), who by his will left lands in Warwickshire to support ten students (now fourteen) of Glasgow University at Balliol for five years. Among Snell exhibitioners have been Adam Smith, John Gibson Lockhart, and John Wilson ('Christopher North'). Among its famous masters have been Wycliffe and Jowett, and among its distinguished *alumni* Southey, Matthew Arnold, Swinburne, Cardinal Manning, G. W. Ward, T. H. Green, and Archbishops Tait and Temple.

Ballista, or BALISTA, an ancient military engine, often confounded with a catapult, used in throwing large stones. At the end of the 4th century each centurion in a legion had a ballista, drawn on wheels by mules, and served by eleven men. In the middle ages it was known variously as trébuchet, mangonel, and caable, and was used as a bearing in heraldry.

Ballistic Pendulum, an apparatus invented (about 1740) by Benjamin Robins to ascertain the velocity of projectiles fired from a gun. It is now almost superseded by other contrivances, as the electro-ballistic.

Ballistics. See GUNNERY.

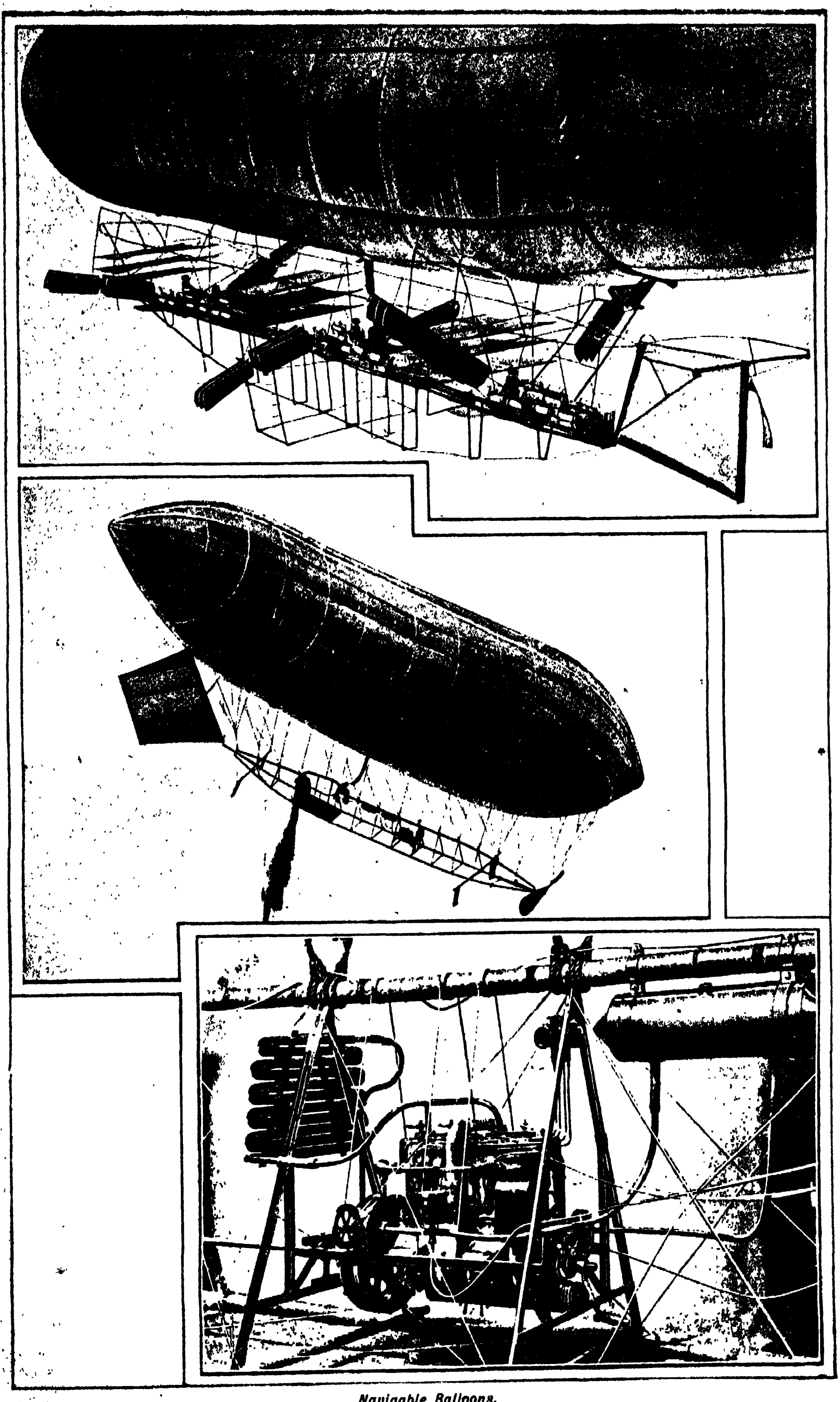
Ballistite, smokeless powder, somewhat similar to cordite. It contains nitro-glycerin and guncotton in equal proportions. See EXPLOSIVES.

Balloon. The discovery of hydrogen gas by Cavendish in 1760 led Black to suggest that a weight might be lifted from the ground by attaching to it a sphere of hydrogen gas. In 1783 the brothers Montgolfier of Annonay filled paper bags with heated air, which ascended; two and a half months later, Charles, the Parisian, sent up the first balloon filled with hydrogen, and unmanned; three months later, Pilâtre de Rozier and the Marquis d'Arlandes ascended from Paris in a fire balloon; and on Dec. 1, 1783, MM. Charles and Robert ascended in a gas balloon. This last balloon included all the features of a modern gas balloon, such as the spherical envelope, net with hoop attached for suspending the car, and valve at the top of the balloon. Amongst the early balloonists the most notable were Tytler, the first aeronaut who ascended from British soil, in 1784; Lunardi; Sadler; Pilâtre de Rozier, who was killed (1785) when attempting to cross the Channel in a compound fire and gas balloon; and Blanchard, who first crossed the Channel with Dr. Jeffries in 1785. The substitution of coal gas for hydrogen is due to Charles Green, who made about four hundred ascents, the first of which took place in 1821. Another memorable ascent by Green, in company with Sparrow, took place in 1823, during commemoration week at Oxford. To Green we owe the invention of the guide-rope.

Scientific Balloon Ascents.—The first scientific balloon ascent of any importance was made by Gay-Lussac and Biot in 1804 from the Conservatoire des Arts, Paris, when it was observed (1) that the dryness of the air increased with the altitude; (2) that there was no sensible variation of the earth's magnetic force at the heights attained; (3) that the chemical composition of the atmosphere was the same at 23,000 ft. as it was on the surface of the earth.

The most important scientific ascents were perhaps those undertaken for a committee of the British Association by Mr. Glaisher in 1862-6. The principal object of these ascents was the determination of the temperature of the air and its dryness at different elevations, to as great a height as could be reached. During the period named Glaisher made twenty-eight ascents, thirteen of which were specially undertaken for the attainment of the objects of the association. In most of these ascents Glaisher was piloted by Coxwell. An important conclusion arrived at was to negative the supposition that the decrease of temperature in ascending was uniformly at the rate of 1° for 300 ft. of elevation. Observations proved that the temperature at any point in the lower atmosphere depends upon many circumstances—*e.g.* the season, the time of day, a clear or a cloudy sky, and the direction of the aerial currents. Very surprising changes of temperature were encountered. For instance, in his ascent of Jan. 12, 1864, the temperature of the air on the ground was 41½° F.; on ascending, it decreased steadily till a height of 1,300 ft. was reached. At this point a warm current was encountered. At 3,000 ft. the temperature was 45°, being 3½° warmer than on the ground; and up to 6,000 ft. it was higher than on starting. In September 1862 the famous high ascent of seven miles was made, from Wolverhampton, by Glaisher and Coxwell. The exact height reached has, however, been disputed, since the last recorded observation was taken at 29,000 ft., when Glaisher became unconscious, and the height at which Coxwell (who was almost paralyzed) opened the valve with his teeth is merely estimated. In Glaisher's ascents valuable information was collected as to the direction of currents, thickness of currents and clouds, etc. The highest recorded ascent was made from Berlin, by Dr. Berson and Dr. Süring, July 31, 1901, when, by imbibing oxygen, they ascended 34,000 ft. Other notable scientific ascents have been made by De Fonvielle, Tissandier, and Flammarion. Among the more important observations recorded in these ascents, those of Tissandier, concerning the varying direction of aerial currents at different altitudes, suggested the possibility of using contrary currents as a means of aerial navigation.

On July 11, 1897, three Swedes—Andrée, Fränkel, and Strindberg—ascended from Spitzbergen in a large balloon furnished with drag-ropes, with the object of reaching the North Pole. But except for three brief messages by carrier-pigeon and floating buoys, liberated within a few hours of the ascent, nothing more has been heard of them.



Navigable Balloons.

1. The Barton Airship. 2. Mr. Spencer restoring the equilibrium of his airship. 3. Simms Motor in the Spencer Airship.

(Photo by Russell & Sons.)

Navigable Balloons or Airships.—The utility of a balloon for the purposes of war and of scientific research would be largely increased if it could be moved against the wind. In balloon navigation, since the body moves in one medium, the only known available means of propulsion is the screw. There have been several recent attempts to navigate balloons by means of screw propellers. In 1852 M. Giffard adopted an elongated balloon, and employing steam for the motive power, with a very light engine and boiler working a screw 12 ft. in diameter, he ascended from Paris on Sept. 24, 1852, but contented himself with circular movements and lateral deviations. In 1883 the brothers Tissandier devised an elongated balloon in which the motive power was electricity, and it is claimed that they held their own against a wind of over 6 m. per hour. In 1885 Captains Krebs and Renard, in their elongated electrically-propelled balloon *La France*, out of seven ascents made five return journeys to the place from where the balloon had started. One of the most successful journeys of this balloon was on Sept. 22, 1885, when a journey was made from Meudon to Paris and back against a wind of 6 to 7 m. per hour, the highest speed attained being 14 m. per hour. In 1900 Count Zeppelin ascended from Lake Constance with his huge combination of balloons contained in a frame of aluminium 420 ft. in length, composed of seventeen aluminium hoops connected by longitudinal pieces, and having diagonal wire stays to impart rigidity. The motive power was obtained from two Daimler motors of 16 horse power, driving four screws 44 in. in diameter, a pair being placed at the bow and a pair at the stern. The speed attained by the Zeppelin air-ship was about 18 m. per hour, travelling against a wind of about the same force as that encountered by *La France* in 1885.

In 1901 the most famous ascents were made by M. Santos Dumont, who devised no less than six elongated balloons in four years. His balloons were worked by petroleum motors, and in the latest type his engine was of 20 horse power. A novel feature of the arrangement is the *ballonet*, or inner balloon, which is filled with air to maintain the rigidity of the envelope. The screw is four metres in diameter; the triangular frame which supports the machinery and the basket for the aeronaut are suspended from the balloon by means of piano wire, thus abolishing the usual net. On Oct. 19, 1901, M. Santos Dumont navigated his balloon round the Eiffel Tower from the Aero Club grounds at St. Cloud and back in 30 min. 14 sec., in a calm, light wind varying from 9 to 11 m. an hour, and thus won the Deutsch prize of 100,000 francs. On May 12, 1902, M. Severo, a Brazilian, ascended from Paris with his engineer in a navigable balloon of his own invention, which had a system of double screws at either end of an axis bisecting the balloon longitudinally, and capable of being worked simultaneously. An explosion took place at a height of 12,000 ft., and both men were killed, the balloon being entirely shattered.

In September 1903 Mr. Stanley Spencer, in the airship *Mellin*, successfully crossed London. During 1903 and 1904, Dr. F. A. Barton constructed a large airship at Alexandra Park. It included a balloon 170 ft. long and 40 ft. in diameter, containing 170,000 cub. ft. of gas, with a lifting capacity of 11,900 lbs. Between the balloon and a bamboo framework forming the deck are 30 aeroplanes, driven by two engines of 47 indicated horse power. The rudder is a large square sail. An accident (July 4, 1904) to Dr. Barton delayed the first trial, which was successfully made Feb. 16, 1905. On Feb. 11, 1905, M. Jacques Faure and H. Latham travelled by balloon from the Crystal Palace to Paris.

Ballons-Sondes, or sounding balloons, are unmanned balloons carrying self-recording instruments to great heights, to obtain scientific data regarding the condition of the upper air. The ascent of human beings to heights of six miles being attended with conditions of great difficulty and danger, it was proposed as far back as 1809 to employ balloons carrying automatically registering instruments, but no observers, to obtain information about the atmospheric strata lying above that height. This was first tried in 1893 by the French aeronauts Hermite and Besançon, who prepared a balloon having a capacity of 3,960 cub. ft., and composed of gold-beaters' skin. An instrument, the meteorograph, registering variations of pressure and temperature on a revolving drum, driven by clockwork inside, was sent up with the balloon, which weighed 40 lbs., with a lifting capacity of 77 lbs. The trial of this, the first of the so-called 'aerophiles,' took place on Mar. 21, 1893, and next day it was returned from the department of the Yonne, where it had fallen. The highest point reached was 49,000 ft., and at this elevation the temperature was − 60° F., both pressure and temperature being the lowest registered in a balloon up to that time. Ballons-sondes are now nearly always made of varnished paper to hold a few thousand cubic feet. Several remarkable journeys have been made by these balloons, notably in July 1894, when one named the *Cirrus* made a journey from Berlin to Bosnia, a distance of 700 m., at a mean velocity of 62 m. an hour, in which a height of 54,000 ft. was attained, and a temperature of − 63° F. recorded. In Apr. 1895 the *Cirrus* rose to the extraordinary elevation of 72,000 ft., or 13½ m., the barometric pressure being reduced to 1½ in. At the Meteorological Congress held in Paris in 1896, simultaneous international ascents on prearranged dates were agreed upon, and balloons carrying instruments were launched from widely-scattered places over Europe, from which valuable data regarding the meteorology of the upper air have been obtained. See *Sounding the Ocean of Air*, by A. L. Rotch (1900).

Military Ballooning.—The ballooning duties of the British army are carried out by the Royal Engineers. Attached to the Royal Engineers are five balloon sections, which, together with the cadre and the balloon factory, are stationed at Aldershot. On mobilization, a section forms part of the 'corps engineers' of each army corps, and at full strength consists of 3 officers, 51 men, and 42 horses. A section carries several balloons (each of 10,000 cub. ft. gas capacity), one pilot balloon (100 cub. ft.), steel tubes for holding gas, and several hundred feet of steel wire for telephonic communication. The number of tubes required to fill a large balloon varies from 80 to 100.

Captive balloons are generally used, but on occasion they may be sent free for certain specified objects. In the former case they are sent up from the balloon wagon, at the tail of which is fixed a drum of wire rope (2,200 ft.). The end of this rope is attached to the balloon, and by means of brakes and handles the latter is kept under absolute control, and can be hauled down or allowed to ascend at will. The height to which a captive balloon can rise in calm weather is about 1,000 ft.; 1,500 ft. is the extreme limit of the 10,000 cub. ft. balloon, and it is only attainable in a dead calm at very low altitudes, and with a light man in the car. When the wind is blowing over 30 miles an hour, captive balloons are absolutely useless as a means of reconnoitring. They can be used when fairly calm, but on a still day their value in watching the enemy's movements, observing the effects of artillery fire, taking photographs and making rough maps of the country, or acting as signal stations, cannot be overestimated. They are sent up about a mile behind the most advanced line of the army, and the officer who makes the ascent can telephone, either to the party at the foot of the rope or direct to the general, the position of the opposing forces. In a mountainous country, however, the officer in the balloon has but a limited range of observation; for though he may ascend to a height of 1,000 or 1,200 ft., yet the reverse slopes of the hills, especially if steep, effectively conceal the enemy's position. The observer in a balloon is fairly safe from hostile fire. A bullet might pass right through the balloon without doing more than slightly lessening its buoyancy.

The first time balloons were used to any great extent for military purposes was in the wars of the French revolution. At Fleurus, June 17, 1794, General Jourdan's success against the Austrians was mainly due to the valuable information he obtained from a captive balloon. The French again used them in the Italian campaign of 1859, and the Federals employed them with conspicuous success in the American civil war (1860–4). During the siege of Paris the French sent out over sixty free balloons with dispatches, and pigeons for the return messages; and Gambetta left the city in this manner to organize an army of relief in the south of France. The British army has used them constantly since the Bechuanaland expedition in 1884, and balloon sections were employed in the Boer war (1899–1902), and in the Russo-Japanese war (1903–5). See Coxwell's *My Life and Balloon Experiences* (1888); *Aeronautical Annual* and *Aeronautical Journal* (London); Proceedings of Aeronautical Society of Great Britain and of Académie d'Aërostation of France; *L'Aerophile*, and *Revue de l'Aëronautique* (Paris); and *Zeitschrift für Luftschiffahrt und Physik der Atmosphäre* (Berlin).

Ballot, or secret voting, is a very old institution, practised both in Greece and in Rome, principally for voting at criminal trials, and for some purp such as ostracism, in deliberative assemblies, but also, in Rome, at the election of magistrates and certain other officials. At one time secret voting in Parliament was advocated in England, and it was used in the Parliament of Scotland in 1662; but no one asks for secret voting in Parliament now, and in modern times the agitation for the ballot has been confined to the demand for its use at popular elections of members of Parliament and other representative bodies. For these purposes voting by ballot was advocated by reformers at least as early as 1817: in 1830 O'Connell introduced the first bill on the subject; in 1838 it was the fourth point of the 'People's Charter.' The report of the committee of the Commons in 1869 was strongly in its favour. It was used at the first election of the London School Board, under the Elementary Education Act of 1870. The Ballot Act, 1872, introduced by Mr. Forster, prescribed that the ballot should be employed at all municipal and parliamentary elections, except at parliamentary elections for the universities. This act was temporary, and would have expired on Dec. 31, 1880, but since that time it has been continued by the Expiring Laws Continuance Acts. Special provisions are made for blind and illiterate persons, and for Jews on Saturdays. The officers and agents of candidates have to make declarations of secrecy, and almost every possible kind of tampering with the papers, boxes, etc., is punishable, in the case of officers with two years' imprisonment with or without hard labour, and in the case of others with six months'. Provision is made for a scrutiny on petition where it is alleged that unqualified or bribed persons have voted, by which the judges on the rota for the trial of election petitions can investigate the particular votes in question. Voting by ballot in some form has been introduced into nearly every country governed in accordance with constitutional methods. For method of marking the ballot paper, see ELECTIONS, and for voting machine, see MACHINES AUTOMATIC.

Ballot, BUYS (1818–90), chemist, physicist, and meteorologist, studied at Utrecht University, where he afterwards became professor of mathematics, and subsequently of experimental physics—a post which he held till 1887. He was also appointed director of the Royal Meteorological Institute of the Netherlands. The 'law' by which he is most widely known defines the relation of the wind to the isobars, and is one of the most important generalizations in meteorological science. It may be put in this form: Stand with your back to the wind, and the barometer will be higher on your right hand than on your left. This rule applies to the northern hemisphere, but in the southern the reverse obtains. In 1883 an island discovered in 70° 25′ 28″ N. was named after Ballot.

Ballota. See HOREHOUND.

Ballycastle, mrkt. tn., Co. Antrim, prov. Ulster, Ireland, 15 m. N.E. of Ballymoney, on an open bay opposite Rathlin I.; is an improving bathing resort.

Ballymena, mrkt. tn., Co. Antrim, prov. Ulster, Ireland, 23 m. N.W. of Belfast, with a flourishing trade in brown linens (yearly average, £1,000,000) and an old linen market (manufacture introduced 1732). The allied industries are extensively carried on in the neighbourhood. In the vicinity is Ballymena Castle. Pop. (1901) 10,886.

Ballymoney, mrkt. tn., Co. Antrim, prov. Ulster, Ireland, 8 m. S.E. of Coleraine, on an eminence 3 m. from the Bann; is an important agricultural centre, with linen manufactures. Pop. (1901) 2,952.

Ballymote, mrkt. tn., Co. Sligo, prov. Connaught, Ireland, 15 m. S. by W. of Sligo, with large coach factory, castle founded (1300) by William de Burgo, and the ruins of a small Franciscan monastery (13th century).

Ballymote, THE BOOK OF, a large folio vellum MS. preserved in the Royal Irish Academy, which was so named because it was owned for some generations by the MacDonoughs of Ballymote, County Sligo. It is written in Gaelic, and consists of pieces of various date, some written before 1400 A.D., relating to history, legend, genealogy, and the Brehon Laws, with some translations from Latin romances. In 1887 it was published in photo-lithography (at Dublin), with introduction, notes, and index by Professor R. Atkinson.

Ballynahinch ('the town of the island'), mrkt. tn., Co. Down, prov. Ulster, Ireland, 15 m. S. by E. of Belfast, with a spa (sulphur and chalybeate springs) in a picturesque valley 2½ m. away (season, June to September).

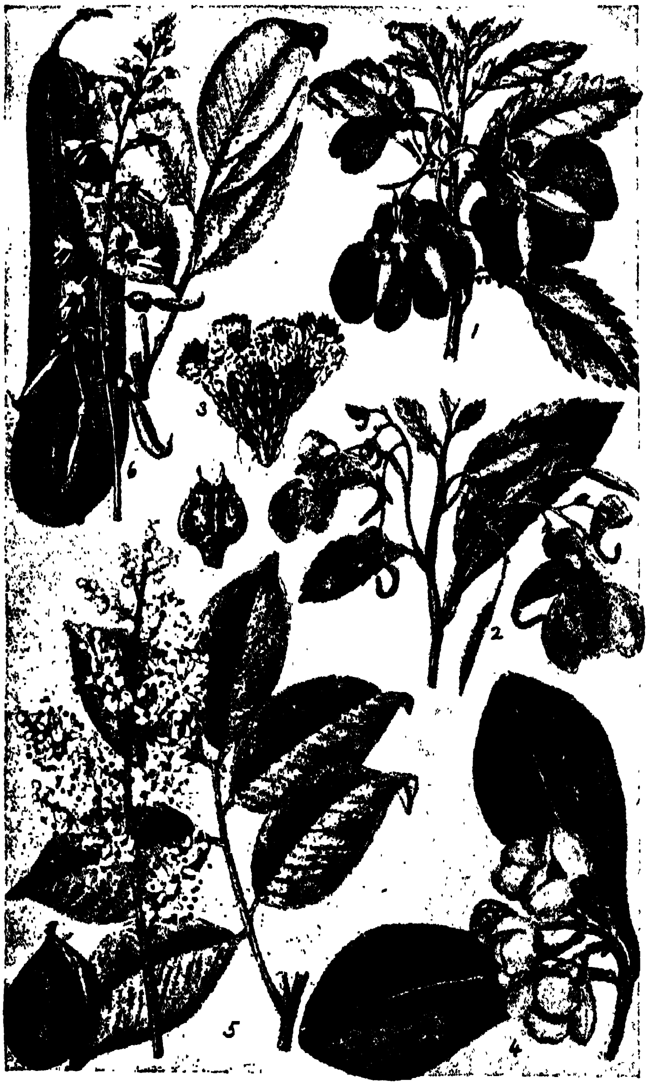
Ballyshannon, mrkt. tn. and seapt., Co. Donegal, prov. Ulster, Ireland, 25 m. N.W. by W. of Enniskillen, on both sides of the mouth of the Erne, and 8 m. from Lough Erne. The salmon fishery is important, and the harbour is accessible for vessels drawing 10 ft. Pop. (1901) 2,359.

Balm. See BALSAM.

Balm of Gilead, or MECCA BALSAM, an aromatic gum or powder with supposed medicinal qualities, which, if not produced in Gilead, was at least a well-known article of commerce in that region. It is generally identified with the resin of *Balsamodendron gileadense*.

Balmaceda, JOSÉ MANUEL (1838–91), president of Chile (1886–91), a powerful speaker and bold statesman. Having lost the confidence of the Assembly, he attempted (Jan. 1, 1891) a *coup d'état*, refused to convene the House, and constituted himself dictator. He was supported by the army; but the navy, having remained faithful to the constitutional government, landed troops at Coquimbo in August, and routed Balmaceda's forces in the battles of Conchon and Placilla. Balmaceda committed suicide on Sept. 18, 1891.

Balmain, populous suburb of Sydney, New South Wales, Commonwealth of Australia, on the W. shore of Darling harbour. It has several docks (one the largest in the S. hemisphere), chemical works, a large cocoanut-oil factory, sawmills, etc. Pop. (1901) 30,881.



Balsams.

1. Impatiens balsamina. 2. Impatiens noli-me-tangere. 3. Bolax glebaria or balsam bog. 4. Clusia flava. 5. Copaifera officinalis. 6. Myroxylon toluifera.

Balmaz Ujvaros, tn., co. Hajdu, Hungary, 12½ m. N.W. of Debreczin. Pop. (1900) 11,550.

Balme, COL DE, famous mountain pass (7,231 ft.) in the Pennine Alps, between the valley of Chamonix and Martigny (Rhone valley), Switzerland, on the dividing line between France and Switzerland; commands superb views.

Balmerino (pron. *Ba'mernie*), par. and vil. on the Firth of Tay, N. Fifeshire, Scotland, 3½ m. S.W. of Dundee; fishing station, but the industry is declining. There are ruins of a Cistercian abbey founded 1227. See Campbell's *Balmerino and its Abbey* (1899).

Balmerino, ARTHUR ELPHINSTONE, SIXTH LORD (1688-1746), Jacobite; in 1745 joined the Young Chevalier, and was taken prisoner at Culloden. When tried at Westminster Hall in 1746, he, unlike the Earls of Kilmarnock and Cromarty, declined to admit that he had committed a crime, or to sue for mercy, and on the scaffold he met his fate with undaunted courage. See *State Trials*, vol. xviii.; Jesse's *The Pretenders and their Adherents* (1857).

Balmoral Castle (Gael. 'the majestic dwelling'), royal residence, W. Aberdeenshire, Scotland, on r. bk. of the Dee, near Crathie, 9 m. W. of Ballater; purchased by Queen Victoria in 1848. In 1853 the present red granite Scotch baronial castle replaced an old one.

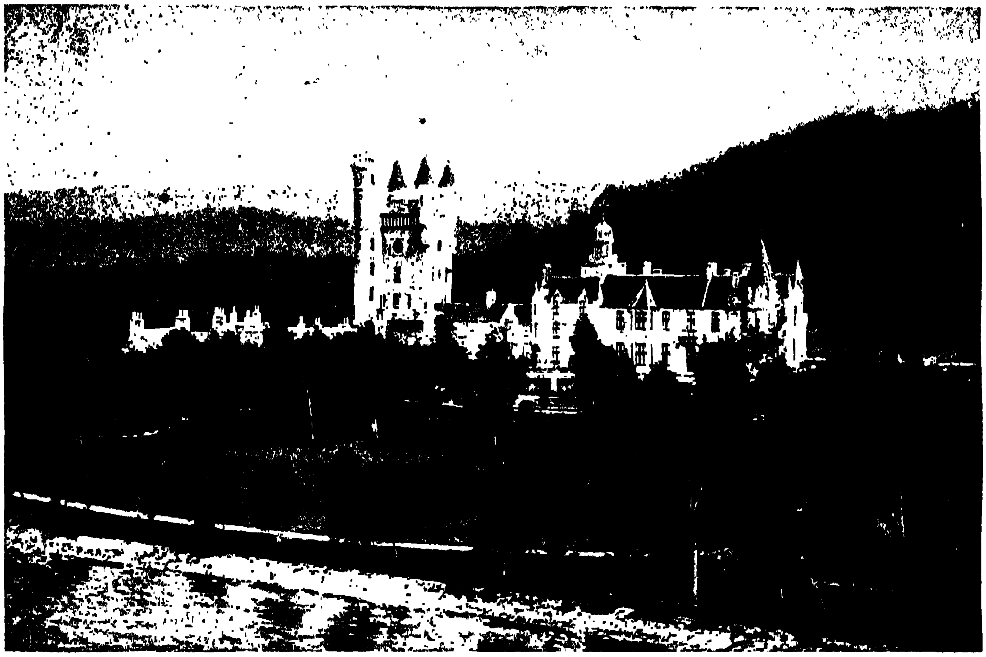
Balnaves, HENRY (d. 1579), Scottish reformer, was appointed (1538) a lord of session by James V.; depute-keeper of privy seal (1542-43). He helped largely in getting the Scriptures printed in the Scots vulgar tongue. For his ardent Protestantism he suffered attainder and imprisonment, being transported to Rouen in 1546; but in 1563 his estates and offices were restored. See M'Crie's *Life of John Knox* (new ed. 1889).

Balrampur, tn., Gonda dist., Oudh, India, 85 m. N.E. of Lucknow; manufactures cotton cloth, blankets, felt, knives, etc. Pop. (1901) 16,723.

Balsa, a raft or surf-boat, made of the extremely light balza-wood of Peru and Brazil.

Balsam, various species of the order Balsamineæ, which is often placed under Geraniaceæ. The principal genus is known as Impatiens, because the ripe capsule bursts spontaneously or when touched. (1.) Noli-me-tangere is the 'touch-me-not,' found wild throughout Britain and Europe. There are over a hundred species of Impatiens, mostly in the shady woods of India, where they form a rich undergrowth with beautiful white and red flowers. They are mostly annuals or biennials; many have been introduced from the East into Britain for greenhouse cultivation. (2.) Balsamina is a scarlet-flowered species from tropical Asia, hardy in most gardens.—BALSAM BOG is a denselytufted xerophyte of the Falkland Is., belonging to the order Umbelliferæ. The tufts are often several feet in diameter. A gum-resin exudes from its branches. (See Hooker's *Flora Antarctica*, 1844-60.)—BALSAM TREE of Jamaica is *Clusia flava* of the order Guttiferæ, yielding a gum-resin which is used as pitch in the W. Indies. —BALSAM OF ACOUCHI is obtained from *Icica heterophylla*, a species of the order Burseraceæ, found in Guiana.—BALSAM OF UMIRI is an oleo-resin obtained from *Humirium floribundum*, related to the geraniums, and found in Brazil. Its properties resemble those of copaiba balsam.—CANADA BALSAM, obtained from the Canadian balm of Gilead fir, *Abies balsamea*, is used in microscopic work for the permanent preservation of sections on glass slides.—WEST INDIA BALSAM is obtained from species of *Clusia*.—BALSAM OF COPAIBA is the oleo-resin obtained from the trunks of various species of *Copaifera*, in the valley of the Amazon and the E. and W. Indies. It has very much the appearance of olive oil, but its odour is aromatic, and its taste bitter. Its chief constituent is a crystallizable resin, copaivic acid. Oil of copaiva is got by distillation, and, administered in capsules or as an emulsion, acts in the stomach like other oleo-resins as a stimulant and irritant, and in large doses as an emetic. Its active principles are absorbed, and all secretions smell of it, and are increased by it. It acts as a stimulant and a disinfectant in the genito-urinary tract, and is chiefly used for that purpose, although it has the useful effect of oleo-resins on the lungs and bronchi, and indeed acts better there than do most others, but is avoided on account of its smell. It is diuretic, and by its stimulating action sometimes induces a rash.—BALSAM OF PERU is taken from the trunk of *Myroxylon pereiræ*, after beating, scorching, and removing the bark. Its volatile oil contains cinnamic and benzoic acids, which give its fragrance. It has the general qualities of balsams, and is used chiefly as a disinfectant expectorant.—BALSAM OF TOLU is obtained from New Granada, by incisions in the trunk of *Myroxylon toluifera*. Its most important constituents are benzoic and cinnamic acids. A syrup and a tincture are prepared from it, and it is present in several compound drugs. It is used only as an expectorant.

Balsamo, GIUSEPPE. See CAGLIOSTRO.



Balmoral Castle, the Highland Residence of the King.

(Photo by G. W. Wilson.)

Balta, tn., Podolia gov., on branch of the railway Moscow-Kiev-Odessa, 130 m. N.W. of Odessa; has brewing, distilling, and manufactures of soap, candles, bricks, and tobacco, as well as an important trade in cereals and cattle. It has two yearly fairs, the principal in May. Pop. (1897) 23,393.

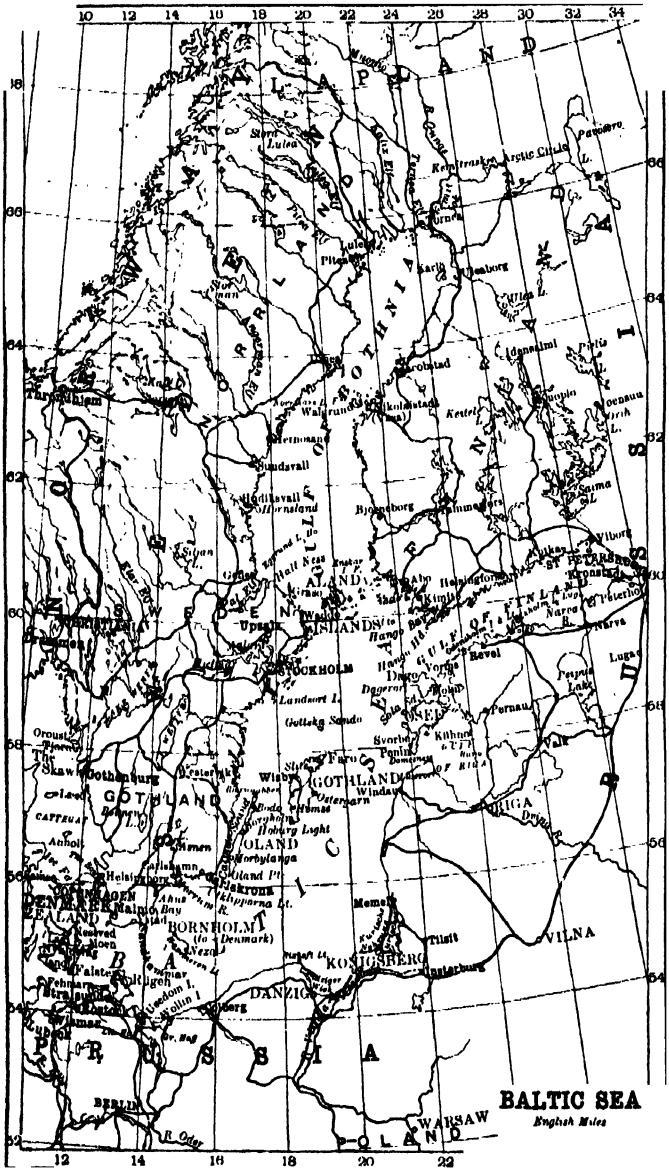
Baltasarini, surnamed BEAUJOYEULX (16th century), Italian musician, was invited by Catherine de' Medici to her court. He was the first to introduce the Italian dances into Paris, and was thus the founder of the modern ballet. His best production was the *Ballet Comique de la Reine* (1582). See Celler's *Les Origines de l'Opera* (1868)

Balthazar, one of the three wise men (Magi) of the Nativity, and one of the fabulous three kings shown in Cologne Cathedral.

Baltic Port, tn. and seapt., Russia, at the entrance of the Gulf of Finland, 250 m. by rail W. of St. Petersburg; important as being the terminus of one of the Baltic railways. Pop. (1897) 850.

Baltic Provinces, the region including Esthonia, lying on the Gulf of Finland and the Baltic; Livonia, on the Gulf of Riga; and Kurland, facing both the Gulf of Riga and the open Baltic, reaching westward to the Prussian frontier. It is inhabited by Esthonian and Lettish races, with a large admixture of Germans, especially in the great towns—*e.g.* Riga. Russia first obtained a permanent footing on the Baltic with the foundation of St. Petersburg (1703). By the peace of Nystadt (1721) Esthonia and Livonia, including the town of Riga, were acquired, and the frontier advanced to the W. Dvina (so-called Düna). Kurland was not added till the third partition of Poland (1795). For several centuries the civilization of these provinces was of German origin; but in 1867-89 this was suppressed by the government, and the people completely Russianized, as well as converted, often under great pressure, to the Greek Church,

Baltic Sea, or East Sea, an inland sea of N. Europe, surrounded by Denmark, Germany, Russia, Finland, and Sweden, and communicating with the Atlantic through the Skager Rak and the Kattegat, which leads to the channels of the Sound (Oresund), the Great Belt and the Little Belt, between the Danish islands. It has three large arms—the Gulf of Bothnia, Gulf of Finland, and Gulf of Riga—and several smaller bays, as the Bay of Danzig, Neustädter Bay, and Kiel Bay. The greatest length from S.W. to N.E. is over 900 m., its width 45 to 140 m., and its area 178,000 sq. m. Its S. shores are low and sandy, and in places lined by shallow lagoons (Kurisches Haff, Frisches Haff, and Stettiner Haff). Several islands stud its waters, the principal being Sjælland (Seeland), Fyn (Fünen), Langeland, Laaland, Falster, Möen, Bornholm, and others of the Danish group; Alsen, Fehmarn, Rügen, Usedom, and Wollin, belonging to Prussia; Ösel, Dagö, Mohn, Worms, belonging to Russia; the Finland archipelagoes of Aland and Quarken; the large Swedish islands of Gotland and Oland; and thousands of small rocky skerries (the Skärgård) all along the E. coast of Sweden and along the W. and S. coasts of Finland. The Baltic is shallow (20 to 100 fathoms), and is shut off from the Kattegat and the G. of Bothnia by submarine ridges; but between the N. of the island of Gotland and the Stockholm skerries there is a depression in which a depth of 420 fathoms has been sounded. The Baltic is fed by numerous streams, some of them considerable rivers, such as the Neva, Düna, Niemen, Vistula, Oder, Göta-elf, Luleå, and Torneå. The fresh water thus poured into its basin in spring sets up a broad, strong outflowing surface current through the Kattegat—a current which increases to a depth of 50 fathoms, and from a salinity of 7 to 8 per cent. in the N.E. to nearly 30 per cent. in the W. But there is a compensating inflow current entering intermittently underneath the first, and having a salinity of 32 per cent. In summer the temperature of the surface water of the Baltic is 62° to 64½° F. In the broadest basin of the sea, which stretches E. of Gotland, the salinity below 100 fathoms is from 8 to 10 per cent. In winter the smaller bays and creeks, especially in the N. parts of the sea, invariably freeze, and so suspend navigation; and in severe winters the Gulf of Bothnia becomes frozen from side to side. The tides are barely perceptible E. of the Danish islands. The Kaiser Wilhelm or Nord-Ostsee Canal, from Kiel to the mouth of the Elbe, has since 1895 afforded a short cut between the Baltic and the North Sea. See Professor O. Pettersson's papers in *Scot. Geog. Mag.*, 1894 (vol. x.); also report by Pettersson and Ekman, issued by the Swedish Academy of Science, and summaries in vol. xiv. of same publication, and works quoted there.



BALTIC SEA

English Miles

Baltimore. (I.) The largest city of Maryland, and sixth in population in the U.S.A., on an arm of Chesapeake Bay. It draws its water supply from Lake Roland and Gunpowder R. The largest of its public parks, Druid Hill Park, is noted for its beauty. Johns Hopkins University (1876) is one of the foremost institutions for advanced learning in the country. Baltimore is also the seat of the Women's College of Baltimore (1888), Loyola College (1852), and Morgan College (1876); the law and medical departments of the University of Maryland, and the splendidly equipped Johns Hopkins Hospital; the Baltimore College of Dental Surgery (1839); the Peabody Institute, a conservatory of music; and the Maryland Institute, a school of art. This city is also the see of a Protestant bishop, and of a Roman Catholic archbishop, who is at the same time Roman Catholic primate of the United States, Baltimore being the oldest Roman Catholic see (1789) in the country. Handsome monuments to Washington (1830), to George Peabody, the Battle Monument (1815), commemorating the citizens who fell defending the city against the British in 1814, have procured for Baltimore the name of the 'Monumental City.' The harbour is excellent, and a large foreign trade is carried on, the exports consisting chiefly of Indian corn, cattle and meat, copper, wheat and flour, cotton and tobacco. The grain trade with Europe ranks first, and as a guano receiver Baltimore takes the lead over all other American ports. The tonnage entered in the foreign trade was, in 1903, 1,406,529; and the amount cleared, 1,338,888 tons. Several lines of coasting steamers, and the transatlantic liners of the North German Lloyd Company, Hamburg America Company, and Red Star of Antwerp, enter this port. Shipbuilding is carried on, but the principal industries are fruit and oyster packing, the manufacture of boots and shoes, flour, chemical manures, and machinery. Banking facilities are afforded by twenty-one national and twenty state and private banks and fifteen trust companies. Baltimore was laid out in 1729, and incorporated in 1796. Pop. (1900) 508,957: foreign-born, 68,600; negroes, 79,258. On Feb. 8, 1904, a great fire blotted out the whole centre of the city. The damage was estimated at $70,000,000. (**2.**) Small seapt. tn. on bay of same name, Co. Cork, Munster, Ireland, 7 m. S.W. of Skibbereen, with which it is connected by rail. Its sheltered harbour is the headquarters of a well-equipped fishing fleet.

Baltimore and Ohio Railroad. The main line runs from Baltimore, in Maryland, to Wheeling, in W. Virginia (380 m.), there being branches connecting Baltimore with Chicago, New York, Philadelphia, St. Louis, and other important cities of Pennsylvania, W. Virginia, and Indiana, the total mileage being 3,199. The ordinary capital of the company owning the road amounts to $125,000,000. The dividend paid on the common stock has for some years been at the rate of 4 per cent.

Baltimore, GEORGE CALVERT, FIRST BARON (?1580-1632), English statesman, born at Kipling, Yorkshire. He entered Parliament (1609), and became secretary of state (1619). The failure of the Spanish marriage scheme made him very unpopular. He resigned office (1624), and at the same time declared himself a Catholic. On his retirement he was created (1625) a baron, and was granted large estates in Co. Longford, Ireland. A settlement in Newfoundland, granted by Baltimore to some colonists in 1621, being in a very unsettled condition, he went over (1627) to restore order. An attempt to settle in Virginia proving a failure, he returned to England to obtain a charter for a new colony (Maryland). He died before the patent had passed the Great Seal, but it was granted in favour of his son. See *Lives* by Neill (1869) and Kennedy (1845).

Baltistan, BULTI, or LITTLE TIBET, mountainous division of Kashmir, India, drained by the Indus in its course between the Himalayas and the Karakoram Mts.; contains many very lofty peaks, especially Mt. Godwin-Austen (28,250 ft.). Cap. Skardo or Iskardo. Pop. about 50,000.

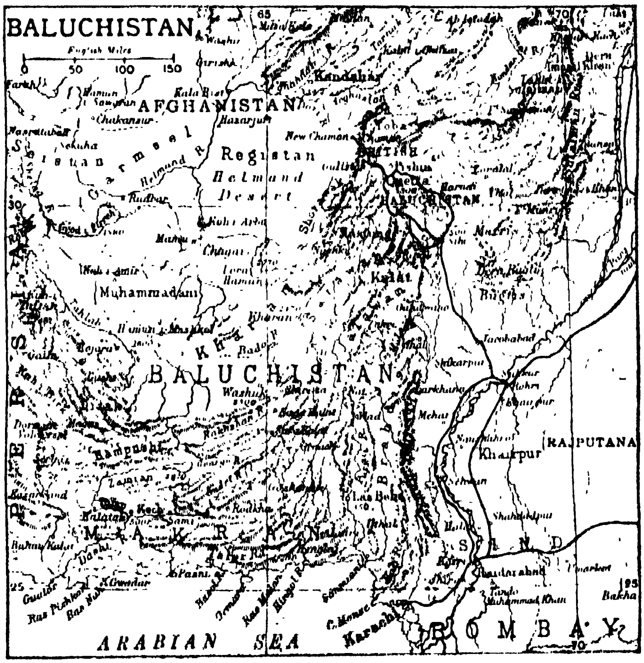
Baltjik, or BALCHIK, seapt. on Black Sea coast, 18 m. N.E. of Varna, Bulgaria, Europe. Pop. (1893) 5,137.

Baluba, large negro tribe in the Congo Free State, living between the head-waters of the rivers Lomami and Sankuru, in 6° S. lat. and 23°-25° E. long.

Baluchi, Iranean dialect which has largely borrowed from the language of bordering nations, divided into two sections, the northern and the southern, the latter being the purer, the former having a superior literature. See Geiger and Kuhn's *Grundriss der Iranischen Philologie* (1898).

Baluchistan, a country of S. Asia, is bounded on the N. by Afghanistan, on the E. by British India, on the S. by the Arabian Sea, and on the W. by Persia. The province has an area of about 160,000 sq. m., and the whole territory (except British Baluchistan) is under native rule.

The mountains of Baluchistan are a continuation of the Sulaiman range. The S. spur, known as the Hala Mountains, reaches the sea at Cape Monze; the W. ridges run parallel to the sea coast, and merge in the mountain system of Persia. The coastline stretches E. and W. for 600 m. There are no harbours. Forests are sparse and stunted; coal is mined at Khelat. The railway from Karachi reaches New Chaman, 65 m. beyond Quetta, which is connected with Sibi by two lines, one through the Harnai Valley, and the other through the Bolan Pass. The few fertile spots in the province are peopled by pastoral tribes, chiefly Brahui and Baluchi. Baluchistan, with its scanty population and products, owes its importance to its position on the British Indian frontier, and its command of the trade routes between Persia, Afghanistan, and India. For administrative purposes it is divided into six agencies · Quetta-Pishin, Sinjawi, Zhob, Khelat, S. Baluchistan, and Chagai. The governor-general's agent, who is also chief commissioner for British Baluchistan, supervises the work of the political officers.



Of the early history of the province we have little authentic information. Up to the 17th century the people of Khelat were Hindus. Threatened by Persia, they invited Kambar, the son of a Brahui Mussulman chief, to be their ruler; and under this chief, from whose patronymic the dynasty is still called Kambarani, the state became Mohammedan. Abdullah Khan, who became the viceroy of the famous Nadir Shah after the latter's conquest of India, was soon afterwards killed in battle. The tyranny and licentiousness of Abdullah's son, Mohammed, led to his deposition and murder by his brother Nasir, who was khan of Khelat from 1755 to 1795. To Nasir is due the formation of the Baluch confederacy.

In 1839 a British force seized Khelat, owing to the supposed treachery of its ruler. In the following year the British garrison was overpowered, and in 1841, under a treaty of friendship, they evacuated the country. Throughout their disasters in Afghanistan the khan of Khelat remained loyal; and fresh treaties, executed in 1854 and 1876, have drawn Baluchistan into closer and more cordial relationship with the Indian empire. On Nov. 1, 1887, the Assigned Districts—tracts in Pishin, Shorarud, Kach, Khawas, Harnai, Sibi, and Tal Chotiali—became British Baluchistan. In 1901, over an area of 134,000 sq. m., the population was found not to exceed 810,746. See Floyer's *Unexplored Baluchistan* (1882); Hughes's *The Country of Baluchistan* (1887); MacGregor's *Wanderings in Baluchistan* (1882); MacMahon and Holdich's 'N.W. Borderlands of Baluchistan,' in *Geog. Jour.*, 1877, pp. 392-416.

Honoré de Balzac.

Baluster, a small circular pilaster, of Italian invention, supporting a hand-rail, coping, balcony, or terrace. A row of balusters forms a *balustrade*. A *banister* is one of the vertical supports of a hand-rail on a balcony or stairs, and is often applied to the hand-rail itself.

Balwearie Castle, ruined stronghold, Fifeshire, Scotland, 2 m. w. of Kirkcaldy, is traditionally the birthplace of Michael Scott.

Balzac, HONORÉ DE (1799-1850), a celebrated French novelist, was a native of Tours. Educated at Vendôme, and at the Sorbonne, Paris, for some years he lived in a state of penury. Success came when, in his thirtieth year, he published, under his own name, *Les Derniers Chouans* (1829), after which he continued to send out an enormous number of novels, some historical, but mainly illustrative of French contemporary life and manners. These he afterwards grouped under the collective title of the *Comédie Humaine*, in which he describes the manifold aspects of human life. Often gross and brutal, Balzac is yet one of the great writers of the world, being the father of the realistic school of fiction, as well as the forerunner of the novelist of character analysis and portrayal. Balzac is one of the closest and shrewdest observers of contemporary life and manners, and one of the keenest analysts of the human heart; and few have excelled him in the power and vividness with which he presents the results of his observations. His death occurred at Paris, on his return from his wedding trip, his marriage with the Polish Countess Hanska having taken place only three months earlier. Of his works, which were very numerous, the best known are *La Peau de Chagrin* (1831); *L'Auberge Rouge* (1831); *La Femme de Trente Ans* (1831); *Eugénie Grandet* (1833); *La Recherche de l'Absolu* (1835); *Le Père Goriot* (1835); and *Les Parents Pauvres* (1849). A collected edition of his works began to appear in 1899. *Les Contes Drôlatiques* (1831-8), although famous, represents the weaker side of Balzac's work. Numerous English translations have appeared, of which the best is the series by Miss Wormeley (1890-3), with a memoir of Balzac. See also Saintsbury's *French Novelists* (1891), and Balzac's *Life*, written by his sister (1858); Lovenjoul's *Histoire des Œuvres de H. de Balzac* (2nd ed. 1886); Théophile Gautier's *H. de Balzac* (1859); Sainte-Beuve's *Causeries de Lundi* (vol. ii.) and *Portraits Contemporains* (vol. ii.); Taine's *Nouveaux Essais de Critique et d'Histoire* (1865); and Faguet's *Etudes Litteraires sur le XIX*^{e} *Siècle* (1887).

Balzac, JEAN LOUIS GUEZ DE (1594-1654), a French author, whose published *Letters* (1624), written from Rome, brought him the friendship and patronage of Cardinal Richelieu. By the polish of his style, and the exactness of his epithets, he did for French prose what Malherbe did for verse —purified it from the pedantries of the 16th century.

Balzico, ALFONSO (1825), Italian sculptor, born at Cava de' Tirreni, near Salerno. He executed several works for King Victor Emmanuel—*e.g.* *Cleopatra*, *The Coquette*, and *Revenge*. Among his other works are *Vincenzo Bellini*, a beautiful statue, now at Naples; *Duke Ferdinand of Genoa*, at Turin; and *Victor Emmanuel* (1897), at Naples.

Bamangwato, or BA-MANG-UATO, a native district and people in the Bechuanaland Protectorate, ruled over by the chief Khama. The Bamangwato are a branch of the great Bantu race, and opposed the fierce Matabele clans to the N. The country extends E. as far as the Macloutsie R., and across it to the confluence of the Shashi and Tuli.

Bambara, or BAMBARRA, people of French W. Africa, inhabiting a region drained by head-waters of the Joliba or Niger, and bounded on S. by the Mandingo country. The Bambara, who belong to the Mandingo race, are workers in gold, ivory, and iron, besides being skilful agriculturists. The majority are slaves and heathen, the upper classes being Mohammedans. The chief towns are Segu, Bammako, and Sansanding. The country was opened up to French trade by treaty in 1881.

Bamberg, tn., Bavaria, dist. Upper Franconia, situated on the Regnitz, 2 m. above its confluence with the Main, partly on a series of hills (795 ft.), partly in the valley below. The chief ornament of the town, which dates from before the 9th century, and contains many noteworthy buildings, is the cathedral (Late Romanesque, founded 1004, but rebuilt in the 13th century, and restored 1828-37), enshrining the tomb and relics of the Emperor Henry II., its founder. Bamberg has recently developed into an industrial town, manufacturing cottons, ropes, beer, tobacco, etc. The independent bishopric of Bamberg (area, 1,482 sq. m.), founded by the Emperor Henry II. in 1007, was secularized in 1801, and in 1802 was transferred to Bavaria. Pop. (1900) 41,823.

Bamberger, LUDWIG (1823-99), German economist, statesman, and author; studied law; became a republican leader in the revolution of 1848; was condemned to death, but escaped from the country. Returning to Germany, he entered (1868) the Reichstag as a National Liberal, where he rose to eminence as a financial authority, monometallist, and free trader, and led the secession of 1881 from the National Liberal party against Bismarck's colonial and protective policy. See his own *Erinnerungen* (1899).

Bambino (Ital. 'The Babe'), a term applied to the wooden figure of the child Jesus in the church of Ara Cœli at Rome. It is credited with miraculous healing powers. On the Epiphany (Jan. 6) occurs the festival of the Bambino, when the image, in swaddling clothes and covered with jewels, is exhibited to the people.

Bamboo, or BAMBUSA, a genus of grasses with woody aerial stems rising from branching rhizomes, and often reaching the height of ordinary trees. They are most plentiful in India, China, and Japan, and are found in Africa and America. *B. vulgaris* is found both in Asia and America, and is widely spread. It reaches a height of over 100 ft., with a diameter of 1 ft. at the base. It flowers only at long intervals, and produces grain which is used as food in India. Bamboos are put to many uses. As they are solid at the nodes and hollow between, vessels and pipes are made of them; they are also used for building purposes, and for furniture, blinds, etc. In the W. Indies the young shoots are eaten like asparagus, and paper is made both in the E. and W. Indies from the young stems. Over two hundred species of these graceful gigantic grasses - for the bamboos belong to the order Gramineæ — have been distinguished and described. They have upright perennial woody stems. No bamboo is native to Europe, but many species do well in English gardens, the first to be so grown having been the Himalayan *Thamnocalamus Falconeri*.

Arundinaria japonica (*Bambusa metake*) is one of the hardiest and most vigorous of bamboos, as it is also one of the most commonly grown. It grows to a height of seven or eight feet. *Phyllostachys nigra* is characterized by the colour of its stems, which are olive green during their first year, subsequently changing to black. It is very hardy and vigorous, and attains to a height of upwards of twenty feet. *Phyllostachys Castillonis* combines considerable hardiness with extreme beauty. Both leaves and stems are subtly variegated—green, yellow, white, and pink. *Bambusa palmata* usually grows to a height of about four feet. The leaves are bright green above, pale and slightly hairy below. *Arundinaria Veitchi* is only about two feet in height. It is hardy, and a very vigorous grower. *Bambusa tesselata* (*B. Ragamowski*) is another small-growing species. The plant has a most interesting and graceful manner of growth. *Phyllostachys Henonis*, which grows to a height of about ten feet, is perhaps our most beautiful species. See Freeman-Mitford's *The Bamboo Garden* (1896); Gen. Munro's monograph, Linn. Soc. (1866); Rivière's *Les Bambous* (1878); Routledge's *Bamboo . . . . its Cultivation and Treatment* (1875); Stewart and Brandis's *Forest Flora of N.W. and Cent. India* (1874.)

Bamborough Castle, on the summit of an almost inaccessible mass of granite (150 ft. above low-water mark) on the coast of Northumberland, England, 5 m. E. of Belford station, on the N. E. R. Founded by Ida about the middle of the 6th century, it was seized by William Rufus (1095), and remained a crown possession until the middle of the 15th century, when it was purchased by Lord Crewe, bishop of Durham, and left by him for charitable uses. It has been acquired by Lord Armstrong, who has endowed it as an almshouse. Near the castle is Bamborough village, once a Saxon royal borough. In the churchyard is the tomb of Grace Darling. See Bateson's *The Parish of Bamburgh, with the Chapelry of Belford*, published under the direction of the Northumberland County History Committee (1893); Clark's 'Bamburgh Castle,' in *Archæol. Jour.*, June 1889, pp. 93 113; Besant's *Dorothy Foster* (1884).

Bambuk, mountainous region of W. Africa, in the French colony of Senegal, between the Faleme and the Senegal River. Cattle and sheep are reared, and iron, gold, ivory, cereals, palms, and fruits are produced. The inhabitants are Mandingoes.

Bamian, former tn. (alt. 8,350 ft.), 80 m. N.W. of Kabul, Afghanistan, on N. side of the pass leading from that country into Afghan Turkestan, between the Hindu - Kush and Koh - i - baba ranges; peopled by Hazaras, and noteworthy for its five colossal human figures sculptured out of the conglomerate of the valley wall, and described about 630 A.D. by a Chinese Buddhist monk, Hwen Thsang. The two largest figures, said to represent Buddha (173 ft. and 120 ft. high respectively), are draped, and are probably the work of Buddhist artists from India. The rocks in the vicinity are honeycombed with caves, domed and pictured in a similar style. See article in *Jour. of the Royal Asiatic Soc.*, 1886, by Captains Talbot and Maitland.

Bampton, mrkt. tn. and par. in Devonshire, England, on Exe Valley Ry., 7 m. N. of Tiverton, about 2 m. from the Exe. Excellent building stone is quarried in the vicinity. A fair for cattle, sheep, and (especially) Exmoor ponies is held in October. Pop. (1901) 1,657.

Bampton, JOHN (1689-1751), founder of the Bampton Lectures, was (1718) a minor canon of Salisbury Cathedral, which position he held till his death. See *The Oxford Ten-year Book* (1882).

Bampton Lectures, a course of eight divinity lecture-sermons provided for by the will of John Bampton. In terms of the will, these lectures are to be given at Oxford on eight Sunday mornings in term between the commencement of the last month in Lent term and the third week in Act term, upon one of the following subjects: To confirm and establish the Christian faith, and to confute all heretics and schismatics; upon the divine authority of the Holy Scriptures; upon the writings of the primitive fathers; the divinity of the Saviour and of the Holy Spirit; and the Creeds. The lecturer, chosen by the heads of colleges, must be a graduate of Oxford or Cambridge.

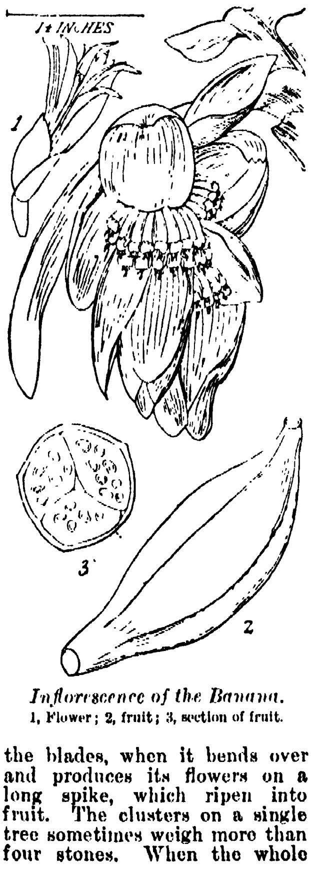
Bamra, native state in Sambalpur dist., Central Provinces, India. Area, 1,988 sq. m. Pop. (1901) 123,378.

Ban. See BANAT.

Banam, tn., Cambodia, 100 m. W.N.W. of Saigon, cap. of prov. of same name. Pop. about 8,000.

Banana, a monocotyledonous plant of the order Musaceæ. Though some have distinguished many species in cultivation, De Candolle (*Origin of Cultivated Plants*, 1884) shows that there is only one, *Musa sapentum* of Robert Brown; even the plantain, or pisang (*M. paradisiaca* of some botanists), is merely a sub-species or variety of *M. sapientum.* The original home of the banana is doubtful, but most evidence is in favour of the E. Indies. It is now cultivated in every tropical and sub-tropical country, where its nutritious fruit, rich in starch, sugar, and nitrogenous matters, forms the principal food of millions. The plant has underground stems or rhizomes, from which groups of leaves arise, their aerial petioles forming sheaths which are rolled concentrically around one another so as to form a vertical hollow structure, wrongly called the stem, which grows to a height of 18 ft. From the crown of the leaf-sheaths the blades spread out like palm leaves, each being in one broad piece from 6 to 10 ft. long. A strong midrib runs down the middle of each blade, and from it parallel veins run out at right angles towards the margin. The axis of an inflorescence which grows up the centre of the petiole-sheath arises from the rhizome until it emerges among the blades, when it bends over and produces its flowers on a long spike, which ripen into fruit. The clusters on a single tree sometimes weigh more than four stones. When the whole aerial growth decays to the ground, the rhizome continues growing and sending up new aerial shoots. The banana being a tropical plant, can only be fruited in Britain by the use of the highest stove temperatures. Certain varieties, however, notably *Musa coccinea, M. superba, M. assamica,* and *M. ensete,* may be grown for decorative purposes without the application of such great heat. All the plantain-tree species have handsome foliage.

Banana Plant.



Inflorescence of the Banana.
1, Flower; 2, fruit; 3, section of fruit.

The variety of banana which is most suitable, as it is most frequently grown, for market purposes, is the large yellow Martinique or Jamaica. These, when intended for export, are gathered green, and allowed to ripen on the voyage and after reaching their destination. In the tropics the banana is among the most important articles of food. It contains about five per cent. albumin, twenty per cent. sugar and pectose, and about seventy-four per cent. water. The dried flour of ripe bananas may be used in the manufacture of bread and cakes, and has considerable nutritive value. The consumption of bananas has increased enormously during the last few years. The fruit comes chiefly from the West Indies (imports from Jamaica in 1902 valued at £1,134,750).

Banana, seapt., N. side of riv. Congo, near mouth, Congo State, W. Africa, 6° 1′ S. and 12° 17′ E.; exports ivory, palm oil, palm nuts, rubber, and gum.

Bananal, or SANTA ANNA. (1.) Island state of Matto Grosso, Brazil, 13° 27′ to 10° 29′ S., 250 m. long, 35 m. broad, enclosed by two arms of the Araguay R. (2.) Town (alt. 1,255 ft.) and ry. stn., prov. São Paulo, 72 m. W. by N. of Rio de Janeiro.

Banas, or BUNAS, riv. in E. Rajputana, India; after a course of 300 m. from the Aravalli Mts. falls into the Chambal.

Banat (Hung. *Bansag*), in its general signification, a frontier province governed by a *ban*, a word cognate with the Slav. *pan*, 'lord.' There were several banats—*e.g.* Croatia, Dalmatia, Slavonia, Bosnia; but when the word is used without qualification, it is generally meant to indicate the Temesvar banat—*i.e.* the region between the Danube, the Tisza, the Maros, and the Carpathians, a region which for more than one hundred and sixty years (1552-1717) groaned under the tyranny of the Turks, from whom it was delivered by Prince Eugene. It was definitively incorporated with the rest of Hungary in 1860. In Roumania the banat of Craiova existed from the 15th century.

Banbridge, mrkt. tn. in Co. Down, Ulster, Ireland, on R. Bann, 16 m. N.E. of Newry by rail; is an important centre of the linen manufacture; in the vicinity large bleach-greens.

Banbury, munic. bor. and mrkt. tn. on the Cherwell, 15 m. N. of Bicester, Oxfordshire, England, with manufacture of agricultural implements, sacking, ropes, bricks, and tiles, and malting and brewing industries. There are nursery gardens in the neighbourhood. The celebrated Banbury cake has had a reputation since 1608. The castle, built 1125, is now represented by a few fragments; and the cross, immortalized in the nursery rhyme, has disappeared. Roman remains have been discovered. Pop. (1901) 3,394.

Banc, SITTINGS IN, were held at Westminster before two or more judges of the courts of Common Pleas, King's Bench, and Exchequer. By the Judicature Act, 1873, the jurisdiction of the courts *in banc* is transferred to divisional courts, which consist of two or more judges of the King's Bench or Probate Division of the High Court.

Banca, BANKA, or BANGKA, an isl. of the Dutch E. Indies, separated from the E. coast of Sumatra by the Strait of Banca; 7 to 16 m. wide. It is long (157 m.) and narrow, hilly (2,300 ft.) in the N. and S., and has a moist climate, with a heavy rainfall—119 in. at Muntok, the capital. Principal productions: tin (10,000 to 13,000 tons annually), bananas and other fruits, areca nuts, wax, and drugs. Banca forms a residency of the Dutch E. Indies, and has belonged to the Netherlands since 1608. Area, 4,475 sq. m. Pop. (1895) 93,600, of whom 32,187 were Chinese.

Banco, in finance, equivalent to 'bank value,' or the standard money in which certain European banks, especially the banks of Hamburg, Genoa, Amsterdam, and Venice, formerly kept their accounts.

Bancroft, GEORGE (1800-91), American historian, statesman, and diplomatist, studied at Göttingen in Germany; he enjoyed the friendship of Goethe, Humboldt, Lappenberg, Schleiermacher, and other eminent men. He returned to America, where he devoted himself to literature and politics, and in 1834 published the first volume of his *History of the United States.* Bancroft was minister to Great Britain (1846-9), minister to Prussia in 1867; was accredited to the N. German Confederation in 1868, and from 1871 to 1874 to the German empire. Volumes of his *History* had been published at intervals, and in 1874 the tenth volume appeared, completing the work. Two supplementary volumes, however, entitled *History of the Formation of the Constitution of the United States,* were published in 1882. Bancroft also translated Heeren's *Reflections on the Politics of Ancient Greece* (1824). A revised edition of the *Hist. of the United States* appeared in 1882-4.

Bancroft, HUBERT HOWE (1832), American historian, born at Granville, Ohio; established a book-shop in San Francisco in 1852. His works include *History of the Pacific Coast of N. America* (40 vols. 1882-91); *Native Races of the Pacific States* (5 vols. 1875-6); *Chronicles of the Builders of the Commonwealth* (7 vols. 1891-5).

Bancroft, RICHARD (1544-1610), Archbishop of Canterbury. In 1597 he succeeded Aylmer as bishop of London. He attended the Hampton Court Conference, and in 1604 he was raised to the primacy. See Fuller's *Church Hist.* (new ed. 1868).

Bancrofts, THE. Sir Squire Bancroft (1841), one of the most successful comedians of the Victorian stage, was born in London. In 1861 he made his début at the Theatre Royal, Birmingham. Maria Wilton attracted the notice of Mr. Charles Dillon, the tragedian, who engaged her for the London Lyceum in 1856. Having entered into partnership with Mr. H. J. Byron, she opened the Prince of Wales's Theatre in 1865, Mr. Squire Bancroft being one of her company. Byron's plays having fallen flat, T. W. Robertson's comedy, *Society,* was secured; and by the genius of Robertson the Prince of Wales's soon became one of the most fashionable and best frequented theatres in London. This success was followed by the production of Robertson's *Ours, Caste, Play, School,* and *M.P.,* in each of which Miss Wilton and Mr. Bancroft—who were married at the close of the 1867 season—took leading parts, as they did in the subsequent productions of *Money, The School for Scandal, Masks and Faces, Diplomacy,* and *Sweethearts.* In 1879 the Bancrofts acquired the Haymarket Theatre, which they opened in 1880 with *Money.* On July 20, 1885, they gave a farewell performance, and retired into private life. Mr. Bancroft was knighted in 1897. See the Bancrofts' autobiography, *On and off the Stage* (1888).

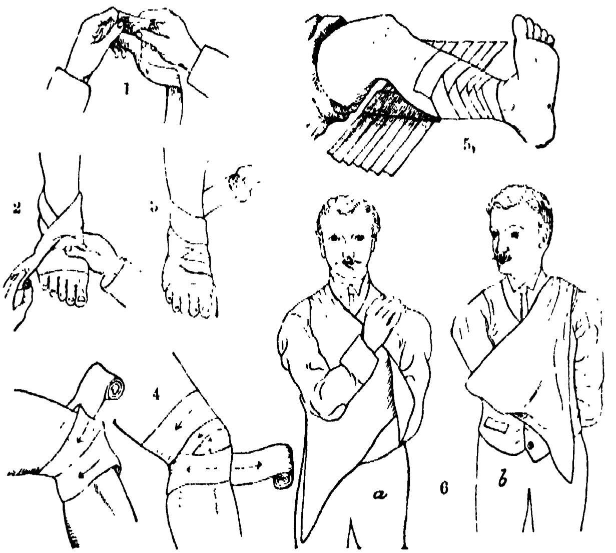
Band, in architecture, is a flat moulding, smaller than a fascia. The word, however, is applied to narrow members somewhat wider than fillets, and the word *fascia* to broader members. The cinctures sometimes used round the shafts of rusticated columns are called bands, in which case the column is styled a banded column.

Band, or BANDS, the linen appendage to the collar or neckcloth with ends hanging in front, which forms part of academical, legal, and clerical costume. It is still a recognized feature of legal attire in England; but in Scotland the white tie takes its place, except with King's counsel.

Band. (1.) MILITARY. The band of a British regiment is divided into the 'brass band' and the 'drums and fifes,' and in the Scottish regiments the 'pipers.' In addition to the establishment of trumpeters, buglers, and drummers (two per company or troop), the regulations authorize the employment of a bandmaster and one sergeant, with, in infantry battalions, one corporal and twenty privates, and in cavalry regiments fifteen privates, as bandsmen. All the bandsmen are on the effective strength of the regiment, and must be drilled and able to serve in the ranks. Bandmasters are trained at the Royal Military School of Music at Kneller Hall, near Twickenham. By Army Order 46, 1904, officers of the cavalry and infantry of the line no longer contribute to the maintenance of the band when serving in the United Kingdom or the colonies. When serving in India, every officer above the rank of lieutenant contributes a sum fixed by the commanding officer, but not exceeding twelve days' pay of his rank. In the artillery, engineers, army service corps, and marines, the bands are supported by contributions throughout the whole corps. The best known of the British military bands are those of the Guards, the Royal Artillery, Royal Engineers, and Royal Marines. (2.) NAVAL. Many large ships in the royal navy possess bands, when the commander bears the rank of post-captain or that of a superior officer. The number of performers ranges from ten to fifteen, consisting of bandmaster, band corporal, and bandsmen, the latter being recruited from the boys' bands in training-ships, and from land bandsmen. In the summer of 1903 it was resolved that all naval bands should be transferred to the Royal Marines, and that a new Royal Naval School of Music should be opened at the Melville Hospital, Chatham. (3.) In addition to the above, volunteer corps, many towns, institutions, and societies have bands more or less resembling military bands. At the annual brass band contest, held at the Crystal Palace, Oct. 1, 1904, one hundred and fifty-six competed, the chief awards being as follows:—Hebburn Colliery, first; Wingates Temperance, second; Irwell Springs, third. Private venture bands are common. For string bands see ORCHESTRA.

Banda, cap. of dist. of same name, N.W. Provinces (United Provinces of Agra and Oudh), India, situated on the r. bk. of the Ken, 70 m. S. of Cawnpur. Pop. (1901) 22,565. Dist. area, 3,061 sq. m.; pop. (1901) 631,058.

Banda. (1.) A group of islands in the Dutch E. Indies, lying some 60 m. S. of the Moluccas, rising independently from a depth of 13,000 ft.; total area, 18 sq. m. All of them are volcanic. Mt. Gunung Api (2,000 ft.) is an active crater. The chief town and centre of trade is Nassau in Banda Neira. Pop. 8,000. Sago, cocoanuts, nutmegs, and mace are the chief productions. Up to 1873 the islands enjoyed a monopoly in the production of nutmegs, which still form the chief export. (2.) B. SEA, division of the Pacific lying between the Moluccas on the N. and the E. islands of the Java-Timor chain on the S.; depth, over 2,000 fathoms, except between the Kei Is. and the string of islets extending from the E. end of Ceram. Between the Kei and Aru archipelagoes there is a deep trough (5,684 fathoms) connecting the Banda Sea with the Arafura Sea.



Bandaging.

1. Rolling the bandage. 2. Reversing. 3. Figure eight. 4. Divergent spica of knee joint. 5. Many-tailed bandage. 6 *a* and *b*. Triangular handkerchief supporting elbow.

Bandage and Bandaging. The bandage may be used to fix splints or dressings, to prevent or to lessen swelling, to stop hæmorrhage, to drive the blood from a limb before operation, to support a limb, or to prevent or lessen movement. It is usually made of calico, linen, domett (a plain cloth, with the warp cotton and the weft woollen), or of flannel. When applied to a wound it may be of gauze, medicated with carbolic acid, iodoform, boracic acid, or some other antiseptic. It may be stiffened with starch, plaster of Paris, or other stiffening material, when it is intended to replace a splint. An elastic rubber bandage (Martin's) is sometimes used in cases of varicose veins in the leg. The bandage is wound spirally about the leg before the wearer rises from bed, and is taken off at night. It supports the walls of the diseased veins with an equal pressure, which must not be uncomfortably great. Because of the heat it produces, the Martin's bandage must be kept particularly clean by washing; and the limb on which it is used must be washed nightly, and then dusted with fuller's earth or some such non-irritating powder. Esmarch's rubber bandage is used to drive blood from a limb before any serious cutting operation that involves risk of considerable loss of blood. The patient being laid flat, the arm or leg is raised as high as possible. This of itself helps to empty the limb of blood, and firm stroking towards the trunk helps further still. The Esmarch's bandage is then rolled round the limb, beginning at fingers or toes, and covering the whole with spiral turns. A thick piece of rubber tubing is tied tightly round the limb just where the bandage stops, and return of the blood being thus prevented, the bandage is removed. An amputation may thus be rendered practically bloodless. The ordinary 'roller' bandage is usually 18 ft. long, and from 2½ to 4 in. broad. As a rule, only elastic bandages can be applied with simple spiral turns. Bandaging always proceeds from below upwards, to help the blood onwards, and to lessen the risk of stopping circulation; and the gradually increasing girth of the average arm or leg necessitates *reverses*—*i.e.* half-turns of the bandage on itself, bringing its inner face outwards. The 'spica' and the 'figure of 8,' whereby the heel or the knee is passed, are more easily explained by diagram than by words; their object is always to make the bandage lie more closely, and therefore more securely. When an arm or a leg is bandaged, the fingers or toes are left uncovered, so that a glance will serve to show whether there is any swelling or discoloration, which means too tight a bandage, and consequent risk of gangrene. A roller bandage, properly put on, lies snug and smooth, with about the upper third of each turn covered by the turn next after it. The lower end is fixed by the first turn or two covering it. The upper end is fastened off with a safety pin; or the bandage is split lengthways for as far as is necessary, the two divisions are knotted together at their base, to prevent the split from lengthening, and then, the split ends being carried in opposite directions around the limb, they are tied together in a reef knot. The finishing off of a bandage must always be of such a form and in such a position that it shall not inconvenience the patient. Ordinary pins must never be used. In bandaging for sprains, and in any case where swelling is to be feared, the four chief points are: (1) to have plenty of elastic pressure, by means of wool padding; (2) to apply that pressure as quickly as possible; (3) to bandage firmly but not tightly; and (4) to examine the bandage without fail in three hours, to see whether it needs slackening.

The roller bandage is the one chiefly used; but the triangular bandage, made by doubling a handkerchief diagonally, is useful for covering the head and for making a sling; while the 'many-tailed' bandage is useful for the trunk or a leg, when dressings need to be frequently changed on the upper surface without change of position. The part lies on an unsplit piece of material, whose long axis is parallel with the long axis of the part. Strips are sewn on either side of this piece, which overlap one another when brought across the limb or trunk, where they are pinned over. See Caird and Cathcart's *Surgical Handbook* (1889).

Bandana, an Indian term properly applied to the rich yellow or red silk handkerchief, with diamond spots left white by exceedingly great pressure applied to prevent their receiving the dye. It has now come to mean a kind of calico printing in which white or bright-coloured spots are placed upon a Turkey-red or dark ground.

Banda Oriental, former name of Uruguay.

Bandawe, Livingstonia Mission stn., W. shore of L. Nyasa, Nyasaland, Equatorial Africa, on a sandy promontory at the base of the Angoni Mts., with an unhealthy climate.

Bandel, Ernst von (1800-76), German sculptor, born at Ansbach in Bavaria, and studied at Munich, Rome, and Hanover. His *Mars Asleep* (1825) established his reputation. His chief works are his colossal statue of Arminius, near Detmold, and busts of Maximilian of Bavaria and the poet Grabbe. See Schmidt's *Ernst von Bandel* (1892).

Ban-de-la-Roche. See Steinthal.

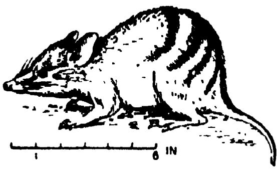
Bandelkhand. See Bundelkhand.

Bandello, Matteo (*c.* 1490-1561), Italian novelist, was born at Castelnuovo (Tortona); entered the Dominican order, and became teacher of Lucrezia Gonzaga, in whose honour he wrote a poem in eleven cantos (1545). Proceeding to France, he was made bishop of Agen by Henri II. (1550). He died at Agen, after a life full of strange loves and adventures. Bandello's *novelle*, written between 1510 and 1560, were published in 1554 (Lucca) and 1573 (Lyons). They are based on the tales of former collections, and on contemporary events. Though in many ways a disciple of Boccaccio, Bandello is devoid of humour. His characterization is excellent, and his narrative direct. The erotic adventures which abound are told with a certain restraint. Several of the tales were used by later dramatists and poets (such as Lope de Vega and Byron); but the *Romeo and Juliet* is derived from the same source as Shakespeare's play—the story of Luigi da Porto. Good editions of the *novelle* are those of London (1740), Milan (1813-14), and Turin (1853). English translations by G. Fenton, 1567 (reprinted in the 'Tudor Translations,' with an introduction by R. L. Douglas, 1898), and by John Payne (for the Villon Society, 1890). The latter version only is complete. See E. Masi, '*M. B., o Vita Italiana,*' in *Un Novelliere del Cinquecento* (1900); Morellini, *M. B., Studj* (1900); and V. Spampanato, *M. B. e le sue Novelle* (1896).

Banderole. (**1.**) A scroll very common on engravings of the 16th-18th centuries, containing a motto, or title, or description of the picture. (**2.**) The piece of bunting attached to a lance or spear, and formerly often decorated with the crest or badge of the bearer.

Band Fish (*Cepola rubescens*), a slender, compressed, and much-elongated bony fish, remarkable for its minute scales and almost uniform red colour. It is rare in British waters. Other species inhabit the north temperate zone.

Bandicoot, a name applied, alone or in combination, to various small marsupial mammals belonging to the family Peramelidæ, found in the Australian region. They are especially characterized by the structure of the feet—the hind feet resembling those of the kangaroo, while the fore feet have two or three of the middle toes of equal length, with strong, sharp claws, and the other toes rudimentary. All are either omnivorous or insect-eating. The common bandicoots (*Perameles*) are small ground animals with pointed noses; the rabbit-bandicoot (*Peragale*) is a burrower; the native rat, or rat-bandicoot (*Chæropus*), is an aberrant form with very long hind feet.



Common Bandicoot.

Bandiera, Attilio (1817-44) and Emilio (1819-44), Neapolitans, sons of an Austrian admiral, who, after attempting an insurrection in Calabria against the Bourbon tyranny at Naples, were captured and executed at Cosenza (1844). Their letters (from Aug. 15, 1842) to Mazzini, opened in London by the English government, were published by Mazzini, under the title of *Ricordi dei Bandiera* (1844). See Ricciardi, *Storia dei Fratelli, B. e Consorti* (1863).

Bandinelli, Baccio (?1488-1560), Florentine sculptor, son of a celebrated silversmith; a contemporary of Michael Angelo and Cellini, whom he vainly tried to rival. Among his masterpieces are the figure of *Christ at the Tomb*, the group of *Adam and Eve*, and the bas-reliefs in the Duomo at Florence. See Vasari's *Lives*, vol. iii.

Banditti. See Brigands.

Band of Hope, great children's temperance society, with the official title of The United Kingdom Band of Hope Union, founded in 1855, but started with local unions eight years previously. In 1904 it had 29,189 Bands of Hope, with a membership of 3,363,973. It publishes juvenile temperance literature and the *Band of Hope Chronicle*.

Bandolier, or Bandoleer, a leather belt worn over the left shoulder, from which, in mediæval times, were suspended a dozen small metal boxes, each containing a charge of powder and shot. Cartridges are placed in small clips fastened to the bandolier.

Bandoline, a gummy substance, produced from gum tragacanth, quince seeds, Irish moss, or Iceland moss, with perfume added, used by hairdressers to make the hair glossy, or to fix it in position.

Bandon. (**1.**) Market tn. in Co. Cork, Munster, Ireland, on riv. Bandon, 20 m. S.W. of Cork; has breweries and distilleries. Pop. (1901) 2,830. (**2.**) River, rises in the Carberry Mts., Co. Cork, and flows E. into Kinsale harbour; navigable for barges to 4½ m. below the town of Bandon.

Bandong, or Bandung, tn., W. of Java, Dutch E. Indies, 75 m. by rail S.E. of Batavia.

Bandra, tn., Thana dist., British India, S.W. end of Salsette I., which is connected with the island of Bombay by a causeway and bridge. Pop. (1901) 22,075.

Bandy, hockey played on ice as distinct from hockey on land. It is largely played in the northern United States, where it is known as 'shinney' or 'shinty.' The rules are very similar to those of hockey. A bandy team consists of eleven players; the ground is a right-angled parallelogram, the best size for play being 150 yds. by 100 yds., and the recognized minimum 100 yds. by 50 yds. The bandy, or club, is of wood, not exceeding 2 in. in width in any part, or 4 ft. in length as measured along the handle and round the curve, and it must not have metal fittings or sharp edges. The ball is of solid india-rubber, not less than 2¼ in. nor more than 2⅜ in. in diameter. The goals are in the centre of the short sides of the ground. They consist of two goal-posts 12 ft. apart, connected by a horizontal tape or lath 7 ft. from the ice. A goal is scored when the ball has passed between the goal-posts and under the tape or lath. The recognized time for play is 1½ hours, choice of goals being tossed for, and ends changed at 'half-time.' Play is started by the referee or one of the umpires (of whom there should be two) throwing the ball vertically into the air. When the ball reaches the ice it is in play. While it is in play, and when a player strikes at the ball, the bandy may not, during any part of the stroke, rise above the player's shoulders.

Baneberry (*Actæa spicata*), a plant, also known as HERB CHRISTOPHER, belongs to the Ranunculaceæ; has compound divided leaves, upright racemes of small white flowers ripening into purplish-black poisonous berries, which, combined with alum, yield a black dye. The roots are antispasmodic, expectorant, and astringent.

Banér, JOHAN (1596-1641), Swedish general, born at Djursholm, near Stockholm; fought with distinction in the Russian and Polish campaigns of 1626-9, and accompanied Gustavus Adolphus to Germany in 1630, commanding the right wing at the battle of Breitenfeld. On the death of Gustavus he was made commander-in-chief of the Swedish forces in Germany, and gained a brilliant victory at Wittstock in 1636, defeated the Imperial troops near Chemnitz in 1639, and occupied Bohemia for a whole year. He was a born strategist, and it was primarily to him that Sweden owed her success in the Thirty Years' war.

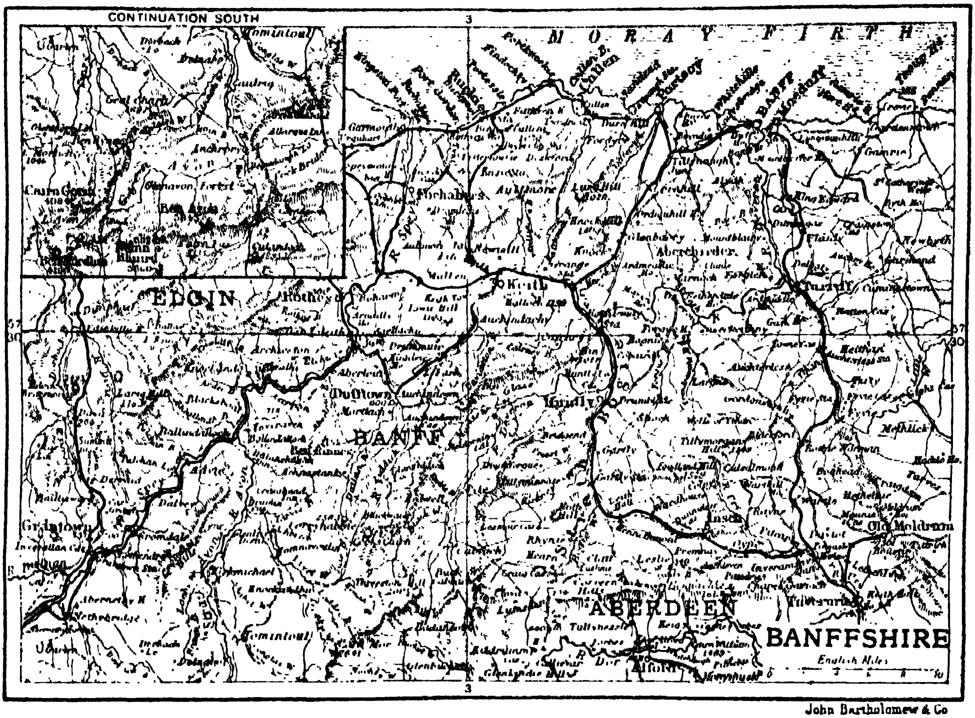
Banff. (1.) Royal and parl. bor., seapt., and mrkt. tn., Banffshire, Scotland, on Moray Firth, at mouth of R. Deveron; has two stations on G.N.S.R.; birthplace of Archbishop Sharp; fishing centre. The Duke of Fife's seat, Duff House, is in the neighbourhood. Pop. (1901) 3,730. (2.) Town, Alberta, Canada, 80 m. W. of Calgary, on C.P.R., at the base of the Rocky Mts.; is included in a national park, and has hot sulphur springs and coal mines.

Banffshire, maritime co. of N.E. Scotland, bounded on the N. by the Moray Firth, E. and S. by Aberdeenshire, W. by Inverness and Elgin shires. Area, 630 sq. m., or 403,364 ac.; greatest length, 59 m.; greatest breadth, 32 m.; average breadth not exceeding 12 m. Pop. (1901) 61,488. The county town is Banff. In the N. the land is low-lying and fertile; in the S. mountainous. The climate is dry and mild in the N., wet and cold in the S. The highest peaks are Cairngorm (4,090 ft.), Ben Macdhui (4,295 ft.), Ben Avon (3,843 ft.), Beinn a Bhuird (3,860 ft.). There are quarries of slate, marble, granite, gneiss, mica-slate, old red sandstone, and limestone. Other minerals are topazes and rock crystals (cairngorms). Agriculture is extensively carried on, cattle are reared, and many of the inhabitants are engaged in the fishery industry. There are several large distilleries, including Glenlivet. The chief historic event connected with the county is the battle of Glenlivet (1594), between the forces of Huntly and Argyll. Ruins of mediæval castles exist at Balvenie, Auchindoun, Findlater, Boharm, and Banff, and of old ecclesiastical buildings at Mortlach and Gamrie. See 'Aberdeen and Banff,' by W. Watt, in *County Hist. of Scot.* (1900).

Banffy, DESIDERIUS, COUNT (1843), Hungarian statesman, born at Klausenburg, Transylvania. In 1892 he became president of the Hungarian Chamber of Deputies, and in 1895 prime minister of Hungary. In this capacity he completed the passing of the ecclesiastical and educational law, but failed to obtain Parliament's sanction to the compromise (*Ausgleich*) with Austria, and resigned in February 1899. In 1902 he published a new national programme for Hungary.

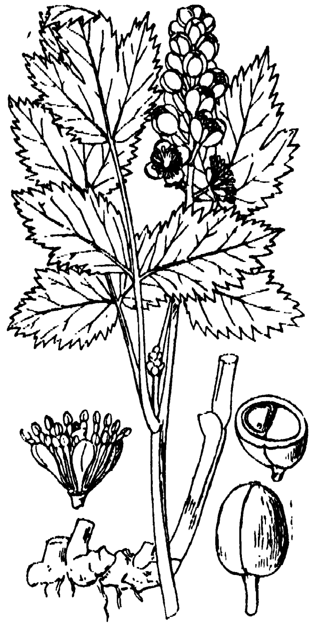
Bang, HERMANN JOACHIM (1858), Danish novelist and journalist, has written the critical works, *Kritiske Studier* (1879-80) and *Realisme og Realister* (1879); and the novels, *Haablöse Slægter* (1880), *Stuk* (1887), *Stille Existenser* (1886), *Det Hvide Hus* (1898), and *Liv og Död* (1899).

Bangalore, cap. of native state, Mysore, India, lies about 150 m. due W. of Madras, with which it is connected by rail. A salubrious climate, a fertile soil, and an excellent water supply have attracted a colony of European settlers. Situated over 3,000 ft. above sea-level, Bangalore commands the province of Mysore, and is an important military station. The fort was stormed by the British under Lord Cornwallis in 1791. Pop. (1901) 159,030.



John Bartholomew & Co

Bange, VALÉRIEN DE (1833), French artillerist, the inventor of the obturator for the prevention of gas escape in the breech mechanism of big guns, in use in the British, French, and other armies. The chief feature of the invention (about 1876) is a canvas pad containing a mixture of asbestos fibre and mutton fat. See Hennebert's *L'Artillerie Krupp et l'Artillerie de Bange* (1887).



Baneberry, showing Root, Flower (part removed), and Fruit.

Bangka, E. Indies. See BANCA.

Bangkok, the cap. of Siam, on both banks of the Menam, 20 m. from the Gulf of Siam, consists of a succession of towns. The first is the commercial town, with shipping, sawmills for teak, and rice-mills; next the town of the Asiatics (Malays, etc.), mostly built on bamboo rafts on the river; then the consular district, with verandahed houses and flowering trees; and lastly, the 'malodorous and ill-mannered' Chinese Bangkok and the native Siamese town, dominated by the royal palace. Steel bridges are taking the place of old wooden ones; tramways traverse the streets, some of which are lighted by electricity. Bangkok is the chief port of the kingdom, its trade being chiefly with Hong-kong, Singapore, Bombay, and Great Britain. Chief exports, rice, fish, *bêche de mer*, cattle, and pepper; imports, textiles, bullion, machinery, opium, and sugar. The annual trade amounts to about £5,800,000. Pop. 400,000. See Smyth's *Five Years in Siam* (1898).

Bangor. (1.) City, munic. bor., and seapt. tn., Carnarvonshire, N. Wales, 9 m. N.E. of Carnarvon, on Chester and Holyhead Ry.; exports slate from the Bethesda quarries, and contains a cathedral (dedicated to St. Deiniol, founded 525 A.D., and restored 1881), a constituent college of the University of Wales, and a normal school. Daily steamers Liverpool to Bangor in summer. Pop. (1901) 11,269. (2.) B.-ISCOED ('below the wood'), charming Welsh village on the r. bk. of the Dee, in outlying portion of Flintshire, 5 m. S.E. of Wrexham; was the site of an ancient monastery. (3.) Seaport tn. and par. (17,015 ac.), Co. Down, Ulster, Ireland, on S.E. side of Belfast L., with terminal station on railway, 12 m. N.E. by E. of Belfast. Muslin embroidery is the principal industry. Clandeboye, the seat of the Marquis of Dufferin, is about 2 m. away. Pop. (1901) 5,903. (4.) City, Maine, U.S.A., the co. seat of Penobscot co., situated on the Penobscot R., 60 m. from its mouth, at the head of navigation, with considerable commerce. The Maine Central Ry. enters the city. Here is the Bangor Theological Seminary (1816). Pop. (1900) 21,850.

Bangorian Controversy arose (1717) from a sermon by Bishop Hoadly, in which he denied that the church possessed authority over the individual conscience. This led to a many-sided controversy. Hoadly's principal opponents were Bishop Sherlock and William Law.

Bangued, tn. on Abra R., cap. of Abra prov., N.W. part of Luzon, Philippine Is. Pop. (1898) 13,117.

Bangweolo, or BEMBA, LAKE, in N.E. of Rhodesia, 3,800 ft. above the level of the sea, lying in long. 30° E., not far from S.E. corner of the Congo Free State. Area, 1,600 to 1,700 sq. m., but variable. Its waters find an outlet, at the S. corner, to Lake Mweru and the Luapula, a tributary of the Congo. Discovered by Livingstone in 1868.

Bania (Banian), a Hindu caste of traders (Vishnuites) who abstain from eating flesh. They are found in all the towns of W. India, dealing in grain, cotton, and dry goods, and are distinguished by thrift and commercial acumen, especially as bankers and money-lenders at a high rate per cent. They carry on trade with the interior of Asia by caravans, and with Africa by ships; many have settled on the east coast of Africa.

Banian Days, in allusion to the ascetic habits of the Hindu Banians, or derived from banyan, the E. Indian fig. A sailor's phrase for the days (originally two, afterwards one, per week) on which no flesh meat was served in the British navy; now applied to any period of poor feeding.

Banian Tree. See BANYAN.

Banim, JOHN (1798-1842), Irish novelist, was the younger of the two brothers who wrote *Tales of the O'Hara Family* (1825-9). Born at Kilkenny, he began life as a drawing-master; but ill-health caused him to give up first art, then dramatic literature, although his play, *Damon and Pythias*, had been acted with success at Drury Lane Theatre, London. Of the *O'Hara Tales* John Banim wrote 'The Peep o' Day,' 'The Fetches,' 'The Smuggler,' 'Peter of the Castle,' 'The Nowlans,' 'The Last Baron of Crana,' and 'The Disowned.' His chief separate novels were *The Denounced* (1830), *The Sergeant's Wife* (1850), *The Smuggler* (1833), *The Celt's Paradise* (1821), *The Bit o' Writin'* (new ed. 1865), *The Boyne Water* (1865), *The Mayor of Windgap* (new ed. 1865), *The Peep o' Day* (new ed. 1865), *Peter of the Castle* (new ed. 1866); though to many of these his brother Michael wrote notes, if not more. See P. J. Murray's *Life of Banim* (1857), and Miss Mitford's *Recollections of a Literary Life* (1859).

Banim, MICHAEL (1796-1874), elder brother of the above, besides joining in the *O'Hara Tales*—*e.g.* 'Crohoore of the Bill Hook'—wrote, with his brother, *Father Connell*, which has for its hero a kind of Roman Catholic Vicar of Wakefield, and alone, *The Croppy* (1828), *The Ghost Hunter* (1863), *Joe Wilson's Ghost* (1870), and *The Town of the Cascades* (1864). *The Chaunt of the Cholera* (1831) was probably written by both brothers.

Banishment (O.E. *ban*, 'proclamation' or 'decree'), originally exclusion of a person from the protection of the law and the society of his fellows, usually for crime or refusal to submit to a tribunal or its decrees. (See OUTLAWRY.) In more advanced societies it implies forcible exclusion from a country with or without confiscation of goods. The punishment was frequently enforced in England even down to the 18th century, despite the clause of Magna Charta which enacts that no freeman shall be banished except by the judgment of his peers or by the law of the land. But one who abjures the realm might lose the right to return. (See OATH.) Rogues could be banished under an Act of 1597, and unregistered Jesuits and members of other Roman Catholic orders may still be banished under the Catholic Emancipation Act, 1829. See TRANSPORTATION. Some modern states, such as Russia, Turkey, etc., still practise banishment for political offences.

Banjaluka, pleasant tn. of Bosnia, in the Balkan Peninsula, on the l. bk. of the Verbas, 87 m. N.W. of Sarajevo.

Banjermassing, or BANJERMASIN, cap. of Dutch Borneo, in the E. Indies; stands near the s. coast, on the Martapura, a few miles from the Barito R., and carries on a brisk trade in spices, gold, canes, wax, drugs, diamonds, etc. (exported), and in cottons, iron goods, salt, rice, etc. (imported). Pop. (1898) 48,021. From the middle ages down to 1857 there existed an independent Malay state of the same name, its cap. being Martapura.

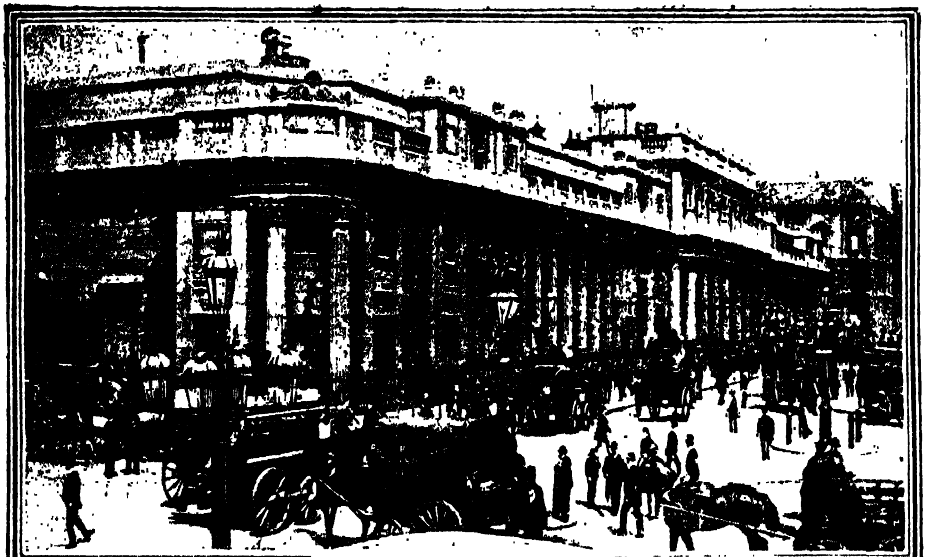
Banjo, a musical stringed instrument originated by the negroes of America. It consists of a hoop of wood or metal, with a long neck containing the tuning pegs in its upper part, and a vellum drumhead body. The strings, from five to nine in number, rest upon a bridge, and are stopped with the fingers of the left hand and plucked with those of the right. The finger-board of the banjo contains no frets, and the upper or octave string is never stopped by the fingers.

Bank, an institution for keeping other people's money both safe and readily available, and for making a profit by putting it out at interest. Banks receive money on current account, or on deposit account. Money received by a bank on current or drawing account is paid in by the bank's customer on the understanding that he can at any time, within certain fixed hours of business, demand the repayment of the money he has deposited, in whole or in part, by means of a written order to pay, signed by himself, and called a 'cheque.' Cheques may be made payable to the bank's customer himself, or to some person named by him. Money received by a bank on deposit account is paid in by the customer on the understanding that he can only demand its return at the expiration of an agreed term of notice of withdrawal, such as a fortnight, one month, three months, twelve months, etc. Some banks, in order to attract custom, allow interest on all moneys deposited with them; but, as a rule, except in the case of very big customers, such as wealthy corporations maintaining enormous daily balances to their credit, banks do not allow interest on money deposited on current account. On the other hand, except in the case of very small accounts with a very small average credit balance, they make no charge—in no case is the charge other than nominal—for the work involved in keeping a customer's account. With regard to money received on deposit account, all banks allow interest varying directly with the length of notice necessary to the withdrawal of the deposit.

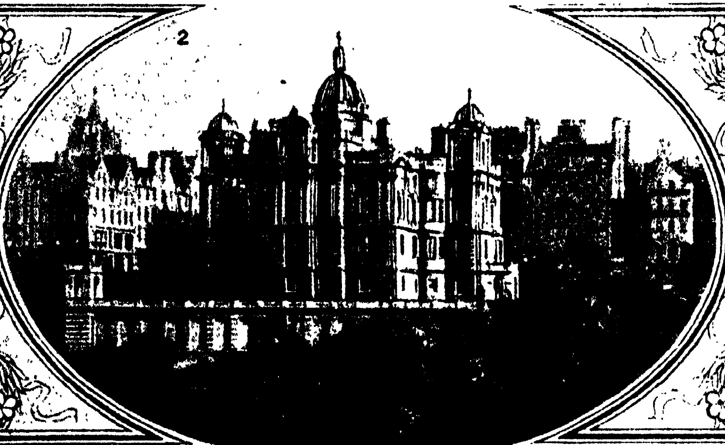
Now, the theory of modern banking, upon which the solvency of every bank entirely depends, is that on any given day comparatively few depositors will draw out the whole or even a large part of the money standing to their credit. This applies to the current accounts; of course, with regard to the money on deposit accounts, the bank knows from day to day exactly how much is under its control, and for how long. Thus, within certain limits determined by experience, there is always in a bank a large floating balance of depositors' money which is not likely to be called for, and which may be safely employed in the money market by the bank for its own profit. As a matter of fact, a dozen of the great London banks, with customers' deposits aggregating nearly £330,000,000, had, at a recent date, just under £50,000,000 in cash for meeting all likely demands. This represented about £15 out of every £100 deposited with them; the other £85 were invested partly in government securities and other high-class stocks, and partly in loans to individuals, corporations or public authorities, advances on mortgage, etc. The proportion of deposits which it is desirable for a bank to keep in hand varies from a multiplicity of causes which are quite normal, such as the business of its principal customers, the due dates of dividends or of taxes, quarter days, harvesting (principally affecting country banks), Christmas, bank holidays, etc.; and also, from time to time, from other abnormal causes, such as trade depression, speculative activity, or commercial panic. Thus, the bankers to the British government (the Bank of England) must be ready on consol pay days (Jan. 5, Apr. 5, July 5, and Oct. 5) to pay out a large proportion of their largest customer's deposits; on the other hand, during the three months January to March the heavy receipts from income tax place, in normal times, a large floating balance at the safe disposal of the bank.

In times of panic the banks are in hourly danger of sudden demands by a large number of customers for a return of their money. This is called a 'run' on the bank. Suppose that out of every £100 deposited with it, a bank has £15 in cash either behind its counter or in reserve (say at the Bank of England), £15 invested in gilt-edged securities (such as consols, railway debentures, etc.), £10 on loan at call or short notice, and the remaining £60 locked up in loans for periods varying from one to twelve months, in mortgages, or in various undertakings; suppose that a great commercial failure takes place, and a panic develops in a week, and that, as a result, in the course of a few days the bank is called upon to return to its customers £50 in every £100 deposited by them: what happens? The 15 per cent. of cash is soon swallowed up; the 15 per cent. of consols might, on forced sales in a falling market, sink to 13 per cent. in realized cash—that also is eaten up; next the 10 per cent. on loan at call or short notice may, with shaken credit and general loss, possibly only produce 7 per cent. of cash—this also goes. Thus, by hook or by crook, the bank managers may be able to get in £35 to meet a demand for £50—a deficit of £15 in every £100. It is true that against this they hold securities of one kind or another representing £60; but the immediate need is for cash, not securities. Then, unless the securities are unexceptionable, and the bank can persuade some other bank or banks to come to the rescue with advances of cash to tide it over the difficulty, it must suspend payment. But the suspension of payment, apart from the heavy losses on forced realizations at a time of panic, is absolutely destructive of the bank's credit, and so there is an end of it.

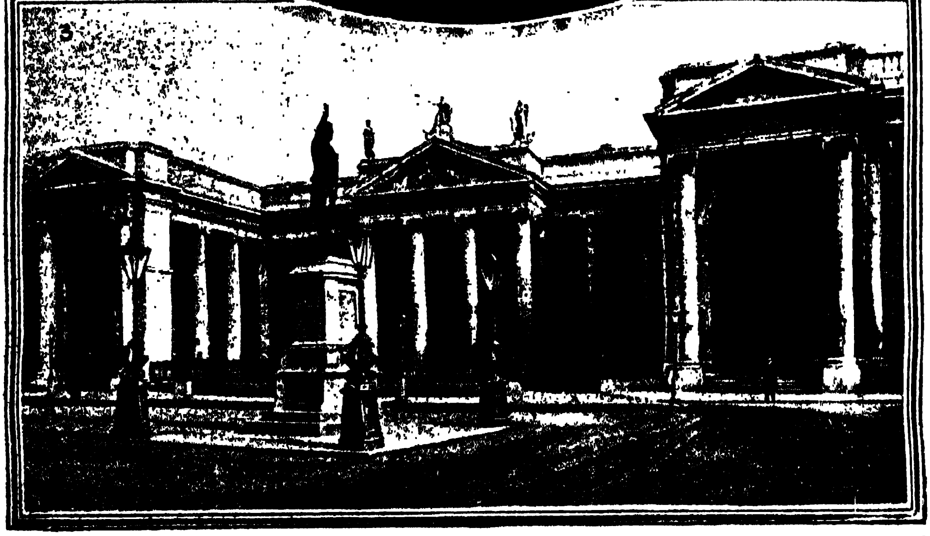
A banker, like any other trader, requires capital in the first instance, partly to erect suitable premises, but chiefly as a guarantee to those who are invited to trust their money to him. This capital, however, in a successful bank, bears but a small proportion to the customers' deposits; hence the high dividends which banks often return to their proprietors or shareholders. This comparatively small capital is the only fund from which bad debts incurred by loans to persons who fail to repay them can be made good; hence the imperative necessity under which all prudent banks lie of taking ample security before lending their customers' money. There would be few insolvencies if time could be had, and time would generally be given to an embarrassed banker if his credit were good; and once his cash is exhausted, his credit must depend on the nature of the security upon which he has conducted his transactions. In 1866 the Bank of England refused to lend Overend, Gurney, and Co. £400,000 in a time of crisis because they could not offer satisfactory security for the advance, and the company failed for £19,000,000, bringing about probably the greatest financial disaster in the history of the City of London. On the other hand, a similar or even greater disaster was averted in 1891, when the Bank of England (borrowing for the purpose £3,000,000 from the Bank of France), backed up



2



3



Three Great Banks.

1. Bank of England. (Photo by York & Son.) 2. Bank of Scotland, Edinburgh. (Photo by G. W. Wilson & Co.)
3. Bank of Ireland, Dublin. (Photo by W. Lawrence.)

by a guarantee fund of £15,000,000 underwritten by the leading London banks, came to the rescue of Baring Brothers. The firm's aggregate liabilities were about £28,000,000, but the slow liquidation of their assets, rendered possible by this timely support, averted wholesale ruin.

Besides making profits by lending their customers' money, banks borrow money on their own credit by issuing promissory notes, which pass as money among their customers or wherever their credit is good. Such banks are called 'banks of issue.' The theory of this practice may be expressed as follows:—A banker issues, say, £2,000 worth of notes against a reserve of, say, £1,000, arguing that, so long as the notes circulate freely as money, a large proportion of them will be always out. By using this £2,000 worth of notes in his business as if it were £2,000 cash, while keeping only £1,000 real cash in hand, he is practically getting the benefit of £1,000 of fictitious capital, the interest on which is so much additional profit. So long as things go well, no harm can befall him; but if his debtors begin to fail him, and the holders of his notes, losing confidence in their value, begin to press for the cash they represent, he may find himself in difficulties. In the United Kingdom, as will be seen below, stringent legislation has been passed regulating the issue of bank notes.

The most striking development of the banking system is afforded by bankers' clearing-houses of which the London Clearing-house is the most famous. Prior to the year 1775 each banker had to send a clerk to every other banker in London, to collect the sums payable by them to him. In 1775 a common centre of exchange was agreed upon—the 'clearing-house'—where the clerks employed in this business ('clearers') met daily for the exchange of bills and cheques and the settlement of differences. An analysis of the clearing-house returns made in 1856 showed that the amount of cash necessary to pay the balances due between the different banks was often less than 4 per cent. of the total sum cleared. Subsequently the clearing-house, as well as each bank using it, opened an account at the Bank of England, and now the balances due at the close of each day's transactions are settled by transfers from one account to another in the books of the Bank of England. The country banks are represented by the London bank which is their correspondent, as every bank in the United Kingdom has an agent in London. The larger provincial towns have also clearing-houses of their own. The immense utility of these institutions can be inferred from the fact that the total of the cheques passing through the London Clearing-house is about £9,000,000,000 a year.

Banker and Customer.—The ordinary relation between a banker and his customer is that of debtor and creditor. When a person opens an account at a bank, the banker becomes liable for the amount paid in, and to honour or cash cheques by that person if presented within banking hours, and if sufficient money to meet them is standing to his credit. Sometimes the banker allows a customer to overdraw his account, taking security for the overdraft, or the guaranty of a third person. In this case the customer is, of course, the debtor of the banker to the extent of the overdraft. The duty of a banker to honour the cheques of his customer is owed solely to the customer, and therefore he alone can sue if his cheque is dishonoured. A banker is entitled to refuse payment of a cheque if presented at any of the bank's branches other than the branch at which the customer's account is kept. On the other hand, he is not bound to honour a cheque presented at one of the bank's branches where there is a balance standing to the credit of the drawer, if the latter has overdrawn his account at another branch to a greater amount than such balance. A banker is not justified in disclosing the state of a customer's account unless authorized to do so, or under legal compulsion; nor may he close an account without reasonable notice, if the customer has a balance standing to his credit and there are cheques of his outstanding. Bankers often receive plate and other valuables belonging to their customers for safe custody. When they do this gratuitously they are only bound to take the ordinary care that a reasonably prudent man would take of his own property of a like nature. Unless there is a contract to the contrary, bankers have a general lien on all securities deposited with them as bankers by their customers. This lien does not extend to plate and other property deposited for safe custody. Bankers frequently issue letters of credit for the transmission of money, either within the United Kingdom or abroad. A letter of credit is 'an authority from the banker who signs it to the banker or other person to whom it is addressed, upon advice, to honour the drafts of the person named in it, and who produces the letter.' He alone is entitled to draw the drafts or to receive payment, and a letter of credit is not a negotiable instrument. See also BILL OF EXCHANGE, CHEQUE, and NEGOTIABLE INSTRUMENT.

General History.—Banking in many of its forms was known to the ancients, notably the Greeks and Romans. Roman banks received money on current account, paying it out to their customers' written order; or on deposit account, repayable at stipulated times. Like their modern successors, they made their profit by lending their customers' money at a higher rate of interest than they allowed them, where they allowed any at all. They do not appear to have issued notes. In the dark and middle ages, the Jews in Europe, as the world's money-lenders, performed some of the functions of bankers. The Lombardy Jews are said to have established a bank in Italy as early as 808 A.D. Be this as it may, Lombard Street, the home of bankers in the City of London, undoubtedly takes its name from descendants of those who settled in London many centuries later.

The Bank of Venice, formed in 1157, is generally given as the first bank. In 1156, the Venetian government, being in sore need of cash, made a forced loan from the wealthier citizens, promising, in return, the punctual payment of interest on the money thus requisitioned. In course of time, as the interest was always punctually paid, every claim against the government registered in the books of the 'bank' would come to be regarded as dividend-earning capital passing from hand to hand by death or deed of gift. Gradually holders of these annuities would see that payments could be made by an order on the bank to transfer portions of their holdings to certain specified persons, and so bank-money came into existence. In fact, the government of Venice created perpetual annuities, and the so-called Bank of Venice was, in the first instance, merely a transfer office of a national debt. It was not until after an experience of several centuries, and subsequently to the loans of 1480 and 1510 A.D., levied in the same manner as that of 1156, that the Bank of Venice became entitled to be called a bank in the modern sense. This bank was destroyed by the French invasion in 1797.

According to Macleod, the origin of modern banking is more properly attributable to the money-lenders of Florence, who, in the middle of the 14th century, were famous throughout Europe, especially the houses of the Acciajuoli, Bardi, Peruzzi, Pitti, and Medici. Thus, in 1345, the Bardi and Peruzzi of Florence failed for large sums. Edward III. of England owed them 1,500,000 gold florins, which he could not repay. Again, between 1430 and 1433, seventy-six bankers at Florence are said to have advanced to different persons nearly 5,000,000 gold florins. But the principal function of a modern bank—that of keeping depositors' money safe but accessible—was perhaps first undertaken on a large scale by the Bank of Amsterdam, founded in 1609. Even in this case the motives of the founders were mixed. Amsterdam was at that time the world's central exchange and mart, with the coins of all nations—some clipped, some debased, and all varying in intrinsic value from time to time—passing through its counting-houses. Partly, then, to steady the exchanges, as well as for security of their cash, the merchants of Amsterdam established a bank to receive all currency at its intrinsic value, and issue therefor standard coin of the country in which it gave credit to depositors in its books.

The history of banking in England is coextensive with that of the Bank of England (see below), but its early origin may be traced to the practice of the London goldsmiths, who throughout the 17th century were in the habit of receiving deposits of money and valuables, against which they issued receipts; these 'goldsmiths' notes,' as they were called, passed readily from hand to hand. Scott, in the *Fortunes of Nigel*, has introduced us to the goldsmith, 'Jingling Geordie,' banker to James I. Since 1694, the year of the charter of the 'Old Lady of Threadneedle Street,' as the Bank of England is popularly called, that bank has gradually established a practical monopoly of the right to issue bank notes, and—in spite of the early competition of the great private banks, and the rapid growth during the last half of the 19th century of the joint-stock banks to a position, collectively, of overshadowing importance—has gradually built up, by the gravitation of financial interests to London, operating through the device of the clearing-house, a highly-centralized system of credit, founded on the narrow basis of one great institution—cash reserve. In Scotland and Ireland, on the other hand, the issuing of bank notes was never made subject to the same stringent regulations as in England.

The following comparison between 1844—the year of Sir Robert Peel's famous Bank Act, designed to regulate the issue of bank notes—and 1901 is instructive:—

	Notes in Circulation, 1844.	Weekly Average, 1901, Jan. 1 Oct. 5.
Bank of England	£21,030,000	£29,800,900
Private Banks	4,880,000	296,500
Joint-Stock Banks	3,483,000	722,000
Total, England	£29,393,000	£30,819,400
Scotland	3,026,000	7,761,700
Ireland	5,728,000	6,144,200
Total, United Kingdom	£38,147,000	£44,725,300

Many competent authorities hold that the artificial regulation of note issue imposed upon English banking by legislation, designed to establish and maintain the Bank of England's monopoly thereof, is a mistake; it being contended that if no legislation is needed to restrict a banker from receiving deposits, neither is it necessary to prevent him from incurring liabilities to the public by issuing his promissory notes. Since the public may be trusted not to deposit money with a bank unless its credit is good, why, it is asked, cannot they be equally trusted not to accept its notes or keep them in circulation, except under the same conditions? Moreover, it is urged that a bank's note issue and the character of its circulation form a natural barometer of a bank's credit, the indications of which may be most helpful to a prudent banker. The fear is of an over-issue. But the natural check to that is the prompt return to the bank of its redundant notes.

BANK OF ENGLAND.—To William Paterson (a Scotsman) is due the credit of devising and founding the Bank of England in 1694. Previous to this, for some forty years, the goldsmiths of London (a wealthy and influential body) were in the habit of changing foreign money and lending on interest. King Charles I. in his necessity applied to them, and got a loan on the security of the taxes. But many private individuals who had money brought it to the goldsmiths for safety, and the receipts issued by the latter for these deposits circulated from hand to hand, and were known as the 'goldsmiths' notes.' These may be considered as the first kind of bank notes issued in England. The goldsmiths, however, lost heavily in the troublous times of Charles I. and Charles II. Their loans to these kings were not repaid, and even their bullion, lodged in the Tower for safety, was used to meet the cost of the civil wars. Public credit was bad, and there was little confidence in private integrity. The trade of the country was poor, and could not be developed; for money was scarce, and the means of communication between different parts of the kingdom were lamentably deficient. 'Scotland,' we are told, 'was swarming with beggars,' and had practically neither trade nor commerce, and its agricultural condition was of the poorest. In these unfavourable conditions the Bank of England, in 1694, and the Bank of Scotland, in 1695, were founded, to meet the monetary wants of the time. The Bank of Ireland was not founded until nearly a century later—*viz.* 1783. The Bank of England charter, issued on July 27 by authority of an Act of Parliament, authorized the formation of a corporation to be styled 'the Governor and Company of the Bank of England,' with a subscribed capital of £1,200,000. It was stipulated that the whole of this capital was to be lent to the government at 8 per cent., with an allowance of £4,000 for management, being £100,000 per annum in all. The corporation were not to trade in goods, but they were allowed to make advances upon, and to deal in, bills of exchange, and to issue 'bills payable in coin on demand,' and transferable 'to bearer on demand.' The privilege thus secured of issuing notes was also secured in the following year by the Bank of Scotland, and marks the beginning of the bank-note system of the country. In this respect the Bank of England and the Bank of Scotland were distinguished from the continental banks, none of which had hitherto ventured to issue paper on their own credit. These promissory notes were simply a kind of stereotyped bills of exchange, with this difference, that the notes were payable to 'A B,' or 'B C,' or 'bearer,' 'on demand.' At first they were only transferable by endorsement. Mercantile custom, however, soon ignored the statutory requirement, and in 1704 English promissory notes were accorded the same rights as bills of exchange, and from that time onward the banks in England and Scotland have issued notes for various amounts, the minimum in England being now £5, and in Scotland £1.

The Bank of England's charter has, since the days of William and Mary, been frequently renewed, the last renewal being in

1844, by the well-known act of Sir Robert Peel's government. By this act the authorized note circulation of every issuing bank in the three kingdoms was fixed at a certain sum, and while the Scottish and Irish banks might exceed this, provided they held an equivalent amount in gold for every note so issued, the English provincial banks were restricted to their authorized limit under a penalty. The Bank of England's absolute monopoly of issuing notes in London and for sixty-five miles round, conferred upon it in 1826, was left untouched by the Act of 1844, and remains to this day. The result has been that many of the provincial banks which now have offices in London have been obliged to give up their note circulation altogether. By the same act the Bank of England was divided into two separate departments—the issue and the banking departments.

The *Issue Department* has only to do with the note circulation, and is quite apart from the ordinary banking business, the directors merely acting as trustees to provide the required securities for the notes issued to the public. By the Act of 1844 the authorized limit was fixed at £14,000,000, upon the security of £11,015,000 lent to the government, and other securities; and any excess, averaging at that time £20,000,000, had to be covered by gold. Since 1844, under the provisions of the Bank Act, which enabled the bank to increase its fiduciary note issue (*i.e.* the amount issued against securities) to the extent of two-thirds of any lapsed issues of the English provincial banks, the total secured issue of the bank's notes has gradually grown to £18,175,000 (Aug. 11, 1902); for every note above this which the issue department may issue, an equal amount of coin or bullion must be paid into its coffers, and the profit upon this excess is claimed by government. The actual circulation now averages about £30,000,000 (*i.e.* is in the hands of the public), but the department has frequently issued as much as £60,000,000 in notes—a large portion of this, however, being held in hand by the banking department. The notes are issued about two-thirds from London and one-third from eleven branches in the principal cities of England. Notes may be demanded from the issue department in exchange for gold at the rate of 77s. 9d. per oz., and they are payable in coin at the mint rate of 77s. 10½d. per oz. Bank of England notes are legal tender, except in Scotland and Ireland; but, as a matter of fact, they are in considerable circulation there and on the Continent.

The *Banking Department* does not differ materially from that of any other banking concern, except that it has the privilege of managing the public debt, and of paying the dividends upon it. It also holds the government deposits, and assists in the collection of the revenue. The bank is recognized as the bank of the other banks of the country for the final settlement of the exchanges and the clearing-house.

The Bank of England publishes a weekly return, furnishing in a short statement the figures applicable to these two departments. That for the week ending July 2, 1902, is given here by way of illustration, and shows at a glance the bank's position at that date.

ISSUE DEPARTMENT.

Notes issued	£53,138,305	Government debt	£11,015,100
		Other securities	6,759,900
		Gold, coin, and bullion	35,363,305
	£53,138,305		£53,138,305

BANKING DEPARTMENT.

Proprietors' capital	£14,553,000	Government securities	£14,790,245
Rest	3,218,587	Other securities	36,221,298
Public deposits	11,492,539	Notes unemployed	22,740,290
Other deposits	46,684,002	Gold and silver coin	2,306,703
Seven day and other bills	110,408		
	£76,058,536		£76,058,536

The *bank rate* (*i.e.* rate of discount) for bills and other advances is fixed from time to time by the court of directors of the Bank of England, and is determined by the conditions of trade and the demand for money. Formerly their decision regulated the rates of interest allowed and charged by the various banks in England, Scotland, and Ireland, but nowadays this is only so when the open market is short of cash. The Bank of England allows no interest upon private deposits.

Suspending the Bank Act.—In times of financial panic the Bank of England, like other banks, is liable to be depleted of cash, more especially as a large part of its deposits consists of the reserves of other banks, very liable to be drawn out at such crises. Then, unless the bank could issue notes temporarily in excess of the statutory limit without being under the obligation of having an equivalent amount of gold in the 'issue department,' it would be forced to stop payment, with disastrous results to the whole English banking system. Permission to do this (*i.e.* to ignore the Act of 1844 in this particular) is called 'suspending the Bank Act,' and has been given by the government of the day on three occasions—during the financial crises of 1847, 1857, and 1866. On only one occasion, however—in 1857—was it actually necessary to take advantage of the permission.

BANKING IN FRANCE.—The first bank of issue established in France was founded in 1716, by the Scotsman John Law. The bank only survived five years, and banking met with little encouragement in France until the 19th century. In 1800–6 was founded the Bank of France, which has become, after the Bank of England, the most powerful bank in the world. Since 1848 this bank has had the exclusive right of note issue in France. During the last half of the 19th century its note issue grew from £14,000,000 to over £160,000,000. Against this gigantic issue it holds an enormous reserve in specie. At the end of 1901 the Bank of France had in its vaults £98,500,000 in gold and £44,000,000 in silver. In striking contrast to the Bank of England with its eleven branches, the Bank of France has some four hundred branches through the length and breadth of the land. The other principal banks in the country are the Crédit Lyonnais, the Comptoir National d'Escompte de Paris, and the Société Générale du Commerce. About the smaller country banks little is known.

BANKING IN GERMANY.—The oldest bank in Germany is the Bank of Hamburg (1619), modelled on the Bank of Amsterdam. Eight banks have the right of note issue in Germany (*Notenbanken*), of which by far the most important is the Reichsbank (1875), or Imperial Bank. This, which is under the control of the government, exerts great influence on business by means of its note circulation of about £60,000,000 (against between £4,000,000 and £5,000,000 of the seven other *Notenbanken*), and the clearing system (*Giro-Verkehr*) which it has developed by means of its three hundred branches. By this clearing system money can be remitted from one end of the empire to the other by the simple expedient of paying in money at one branch to the credit of the payee at another branch, after the manner of our post-office money orders, but without charge either to the sender or the receiver. The note issue is regulated very much as in England under Peel's Act—a limited note issue of £22,500,000 (1899) against securities, supplemented by a further issue against specie or coin; but at least one-third of the notes in circulation must be covered by bullion, coin, or notes of the imperial treasury. But when the bank is forced by the conditions of the money market to issue uncovered notes beyond the legal limit, it can do so on payment to the government of 5 per cent. on the surplus issue. This automatic provision takes the place of the 'suspension of the Bank Act' with us. Of late years the excess of issue has become chronic—in 1899 it amounted to nearly £7,000,000—and this provision of the German law would seem rather to favour speculation. Besides the note-issuing banks there are some 140 banks in Germany, among which the most important are the Deutsche Bank, the Disconto-Gesellschaft, and the Dresdner Bank.

BANKING IN THE U.S.A.—The mainstay of the banking system of the United States is the national banks. These banks are regulated by the National Bank Act of 1864, as amended from time to time. The notes issued by these banks are secured by a deposit at Washington of United States bonds; and their customers' deposits are protected by a compulsory cash reserve for each national bank of 25 per cent. of the amount of its deposits in the larger cities, and of 15 per cent. in the smaller cities.

STATISTICS.—The following banking statistics for the United Kingdom and the United States are not necessarily comparable:—

1. UNITED KINGDOM—JOINT-STOCK BANKS (June 1904).

(*From the 'Economist,' Oct. 22, 1904.*)

	English.	Scottish.	Irish.	Colonial.	Foreign.	Total.
	Mill. £	Mill. £	Mill. £	Mill. £	Mill. £	Mill. £
Subscribed capital	231·9	29·1	26·3	52·7	68·6	408·6
Paid-up capital	62·7	9·3	7·3	37·8	66·4	183·5
Market value of capital	196·7	31·8	21·6	53·0	104·5	407·6
Deposit and current accounts	642·2	103·8	52·2	211·4	257·8	1267·4
Notes in circulation	29·3	7·7	6·2	11·4	3·9	58·5
Reserve and dividends	39·3	8·6	4·3	16·0	28·0	96·2
Total liabilities	797·6	134·6	70·9	311·0	446·9	1761·0
Cash in hand and at call	183·2	24·9	9·4	73·1	48·0	338·6
Investments	160·0	31·5	19·8	29·5	32·5	273·3
Discounts, advances, etc.	425·0	70·1	40·5	197·0	353·7	1086·3

In Table 1 the figures include the totals for the banks of England, Scotland, and Ireland. The total liabilities include the paid-up capital at its face value, the deposit and current accounts, the notes in circulation, the reserves, and other items not here shown. The total assets balance at the same figure. In addition to the above, eighteen private banks in England and Wales, making returns, had £39,500,000 of deposits, with £10,500,000 of cash in hand or at call. Their total assets and liabilities balanced at £47,200,000.

2. UNITED STATES (Sept. 9, 1903).

(*From the 'Statesman's Year Book,' 1904.*)

	National Banks.	State Banks.	Private Banks.	Total.
	Mill. £.	Mill. £.	Mill. £.	Mill. £.
Capital stock	150·7	60·4	4·6	215 7
Deposits	661·1	362·9	26·6	1050·6
Notes in circulation	75·0	..	..	75·0
Total liabilities	1262·0	498·2	33·8	1794·0
Surplus fund	74·0	25·9	·9	100·8

In Table 2, dollars have been converted into pounds at the rate of $5 = £1. The total liabilities, in comparison with those of the English banks, are swollen by the inclusion of large sums due to other banks; these sums aggregate about £200,000,000, and are offset in the assets by sums due *from* other banks. This should be taken into account in considering the proportion of cash on hand to total liabilities. The larger proportions of the sums due to and from other banks in the United States is due to the fact that over so wide an area there cannot be, as there is in the United Kingdom, one central clearing-house. Cash on hand includes specie and legal tender notes. There were in the United States, on Sept. 30, 1901, 4,221 national banks, 4,983 state banks, and 917 private banks.

Of joint-stock banks making returns there were in June 1904: In England and Wales, 64 joint-stock banks, with 4,417 branches; in Scotland, 11 joint-stock banks, with 1,137 branches; in Ireland, 9 joint-stock banks, with 653 branches; in London, 33 offices of colonial banks, with 2,082 branches, and 28 foreign banks with 1,181 branches. Total, 145 banks and 9,470 branches.

See *Elements of Banking*, *Lectures on Credit and Banking*, *Theory and Practice of Banking* (2 vols.), all by D. H. MacLeod; *The Country Banker*, by G. Rae; *Lombard Street*, by W. Bagehot; *Money and the Mechanism of Exchange*, by Professor W. S. Jevons.

Banka, E. Indies. See BANCA.

Bankers, INSTITUTE OF, founded at London in 1879, for the discussion and publication of matters interesting to the profession. It has members (over 4,000) in all parts of the empire, and conducts annual examinations in banking subjects.

Bank Holidays, certain days fixed by Act of Parliament (1871), chiefly through the advocacy of Sir John Lubbock (Lord Avebury), as holidays for all banks and customs and inland revenue offices: in England and Ireland—Easter Monday, Monday in Whitsun-week, first Monday in August, and December 26 (or, if Sunday, 27); in Scotland New Year's day, Good Friday, first Mondays in May and August, and Christmas day. Bills, etc., due on such dates are not payable until the following day. Banks in England and Ireland are also closed on Good Friday and Christmas day.

Bank Note, a promissory note by an authorized bank of issue, payable on demand. In England the lowest note is that for £5, in Scotland and Ireland that for £1.

Bank of Deposit, a bank which receives money at interest on condition that a certain notice shall be given before withdrawal.

Bank of Issue, a bank authorized by government to issue notes of its own, payable on demand. In and for sixty-five miles round London this privilege is confined to the Bank of England. Any issue in excess of the authorized circulation must be covered by gold reserves at the bank.

Bank Post Bills, bills issued without charge by the Bank of England, payable to 'order,' at seven or sixty days after sight, on payment of the sum for which the bills are required. They are payable on the date due, and are not subject to days of grace, and provide a safe means of transmitting money.

Bankruptcy. Bankruptcy legislation in England dates from the time of Henry VIII. In the statute passed in his reign, and in many later acts, the bankrupt's position resembles that of a criminal rather than that of an unfortunate debtor. This characteristic of severity clung to bankruptcy legislation till a comparatively recent date. A second feature of the older bankruptcy law was that only traders were entitled to its benefits. This lasted till 1861. The present law is contained in the Bankruptcy Act, 1883, as amended by the Bankruptcy Act, 1890. Under these statutes the foundation of bankruptcy proceedings is the commission by a debtor of an act of bankruptcy. This may take various forms, each indicating either an inability by the debtor to meet his engagements, or a dishonest attempt to alienate his property either for his own ultimate benefit or for that of some particular creditor. When an act of bankruptcy has been committed a bankruptcy petition may be presented, either by the debtor himself, or by a creditor or creditors to the amount of £50; upon this a receiving order is made, which has the effect of vesting the administration of the debtor's property in an official receiver, an officer of the Board of Trade, who is subject to the directions of the court. The debtor makes a statement of his affairs, within seven days, on oath, and is publicly examined, and the creditors hold a meeting. He may make a composition with his creditors, which, if approved by a majority in number and three-fourths in value of the creditors, may receive the sanction of the court. The court, however, can withhold its sanction, on grounds entitling it to refuse a discharge, unless under the composition 7s. 6d. in the £ is paid on all debts. In default of a composition the court may adjudge the debtor bankrupt, either upon a resolution of the creditors or not, and the creditors appoint a trustee of the estate, and a committee of inspection to supervise his work. The trustee administers the estate, decides on proofs of debts, inquires into the validity of suspicious transactions, realizes the assets, and pays dividends thereout. The bankrupt must give the trustee all information, and he may be committed to prison if he appears likely to abscond or tries to conceal his goods from the trustee. At any time after adjudication the bankrupt may apply for his discharge; but it may be refused, or suspended for two years, or granted subject to conditions, if (1) his assets do not realize 10s. in the £, (2) he has not kept proper books, (3) has traded with knowledge of insolvency, (4) has failed to account for losses, (5) has speculated rashly or lived extravagantly, (6) has given undue preference to creditors, (7) has previously been bankrupt, (8) has been fraudulent. It is a misdemeanour for an undischarged bankrupt to contract debts of £20 without revealing his condition. A bankrupt cannot sit in Parliament or hold any public office unless he is discharged and obtains a certificate that his bankruptcy is due to misfortune. In bankruptcy, rates, taxes, and wages are paid in full before other debts. Marriage settlements made within two years before the date of bankruptcy are, and within ten years before are liable to be, rendered void by bankruptcy, unless in the latter case the bankrupt can show that he was solvent at the time. An allowance may be made to a bankrupt, and he is entitled to any surplus after the debts and costs have been paid. Bankruptcy business is assigned to a judge of the High Court. The proceedings are simplified where the debtor's property is less than £300, and the county court can deal with cases where the debts are less than £50. The court may order a bankrupt to be prosecuted. A married woman can, since 1882, be made bankrupt, but only if she is trading separately. A lunatic can commit an act of bankruptcy in a lucid interval. Bankruptcy in Ireland is governed by the Debtors Act, 1872; the Bankruptcy Amendment Act, 1872; the Local Bankruptcy Act, 1888; and the Deeds of Arrangement Act, 1872. For Scots law, see INSOLVENCY. In the main the colonial bankruptcy laws follow the principles of English law. See sixteenth *Annual Report of Board of Trade*, and subsequent issues, which contain summaries of the various acts obtaining in India and the colonies. See Williams's *Law and Practice of Bankruptcy* (7th ed. 1898).

Banks. (1.) LAND, isl., Arctic Ocean, Dom. of Canada, separated from Melville I. by MacClure or Banks Strait; named after Sir Joseph Banks. (2.) B. PENINSULA, E. coast of South I., New Zealand; a high table-land with extinct volcanoes; 50 m. long and 25 wide. (3.) B. ISLANDS, group, S. Pacific, 14° S., 167° 30′ E. The chief are Vanua Lava and Gawa (Santa Maria).

Banks, SIR JOSEPH (1744-1820), president of the Royal Society, was born in London; made a voyage to Newfoundland in 1766, collecting plants; and fitted out a vessel at his own expense in which he accompanied Captain Cook in his voyage round the world (1768-71), after which he visited (1772) the Hebrides and Iceland. He was the first, as the result of this voyage, to make Staffa known to the world. He was elected president of the Royal Society in 1778, an office which he held for forty-one years. Banks had much to do with the formation of the colony of Botany Bay. He introduced into the West Indies the mango from Bengal, the bread-fruit tree from Tahiti, and various other fruits from Asia. He rendered great service to Mungo Park, Burckhardt, and other travellers. Banks wrote *Journal during Captain Cook's First Voyage* (1768-71), ed. by J. D. Hooker (1896). See Home's *Life of Sir Joseph Banks* (Hunterian Oration, 1822), Cuvier's *Eloge* (1821), and A. Duncan's *Short Life of Sir Joseph Banks* (1821).

Banks, NATHANIEL PRENTISS (1816-94), American general and politician, native of Massachusetts. In 1853 he entered Congress, where he became Speaker. From 1857-9 he was governor of Massachusetts, and in 1861 resigned the presidency of the Illinois Central Railroad to serve on the side of the North in the civil war. He held commands on the Upper Potomac, in the Shenandoah Valley, and at Washington; led the New Orleans expedition of December 1862, and in 1863 took Port Hudson. Re-entering Congress in 1864, he held a seat almost continuously until 1877. He was for several years chairman of the Committee on Foreign Affairs, and finally retired from Congress in 1891.

Banks, THOMAS (1735-1805), an English sculptor of ideal subjects, born at Lambeth. He entered the Royal Academy schools, and, having gained the gold medal (1770), spent some years (1772-9) in Italy. Proceeding to Russia (1781), he was patronized by Catherine II., who bought his *Cupid Catching a Butterfly* and *Caractacus before Claudius*. The British Institute possesses his *Achilles Mourning for Briseis*. He was elected a Royal Academician in 1785. See Leader Scott's *Sculpture—Renaissance and Modern* (1886).

Banksia, in botany a genus of the order Proteaceæ (named by Linnæus after Sir Joseph Banks), confined to Australia, where the species are called 'honeysuckle trees,' from the abundance of nectar. Some reach a height of fifty feet; the umbellate flowers are mostly yellow, but some are red and others white. The hard and evergreen leaves have a pale under-surface.

Banksian Cockatoo, an Australian cockatoo; plumage black or brown, flecked with red or orange.

Bankura, chief tn., Bankura dist., Bengal, India, 90 m. N.W. of Calcutta. Bishnupur, farther S., was the ancient capital. Manufactures silk and cotton. Pop. (1901) 20,737. District: area, 2,621 sq. m.; pop. (1901) 1,116,411.

Bann, riv., prov. Ulster, Ireland, consisting of the Upper and Lower Bann—the former (25 m. long) rising (1,467 ft.) in the Mourne Mts. (Co. Down) and flowing past Bainbridge to Lough Neagh; the latter (33 m.) issuing from the N.W. corner of the lough and flowing N.W. to the Atlantic, between the counties of Antrim and Londonderry. The river is navigable to Coleraine.

Bannatyne Club, a literary society named after George Bannatyne (1545-1609), the collector of ancient Scottish poetry, was founded in Edinburgh in 1823 by Sir Walter Scott. David Laing was its first and only secretary (1823-61). The object of the club was the printing of rare works connected with the history, literature, and antiquities of Scotland. Accounts of the origin and early progress of the club may be read in Lockhart's *Life of Scott*, and in Scott's review of Pitcairn's *Criminal Trials*. The Bannatyne MS. has been published by the Hunterian Club of Glasgow (1873).

Banneret, a higher grade of British knighthood bestowed on the field of battle by the sovereign in person for distinguished courage. The last instance of its bestowal was by Charles I. on Sir John Smith at Edgehill (1642).

Bannock (Gael. *bannach*), a flat, round cake made of oat or barley meal, or a mixture of these, moistened with water and toasted upon a girdle; usually thicker than the common Scotch oatcake.

Bannockburn, tn. and *quoad sacra* par. in St. Ninian's parish, Stirlingshire, Scotland; stn. on C.R., ½ m. to the E. Within a century it has grown from an insignificant village into a manufacturing town noted for tweeds, tartans, and carpets, tanning and coal-mining. The battle of Bannockburn, in which the forces of Edward II. were defeated by the Scots, led by Robert Bruce, was fought near the site of the town on June 24, 1314. On Brock's Brae is a huge sunken granite mass, the Bore Stone, the legendary spot where Bruce's standard was fixed. Tn. pop. (1901) 2,444.

Banns. See MARRIAGE.

Bannu, dist., Punjab, India; area, 1,680 sq. m.; traversed by the Indus. Wheat, barley, Indian corn, and sugar-cane are its agricultural products. The chief town is Edwardesabad. Pop. (1901) 231,485.

Banquette, in fortification a small bank at the foot of a parapet, from which the defenders can safely fire over the parapet.

Banshee, a female fairy, believed in certain parts of Ireland and Scotland to attach herself to some particular aristocratic family, and sing a mournful wail near the house when an inmate is about to die.

Banswara, state in Rajputana, India. Area, 1,973 sq. m. Chief town, Banswara, 108 m. N.W. of Indore, with pop. (1901) about 7,500. Pop. of state (1901) 165,276.

Bantam, residency of Java, E. Indies, W. extremity of the island. Area, 3,053 sq. m. Pop. (1896) 709,339, principally Sundanese.

Bantam Fowl. See POULTRY.

Banteng, Malay name of the *Bos sondaicus*, a species of wild ox found in the E. Indian islands and the Malay Peninsula. As ferocious as the Indian gaur, which it resembles in the lack of a dewlap and in some other points, it has yet been tamed and used for breeding purposes.

Banting System, a method of curing corpulency, proposed by Harvey, but first effectively practised by William Banting (1796 - 1878) of Kensington. It is described in detail in Banting's *Letter on Corpulence* (new ed. 1885).

Bantry, seapt., mrkt. tn., and tourist resort, Co. Cork, prov. Munster, Ireland, 51 m. W.S.W. of Cork, picturesquely situated at head of BANTRY BAY (20 m. long by 6 broad), which is a naval centre during the autumn manœuvres. Friezes, tweeds, etc., are manufactured, but the fisheries are of the first importance. Pop. (1901) 3,109. The BATTLE OF BANTRY BAY was a naval engagement fought on May 1, 1689. Louis XIV., in support of James II., after the latter's deposition, sent a fleet of 24 ships of the line, 2 frigates, and 10 fireships, under Comte de Châteaurenard, to the coast of Ireland. They were found in Bantry Bay by a British fleet of 19 ships of the line and 3 fireships, under Admiral Arthur Herbert. After the action which ensued the British drew off, having had the worst of it, though Herbert was not pursued.

Bantu, a race of people widely spread in S. and S.W. and S.E. Africa, their original cradle being in the N. and in Equatorial Africa. Their language, with its dialectical variations, may be termed the *lingua franca* of inner Africa. In the Cape Colony, where their arrival on the E. has been recent, they are known as Amaxosa, Slambies, Tambookies, Gaikas, Gcalekas, Fingoes (*i.e.* slaves), Tembus, and Pondos. Sometimes they are termed Caffres or Kaffirs, as a convenient generic term covering all varieties: this word means 'unbelievers,' and was given to them originally by Mohammedans on the coast. The Bantus must be distinguished from the aboriginal Bushmen and Hottentots. In Natal the great branch of the Bantu race is the Zulus; in Rhodesia, the Matabele and the Mashonas; in S.W. Africa, the Damaras. The tendency of the Bantu race has been to form conquering castes under paramount chiefs—as Kreli, Sandili, in the E. of the Cape Colony; Moselikatze, Chaka, Dingaan, and Cetywayo, in Natal and the north: but these have all disappeared before the Europeans. The Bechuanas still retain a system under chief Khama, as do the Basutos under their headmen. Swaziland is also quasi-independent. See Deniker's *Races of Man* (1900); Torrend's *Comparative Grammar of the South African Bantu Languages* (1891).

Bantwa, trib. state, prov. of Gujarat, Bombay, India. Area, 208 sq. m. Chief manufacture, coarse cotton cloth. Bantwa, the chief town. Pop. (1901) 8,591.

Banville, THEODORE FAULLAIN DE (1823-91), French poet, born at Moulins. In 1842 he published *Les Cariatides*, a volume of verse; and in 1846 *Les Stalactites*, in which he showed a mastery over French verse of what then seemed a new type. But he first attracted general attention by a number of fugitive odes, collected from ephemeral journals, and published in 1857 under the title of *Odes Funambulesques*, followed by another series in 1867, *Nouvelles Odes Funambulesques*, and by a volume of verse entitled *Idylles Prussiennes*, commemorating the war of 1870-1. Banville also wrote a valuable treatise on French versification, as well as novels and plays, the latter including *Gringoire* (1866), translated by Sir Walter Besant and Mr. W. H. Pollock, under the title of *The Balladmonger*, in *The Charm, and other Plays* (1896), and played by Mr. Beerbohm Tree. See his *Poetic Works*, in 3 vols. (1878-9), also his *Comédies* (1878) and *Esquisses Parisiennes* (1859). *Mes Souvenirs*, appeared in 1882.

Banyan Tree (*Ficus bengalensis*), of the fig order Moraceæ, is found in India. So called because frequently used as market-places by the Banians or Indian merchants. As the branches spread they send down aerial roots which penetrate the soil, becoming stems or trunks. In this way one tree in course of time may form thousands of props. The Hindus assist the development of the aerial roots by preparing the soil, and by protecting the young roots within bamboo tubes as they approach the ground. For a time the young banyan lives as an epiphyte, but gradually its aerial roots reach the ground and form the first props, its branches spreading until the tree which was its first resting-place decays. An abundance of gum-lac is procured from the banyan, the bark of which is used as a tonic by Hindu physicians. See Kerner's *Nat. Hist. of Plants* (new ed. 1902).

Banyuls-sur-Mer, fishing village and bathing resort, dep. of Pyrénées-Orientales, France, 20 m. by rail S.E. of Perpignan. A marine biological laboratory was established here in 1874. Pop. (1900) 3,111.

Banyumas, or BANJOEMAS, residency of Central Java, in the E. Indies, stretches from the mountain backbone S. to the Indian Ocean. Area, 2,147 sq. m. Pop. (1896) 1,270,577.

Banyuwangi, tn., Java, Dutch E. Indies, on the E. coast, over against the island of Bali; formerly capital of the native kingdom of Balambangan. Pop. (1896) 16,198.

Baobab, or Monkey Bread.
1, Part of tube of stamens; 2, fruit; 3, section.

Baobab, also called MONKEY BREAD and SOUR GOURD, is *Adansonia digitata* (named in honour of Adanson, the great French naturalist), a tree of the order Malvaceæ, and found in most parts of tropical Africa. It is one of the largest and oldest trees in the world, with a trunk often more than 20 ft. in diameter. The bark is fibrous, and is stripped off for making ropes and clothes; it is also used as a febrifuge. The leaves are dried, and made into a powder called *lalo*, which is used by W. Africans as a condiment. The large white flowers have stalks 3 ft. long. The fruit has a woody coat, is about the size of a large lemon, and contains seeds embedded in an acid pulp which is eaten by the natives. The tree has been acclimatized in S. America and the E. Indies.

Bapaume, tn., dep. Pas-de-Calais, France, 15 m. S. of Arras; notable for the fierce struggles of Jan. 2 and 3, 1871, between the French and the Prussians, in which the former lost over 2,000 men, but claimed a victory. Pop. (1901) 3,113.

Baphomet (probably a mediæval corruption of Mahomet), the name given to the mysterious two-headed idol which the Templars were said to worship with secret licentious rites.

Baptanodon, a late ichthyosaurian which, in the Middle Jurassic period, had its home in the waters of Colorado and Wyoming. It is the only type of the aquatic ichthyopterygian reptiles found in America. Amphibious and toothless, both these characteristics are noted in its name. Its length was from 9 to 11 ft.

Baptism, the rite of initiation into the Christian church, performed by sprinkling with or immersion in water, and recognized almost universally throughout Christendom as a sacrament.

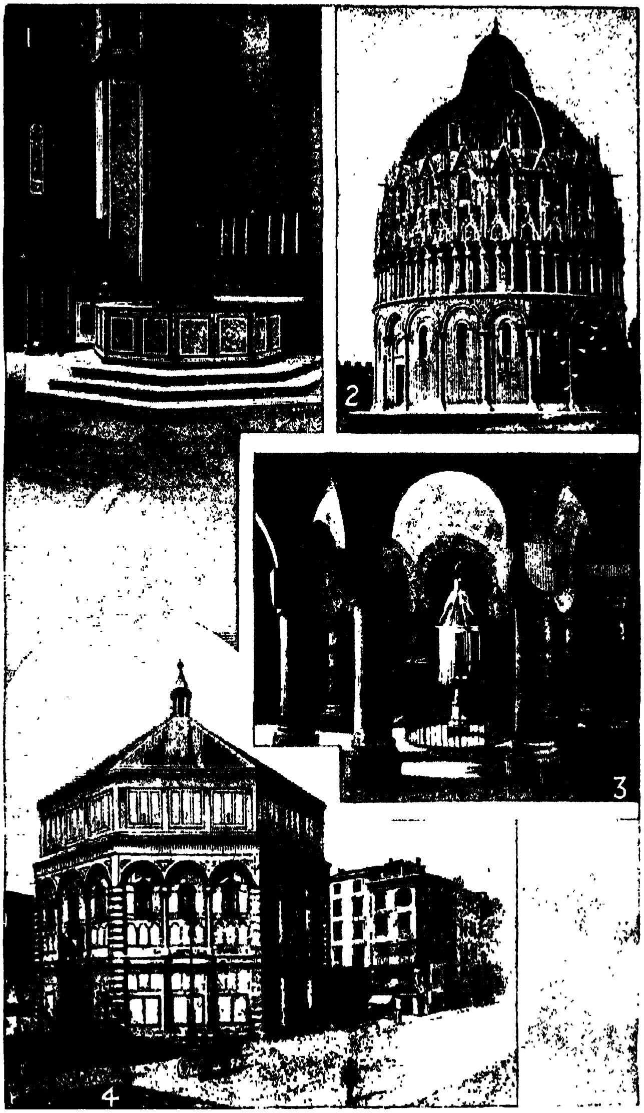
1. *Origin.*—The origin of Christian baptism would appear to be what is called 'the baptism of John' (Mark 11:30), which, again, was doubtless suggested by the Jewish practice of baptizing proselytes. When a Gentile desired admission into the commonwealth of Israel, he required to be circumcised, and in later times a form of baptism was also administered: the candidate stood immersed to the neck in water, and had the commandments recited to him. The distinctive feature of 'John's baptism' was that it was administered to Israelites themselves, as a token of their entrance into the new Messianic kingdom, thus having a moral and spiritual (*cf.* 'unto repentance,' Matt. 3:11) rather than a merely legal or ethnological significance. It is likely that the act of baptism practised by the disciples of Jesus while He was still with them was identical with John's rite; but an entirely new stage is reached in the practice enjoined by our Lord's words (Matt. 28:19).

2. The distinctively Christian rite is so far congruent with that administered by John, being (*a*) a condition of entrance into the Messianic kingdom, and (*b*) a symbol of a moral change in the recipient. But the baptism of the disciples of the risen Lord was, further, the voucher of a *new life* to the individual submitting to it, and of his union with Christ; which privileges were conferred by the gift of the Holy Spirit. The converts were to be baptized 'into' the name of the Trinity; and though the disciples seem at first to have used the name of Jesus (or Christ) only (Acts 2:38; 8:16), in course of time the original mandate came to be more literally obeyed. It may be remarked that Deissmann (*Bible Studies*, pp. 146 *f.*, 196 *f.*, 1901) has shown, from the evidence of recently-discovered inscriptions, that 'name' used in this manner signifies *power*, *dominion*; so that to baptize into the name of any one means to place in the possession or at the absolute disposal of the same. Hence the usage 'into the name' instead of 'in the name' more adequately expresses the close connection between the person initiated and the Deity; he is no longer his own, but another's.

3. *Controversies.*—These are neither few nor unimportant, and we proceed to consider some of them. (1.) *The Baptism of Infants.* The question of the eligibility of the infants of Christian parents for baptism hardly seems to have arisen in New Testament times, the converts being necessarily of sufficient age to make profession of their faith. But it must have emerged very soon, probably in a few years—when children were born in Christian homes. The church, proceeding on the analogy of circumcision, and in view of Christ's declaration regarding children (Mark 10:14), of Paul's statement (1 Cor. 7:14) that the children of believers are holy, and of the fact that in the case of some a minimum of preparation had been deemed sufficient by the apostles (Acts 16:31 *f.*), sanctioned the practice, which soon became general. The opponents of infant baptism, however, point out that the practice is nowhere commanded or even countenanced in Scripture, that our Lord's commission (Matt. 28:19) plainly connects the ceremony with teaching, and that the apostles always restricted baptism to believers, as the symbol of a conscious change which had already taken place (Acts 10:43, 48); while they repudiate the analogy of circumcision in view of the essential distinction between the Jewish theocracy as an earthly kingdom and the kingdom 'not of this world.' Such are the salient points in the controversy; for the rest the reader is referred to the literature given at the end. (2.) *The Manner of Baptism.* There is little doubt that the original practice was immersion (Matt. 3:6, 16; Acts 8:38), but it is equally undeniable that sprinkling or pouring was sometimes substituted at a very early period. It may be questioned whether immersion could have been possible in the instance of the Philippian jailer, and it is probable that in such

as his, or where large numbers of both sexes were baptized at one time, the church's common sense seemed to demand the simpler and more convenient form of pouring (affusion—the Roman Catholic form to this day) or sprinkling. It should also be noted that *baptizo* does not necessarily mean 'immerse' (see Luke 11:38, where 'wash' is literally 'baptize'). (3.) *Lay Baptism.* Can baptism be properly administered by the clergy only? or is it equally valid when performed (in certain cases) by the laity? Scripture throws no decisive light on the question. It has generally been held that baptism by duly qualified ministers is desirable; but in cases of imminent death, when no minister was at hand, the administration of the rite by laymen, or even by women, was deemed perfectly valid. The custom had its rise, of course, in the belief that baptism was essential to salvation. Lay baptism was formerly permitted in the Church of England, and is still in the Church of Rome. In the reformed churches generally, however, where the necessity of baptism is not regarded as being absolute, its administration is confined to the regularly ordained ministry. (4.) *Baptismal Regeneration.* It is held by the Church of Rome and by ritualistic Anglicans that baptism confers even upon infants an 'indelible' character—*i.e.* actually changes the standing of the person baptized before God. Protestants generally admit that the act removes the guilt of original sin, but regard the change of character as something that can only be acquired consciously, and apart from any necessary connection with an external ceremony such as baptism. They hold that the act changes the relation of the person to the church, but that, either before or (as in the case of infants) after, the privileges symbolized by baptism are to be consciously and voluntarily embraced. Thus, the omission of it, as in the case of a child dying shortly after birth, is not considered by Protestants to involve any detriment to the eternal interests of the individual; but, on the other hand, the neglect of it when easily obtainable is deemed, to say the least, presumptuous, harmful, and even perilous. See Hodges' *Baptism Tested by Scripture and History*, and articles in Smith's (1869) and Hastings's (1900) *Bible Dictionaries.*

Baptistery, or Baptistry, a place where the sacrament of baptism is publicly administered. Originally Christian baptism was performed at the river-side, or at founts where springs of water flowed. The first built baptisteries were not, as now our fonts are, within the church, but without, and often in places very remote from it, distinct from the church, and connected with it only by a passage or cloister. Afterwards they formed a constructional part of the church, towards the west end. There are several old specimens in England—at Norwich, Lambeth, and Luton; and those at Asti, Novara, Pisa, and Florence are well-known examples of Italian church architecture.

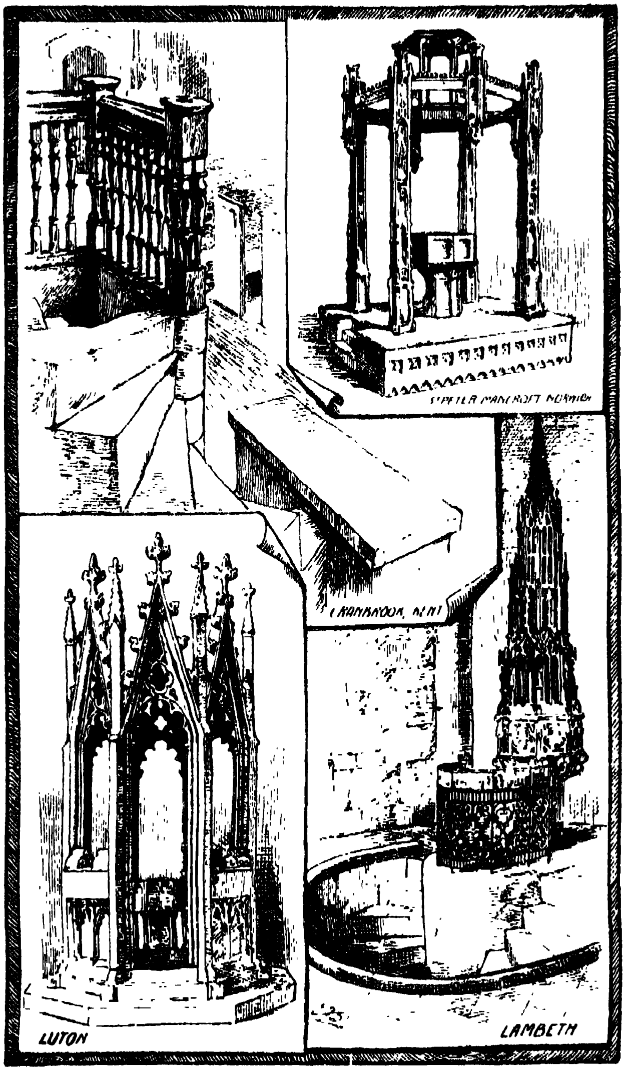


Famous Italian Baptisteries.

interior; 2. exterior. 3. Asti: S. Pietro. 4. Flo

Baptists, a denomination of Christians whose distinctive principles are found in their views regarding the ordinance of baptism. Broadly speaking, these principles are two. (1.) Looking upon the church as a completely spiritual institution, they maintain that the membership (and therefore the rite of initiation—*viz.* baptism) ought to be confined to believers only; this tenet excludes the baptism of infants, who are incapable of belief. (2.) They hold that the only correct mode of administering the ordinance is by immersion, asserting that sprinkling, as practised in other sections of the church, obscures the significance of the rite, and disannuls its historical testimony to the cardinal facts of redemption as indicated, for example, in

Rom. 6:1-11 and Col. 2:12. As to church government, Baptists are at one with the Congregationalists in maintaining the independence of the individual community; though various national Baptist Unions (*e.g.* Scottish, English, etc.) exist, and though most of the congregations belong to them, yet these unions exercise no control over the individual churches, having been formed for the purpose of organizing aggressive Christian work on a scale wider than that of the congregation, and for mutual support and encouragement. This doctrine of congregational independence is also held to render unnecessary any general creed or confession; but it is assumed that all ministers and members of Baptist churches accept the principle of liberty of conscience and of the divine authority of Scripture.



Famous Baptisteries in English Churches.

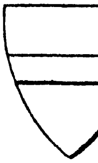
The doctrines of the Baptists cannot be said to have hitherto made much headway in Britain. For England and Wales there was in 1902 a membership of about 367,000; for Scotland, about 18,000; for Ireland, 2,700. In the United States, on the other hand, they appear to find congenial soil: the statistics for 1901 show an aggregate of 4,808,800 members, with 51,000 churches, 33,250 ordained ministers, 2,250,000 Sunday scholars, and 9 theological institutions—numbers which, among evangelical churches, are surpassed only by the Methodists. It is in America, too, that the Baptist denomination shows the most decided tendency to split up into fragmentary sects; thus we have the Seventh-day Baptists, the Campbellites, the Anti-mission Baptists, etc. The term Scottish Baptists is applied to those communities which maintain the necessity of a plurality of pastors in each congregation, and of mutual public exhortation by the members, while the English Baptists are in this respect more akin to Congregationalists and Presbyterians; but it should be noted that the overwhelming majority of Baptist congregations even in Scotland hold to the so-called English practice. The distinction between General and Particular Baptists was originally similar to that between Arminians and Calvinists; but the former have shown a tendency to drift towards a laxer Christology, such as is found, for example, in Socinianism. Finally, the terms Open and Strict Baptists are applied respectively to those who permit, and to those who disallow, to Pædobaptists the privilege of partaking with them of the Lord's Supper.

The Baptists are not concerned to trace their origin to any great reforming movement in the history of the church, but are content to find support for their distinctive tenets in Scripture. They maintain, indeed, some sort of historical continuity with the early church—*e.g.* through the Cathari, the Albigenses, and other bodies; but they repudiate all connection with the German Anabaptists and Mennonites of the 16th century. In England they emerged into public notice in the time of Henry VIII., and in his and the succeeding reigns they suffered persecution or laboured under disabilities till the Act of Toleration (1689) placed them on a level with other denominations. Their doctrines appear to have been transplanted to America about 1630; in 1691 was formed the great division between Particular and General Baptists above referred to. They have the honour of having inaugurated the first missionary society (1792) among English-speaking Christians, and the name of William Carey, the pioneer of the movement, is indelibly written in the history of Christian missions.

Full statistical particulars and much general information regarding the Baptists will be found in the year-books of the American, English, and Scottish Baptist Unions.

Bar, Aramaic for 'son;' a common constituent of Jewish names—*e.g.* Bar-jesus, Bartimæus, Bartholomew.

Bar. (**1.**) In heraldry, one of the *honourable ordinaries.* It differs from the fess only in its size (*i.e.* height), which is but one-fifth of the field, and in the fact that it may be borne in any part of the shield. Its diminutives are the *closet*, which is half a bar; and the *barrulet*, which is half a closet. Any number of bars, not exceeding four, may be borne. When two are borne in close proximity, they are blazoned collectively—a bargemel (Fr. *jumelle*, 'twin'). *Bar sinister*, the popular, but erroneous, term for the 'baton sinister,' the mark of illegitimacy. (**2.**) In music, an upright line drawn across the stave to regulate the accent and divide the music into equal portions as determined by the time signature. Each portion is termed a *measure*, but is sometimes incorrectly called a bar. A *double bar*, consisting of two lines, denotes the end of a complete section or movement, or the introduction of a change of time or key.



Bar (*Heraldry*).

Bar, collective term comprehending all those members of the legal profession who have the right to appear at the bar on behalf of suitors. See BARRISTER, ADVOCATE, INNS OF COURT.

Bar (*Rov*), fortified tn. of Podolia, Russia, 50 m. N. of Mohilev, on an affluent of the Bŭg. The famous Confederation of Bar, in the Polish Catholic and patriotic interest, was formed here (Feb. 29, 1768). Pop. (1897) 10,614, more than half Jews.

Bar, TRIAL AT. Before the institution of *nisi prius* trials by the Statute of Westminster in 1285, all trials were 'at bar'—*i.e.* they were before two or more judges sitting *in banc.* A trial at bar now comes before a divisional court; but they are very rare, and may always be refused to private individuals, though the attorney-general may sometimes claim such a trial as of right. There have only been two trials at bar since the Judicature Acts came into force—*viz.* the Attorney-general *v.* Bradlaugh in 1885, and the trial of the Jameson raiders in 1896.

Bara Banki, dist., Oudh, India; area, 1,703 sq. m.; a plain, watered by the Gogra and the Gumti. Grows wheat and rice; coarse cloth and brass and iron vessels are its manufactures. Pop. (1901) 1,179,323. Bara Banki is the chief town. Pop. (1901) 14,478.

Bar Council, the accredited representative of the bar, empowered to deal with all matters affecting the profession. It consists of the attorney-general and the solicitor-general for the time being, and every practising barrister who has held either of these offices, together with forty-eight practising barristers elected by the whole bar. The council can co-opt six additional members. Offices, 2 Hare Court, Temple, E.C.

Baraba Steppe, immense tract (estimated at 100,000 sq. m.) in the govts. of Tobolsk and Tomsk, Siberia; stretches N. from the Altai Mts., and E. and W. between the Obi and the Irtish.

Barabbas ('son of the father,' *i.e.* 'teacher'), a robber or housebreaker (rather than insurgent), whose release was demanded from Pilate in preference to that of Jesus. An interesting reading in some of the later MSS. of Matthew, and in the Armenian and other versions, gives the robber's name as *Jesus* Barabbas, which would then form a striking contrast to the name *Jesus* Christ in Matt. 27 : 17; but it is probably due to a copyist's error (Tregelles). But see Renan's *Life of Jesus* (trans. 1897).

Barabra, or BARABIRA (Negroid Núbas), a Mohammedan and agricultural people occupying both banks of the Nile, Nubia, between Assouan and Dongola.

Barada, or BARRADA, river in Syria; the ancient Abana; rises in Anti-Lebanon, flows S.E. to Damascus, then E., and loses itself in the lake of Bahret-el-Ateibeh.

Baraguay d'Hilliers. (**1.**) LOUIS (1764–1812), French general, was born at Paris. He distinguished himself in Italy, Egypt, and Russia under Napoleon. He died at Berlin. Barbier attributes to him *Mémoires Posthumes du Général Français Comte de Custine* (1794). (**2.**) ACHILLE, COMTE (1795–1878), French marshal, son of the above, born at Paris, was appointed governor of the military school at Saint-Cyr (1836). In 1848 he was given command of the army of Paris by Napoleon III. (1851). He distinguished himself in the Crimea, and in Italy in 1859. After the Franco-Prussian war he was president of the council appointed to inquire into the capitulation of Bazaine at Metz.

Barahona de Soto, LUIS (1560–90), Spanish poet. His principal work is a continuation of *Orlando Furioso*, called *Angelica* (1586; 2nd ed. 1602–5), highly praised in *Don Quixote*, and also by Lope de Vega in the *Laurel de Apolo.* He wrote some graceful lyrics included in Espinosa's collection of *Flores de Poetas Illustres* (1849).

Baranetz, or BAROMETZ, or SCYTHIAN LAMB, a fern (*Cibotium barometz*) growing in the neighbourhood of the Caspian Sea. The name is also given to an especially fine variety of lamb's wool, which legend asserts to be yielded by a plant which is also at the same time an animal (lamb).

Baranov, or SITKA ISLAND, in Alexander Archipelago, Alaska, U.S.A.; lat. 57° N., long. 135° W. Very mountainous (highest summit, Mt. Edgecumbe, 8,000 ft.). Coal is found in many places, and gold is worked near its capital, Sitka. Pop. 1,396.

Baranquilla. See BARRANQUILLA.

Barante, PIERRE AIMABLE PROSPER BRUGIÈRE, BARON DE (1782–1866), a French historian and politician. His chief works are: *Tableau de la Littérature Française au XVIIIe Siècle* (1809); *Histoire des Ducs de Bourgogne de la Maison de Valois, 1364–1477*, 12 vols. (1824–8); *Histoire de Jeanne d'Arc* (1859; 4th ed. 1880). His *Souvenirs* were published in 8 vols. (1890–1901). See Guizot's article in the *Revue des Deux Mondes*, July 1867.

Baranya, co. of Hungary, in the S.W., has the Danube on the E., and the Drau (Drave) on the S. The soil is generally fertile. Area, 1,981 sq. m. Pop. (1900) 290,519, consisting of Hungarians, Germans, and Croats. Chief town, Pécs (Fünfkirchen).

Barasat, munic. tn. in the Twenty-four Parganas, Bengal, India, 14 m. N.E. of Calcutta. Pop. (1901) 8,634.

Barataria (Sp. *barato*, 'cheap'). (**1.**) The so-called 'island' over which Sancho Panza was installed mock governor. See *Don Quixote*, pt. ii. ch. 42–53. (**2.**) The imaginary kingdom in Gilbert and Sullivan's *Gondoliers* (1889).

Baratieri, ORESTE (1841–1901), Italian general, was born at Condino, Tyrol, and served with Garibaldi. Appointed governor of Eritrea in 1891, he in 1894 defeated the Dervishes at Kassala. Then after routing (1895) Ras Mangasha he took possession of Adigrat and Tigré, but was himself disastrously defeated at Adua in March 1896. He defended himself in his *Memorie d'Africa, 1892–6* (1897).

Baratynski, YVGENI ABRAMOVITCH (1800–44), Russian poet; served as a soldier in Finland, during which he wrote his first poem, *Eda* (1826). He afterwards settled at Moscow, and produced his finest work, *The Gypsy.* A collected edition was published in St. Petersburg (1869; 4th ed. 1884).

Barava, or BARAWA, tn., E. Africa. See BRAVA.

Barbacena, tn., prov. Minas Geraes, Brazil, on W. slope of Sierra de Mantiqueira or Espinhaço; on railway 120 m. N.W. of Rio de Janeiro. Alt. 3,500 ft. Gold-mining. Pop. 6,000.

Barbacoas, tn., Cauca dep., Colombia, on the Telembi, which is navigable by steamers. Gold exists in the district. Pop. 6,000.

Barbados, island of the W. Indies, about 125 m. E. of the chain of the Lesser Antilles. The population is 1,157 to the square mile. The people are mostly of negro or coloured race, and are engaged in sugar cultivation. The capital, Bridgetown, is a port of call and repair, where passengers and goods from Europe are transhipped to the steamers which run northwards to the Virgin Is. and south to Trinidad. It is a bishop's see, and the headquarters of the military forces in the W. Indies. Here is Codrington Theological College (1712), affiliated to Durham University. The total trade is valued at about two millions sterling annually. The island is frequently visited by hurricanes. Barbados, which was so named by the Portuguese from the bearded fig-trees found on the island, has been a British colony since 1605. Area, 166 sq. m. (half the size of Anglesey). Pop. (1902) 196,000.

Barbados Cherries, edible fruits of two species of trees of the order Malpighiaceæ, which is closely related to the flax order. They are natives of the W. Indies.

Barbados Gooseberry, the fruit of the W. Indian cactus (*C. Pereskia*).

Barbados Leg, another name for ELEPHANTIASIS.

Barbara, a mnemonic word used in formal logic to denote a syllogism of the first figure, all of whose propositions are universal affirmative.

Barbara, ST., suffered martyrdom at Nicomedia in Bithynia, about 235 A.D. She is the patron saint of artillerists; her image is often seen on guns, and the powder magazine of a French man-of-war was formerly called a *Sainte-Barbe*. Her feast is on December 4.

Barbarians (Gr. *barbaros*). Among the ancient Greeks the word was applied to all foreigners—those who could not speak Greek, including even the Romans, until the Greek language was cultivated by the latter, when the word was confined to the Teutonic and Scythian races. Before the fall of the empire the Romans applied the term to a foreigner who could speak neither Latin nor Greek. It was in Egypt a term both of dread and contumely, in which sense it may have passed to the Greeks and Romans. An important period in European history was that of the barbarian invasions (395-527 A.D.). The invasion of Greece by the Visigoths under Alaric (396 A.D.) led to the dismemberment of the western half of the empire. Britain was the first portion to be given up, and about the same time barbarian hordes, after making their way through Gaul, entered Spain in 409 A.D. They were a mixed band of Vandals, Suevians, and Alans. The Vandals were two German tribes—the Asdings and the Silings; the Suevians were Teutons, and the Alans a Caucasian race. They were scarcely settled in their Spanish territories when, in 412 A.D., the Visigoths or West Goths swooped down on them, and took Lusitania from the Alans, and Bætica from the Silings, whom Wallia, the Gothic king, exterminated. In 429 A.D. Spain was abandoned by the Vandals and the Alans, who crossed to Africa. The Emperor Honorius, for the services of the Visigoths in Spain, rewarded them with two large territories in Gaul, consisting of Aquitania and Toulouse, which they formed into the second Visigothic kingdom, the first having been founded in Spain, with Barcino (Barcelona) as its capital. The Visigoths added to their possessions, till in 490 A.D. they reached from the Loire to the Garonne. The next barbarian invasion was that of the Franks, who took possession of the greater part of Visigothic Gaul. The Huns—Asiatic nomads—are the next to figure as invaders, under Attila, their sway extending from the Rhine to the Volga, from the Danube to the North Sea. By the confederated German tribes, in 454 A.D., the power of the Huns was destroyed at the river Netad in Pannonia, and other barbarians took possession of their territory—the Gepidæ, a German tribe, seizing Dacia and Jazygia, the Ostrogoths taking Pannonia, the rest of the territory falling into the hands of other German peoples. The Alemanni settled in the northern part of Rhætia, and they had as neighbours the Thuringians. Italy, as well as Gaul, suffered from the invasions of barbarians. In 476 the Rugians erected a German kingdom in Italy under Odovacar, which continued till the Ostrogothic kingdom was formed (489) under Theodoric, whose rule extended from Dalmatia to the Atlantic. With Odovacar and Theodoric establishing their domination in Italy the Western Roman empire may be said to have come to an end, though the Eastern empire held on for many centuries afterwards, notwithstanding the continual invasions of other barbarians, such as the Hungarians and the Saracens.

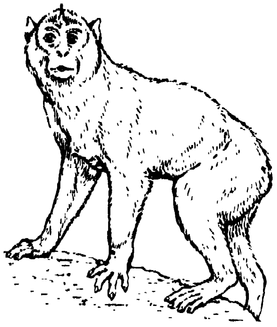
Barbarossa. See FREDERICK I.

Barbarossa ('Red-beard'), HORUK (*c.* 1473-1518) and KHAIR ED-DIN, the name of two celebrated Turkish corsairs of the 16th century, born at Mitylene, on the island of Lesbos. Entering the service of the emir of Tunis, Horuk became commander of his fleet, and in 1515 made himself master of Algiers. He was defeated and slain by the Spanish general Gomarez near Oran in 1518. The war was continued by his brother Khair ed-Din, who, with Turkish help, seized both Algiers (1519) and Tunis (1533). Although routed near Tunis by the Emperor Charles V. in 1535, he maintained himself at Algiers, and was in the following year made chief admiral of the Turkish fleet by Sultan Solyman II. During the next ten years, until his own death in 1546, he was the terror of the Mediterranean, plundering Port Mahon (Minorca), the Ionian Is., Dalmatia, and Nice, and defeating the fleet of the emperor in the Gulf of Arta (1538), near Crete (1540), and off Algiers (1541). See La Gravière's *Doria et Barberousse* (1886); *Blackwood's Mag.*, vol. lii.

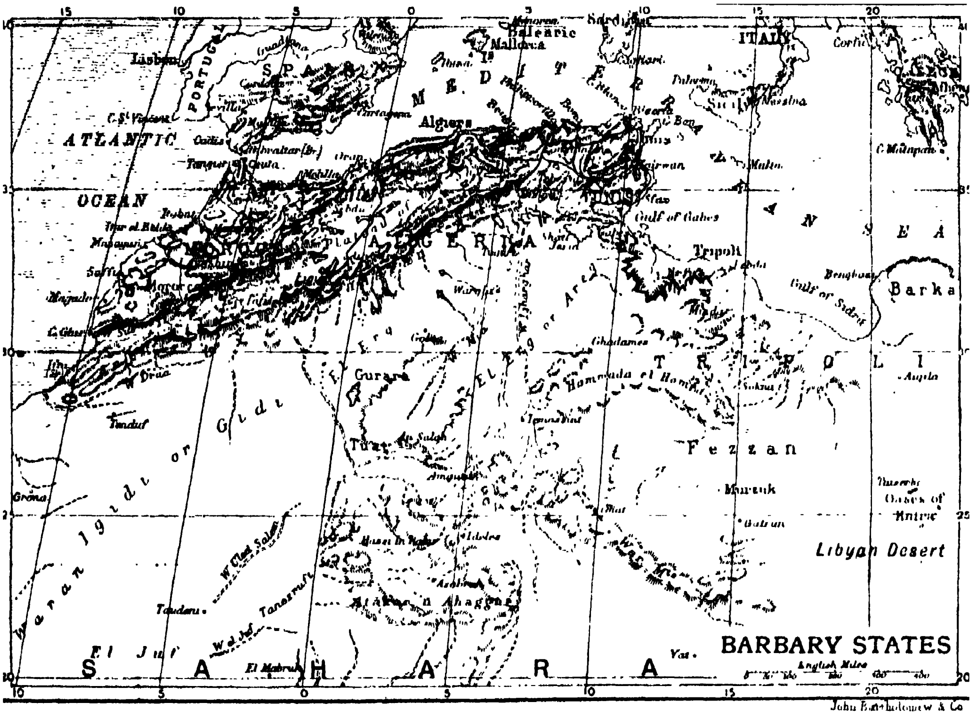
Barbaroux, CHARLES JEAN MARIE (1767-94), Girondist orator and politician, was born at Marseilles, where he practised as an advocate until the revolution, when he was sent to represent his native town in the Legislative Assembly at Paris. Here he attached himself to Brissot, Vergniaud, and Gensonné, the most influential of the Jacobins, and discussed with Roland the possibility of a southern republic. He led the Marseilles battalion on Aug. 10, 1792, and was a Girondist deputy to the Convention. He denounced Marat and Robespierre, and sustained the appeal to the people in the sentence passed on the king. In consequence he was proscribed as a royalist (May 31, 1793), and had to flee from Paris. But he was captured and guillotined at Bordeaux (June 25, 1794). See *Mémoires relatifs à la Révolution*, ed. Boudouin (1822).

Barbary ('land of the Berbers'), an extensive region of N. Africa, stretching from Egypt to the Atlantic, and from the Mediterranean to beyond the Great Atlas, was variously known to the ancients as Mauritania, Numidia, and Africa Propria. Colonized by Mauri (Moors), Numidians, and Phœnicians, it reached its zenith under the Carthaginians, and was subject to the Romans from 146 B.C., from whom it was taken by the Vandals (429-533). Then for a little more than a century it was subject in part to Byzantium; but during the 7th century it passed under the sway of the Arabs. The French secured possession of most of it in the second quarter of the 19th century. The Barbary States are MOROCCO, ALGERIA, TUNIS, TRIPOLI, and BARKA. See also BERBERS.

Barbary Ape (*Macacus inuus*), a macaque monkey, remarkable in that it occurs on the Rock of Gibraltar and the opposite shore of Africa, while its allies are confined to Asia. It is the only monkey found native in Europe in the living state, though they are abundant as fossils. At one time the ape population at Gibraltar was reduced to four; but the numbers were successfully reinforced from Africa, and the herd is now carefully protected, in spite of the destruction which they effect in gardens and orchards.



The Barbary Ape
(The only native European monkey.)



BARBARY STATES

John Bartholomew & Co

Barbastelle (*Synotus barbastellus*), a brown bat found in England, France, and Germany, the cheeks of which are covered with a beard, while the ends of the hairs are yellow.

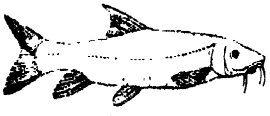
Barbastro, tn., prov. Huesca, Spain, 27 m. on coach road S.E. from Huesca, and on a branch railway from Saragossa to Barcelona. The ancient Aragonese Cortes was formerly held here. Pop. (1900) 7,033.

Barbauld, Anna Letitia (1743–1825), English authoress, was born in Leicestershire. In 1773 she published her first volume of poems, which was instantly successful. In 1774 she married the Rev. Rochemont Barbauld, with whom she kept a boarding school for twelve years at Palgrave in Suffolk. She edited (1810) the English novelists in fifty volumes, with biographical and critical notices, and also *The Female Speaker*, a selection of English prose and verse for young ladies. In conjunction with her brother, John Aikin, she began in 1792 the series entitled *Evenings at Home*. See *Memoirs* by Lucy Aikin (1826), Le Breton (1874), G. A. Ellis (1874), Thackeray-Ritchie's *Book of Sibyls* (1883), and Murch's *Mrs. Barbauld and her Contemporaries* (1877).

Barbecue (Haytian, *barbacoa*), a wooden or iron framework on which large pieces of meat or whole pigs or oxen were roasted; also a name given to the meat thus roasted, and now extended in the United States to an *al fresco* feast where meat is thus cooked. Another derivation is given as a corruption of the French *barbe-à-queue* (snout to tail).

Barbed Wire Act, 1893. Where barbed wire which 'may be injurious to persons or animals lawfully using a highway' adjoins a highway, the local authority may call upon the owner of the land to remove the wire; and if he fails to do so, may apply to a court of summary jurisdiction in England and the sheriff in Scotland; and if he still fails to remove it, may remove it themselves and recover their expenses. Apart from the act, a person may be liable in damages for injuries done by barbed wire to any one who is not a mere trespasser. For manufacture, see Wire; for use in war, see Fortification.

Barbel, a general name applied to the very numerous species of a genus (Barbus) of Cyprinoid fishes. There are usually four barbels or processes on the upper jaw, and the third ray of the dorsal fin is usually elongated, ossified, and toothed. The common barbel of Europe (*B. vulgaris*) may reach a length of 2 ft., and, like its near ally the carp, buries itself in mud during winter. The diet is very varied, including refuse of various kinds, and the flesh is almost inedible. Other species occur in the temperate and tropical regions of the Old World.



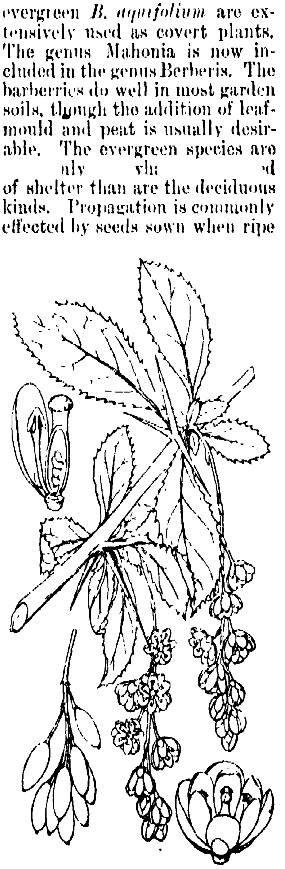
Barbel.

Barber (Lat. *barba*, 'a beard'), a beard trimmer and shaver, now also a hair-cutter. Formerly the barber added to his duties as hairdresser that of surgeon, especially in simple cases such as blood-letting. The profession of barber-surgeon was incorporated first in England by Edward IV. in 1461, and was united with the surgeons under Henry VIII.; but the connection was dissolved by George II. in 1745. The sign of the barber (a pole with spiral bands or bandages of red, and a pendent brass basin with a semicircular opening in its rim) symbolizes the old function of the barber blood-letting. Barber-surgeons existed in France as a corporation from 1371 to the Revolution. See *Annals of the Barber-Surgeons of London* (1890).

Barber, the name applied in the Gulf of St. Lawrence to a strong wind that blows at times loaded with ice particles of frozen fog. Driven by a high wind, these ice particles cut the face; hence the name.

Barberini, an Italian family of the 17th century, originally of Tuscan origin, whose greatness dates from the elevation of Maffeo Barberini (1568-1644) to the papal chair as Urban VIII. (1623). His brother Carlo and two of his nephews, Francesco and Antonio, were raised to the cardinalate; Taddeo, another nephew, was given the principality of Palestrina. Incensed by the growing avarice and power of the Barberini, the families of the Medici, Este, and Farnese waged war upon them (1641-4), and defeated them. Under Pope Innocent X. they were forced to flee to France, where Taddeo died (1647). The family became extinct in the male line in 1738. The valuable library collected by Francesco Barberini was sold to the Pope (Leo XIII.) in 1902, though not the great works of art preserved in the ancestral palace at Rome.

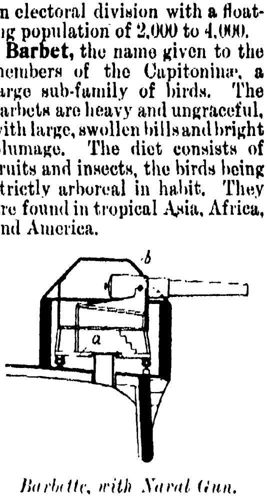
Barberry, an ornamental evergreen shrub of the genus Berberis, natural order Berberidaceæ. Whether the common barberry (*Berberis vulgaris*) is or is not a native of Britain is open to some doubt. *B. vulgaris* is a thorny shrub which in early summer bears yellow, many-flowered, pendulous racemes. The flowers, on first opening, have a faint scent of cowslips, but this soon gives place to a smell as of putrefaction. The scarlet fruits afford a brilliant display in autumn, and their astringency was formerly made use of in medicine. The orange-yellow flowered *B. Darwinii*, the graceful, evergreen, box-leaved, yellow-flowered *B. dulcis* or *B. buxifolia*, the evergreen, long-leaved *B. japonica*, the yellow-flowered *B. aristata*, with bloom covered berries in autumn, the low-growing *B. Thunbergii*, with lovely autumn colouring of leaves and scarlet berries lasting well to Christmas, the slightly more delicate *B. nepalensis*, with its slender racemes of yellow flowers, and certain hybrids derived from them, are among the best shrubs for garden decoration. *B. Darwinii* and the evergreen *B. aquifolium* are extensively used as covert plants. The genus Mahonia is now included in the genus Berberis. The barberries do well in most garden soils, though the addition of leaf-mould and peat is usually desirable. The evergreen species are [illegible] of shelter than are the deciduous kinds. Propagation is commonly effected by seeds sown when ripe in autumn, but barberries may also be increased by means of layers, or by cuttings taken in autumn and placed in light soil under glass. A yellow colouring matter used in leather manufacture is obtained from the roots. A fungus (*Aecidium Berberis*) which attacks the plants has been proved to be a stage in the life of the red and black rusts of cereals.



Common Barberry.
Inflorescence, single flower, pistil and stamen, and fruit.

Barberton, dist. and tn. in E. Transvaal, about 136 m. from Pretoria; the centre of De Kaap gold fields. Under the Boer rule an electoral division with a floating population of 2,000 to 4,000.

Barbet, the name given to the members of the Capitoninæ, a large sub-family of birds. The barbets are heavy and ungraceful, with large, swollen bills and bright plumage. The diet consists of fruits and insects, the birds being strictly arboreal in habit. They are found in tropical Asia, Africa, and America.



Barbette, with Naval Gun.
a, Turntable; *b*, armoured roof.

Barbette, in its naval sense a low, fixed armoured breastwork behind which the heavy armament of a ship is mounted, and over which it fires. The guns thus placed revolve on turntables within, and their after-ends are frequently protected by means of armoured hoods. The first British ironclad to be fitted with barbettes was the *Téméraire* of 1876. After 1890 the turret was superseded by the barbette.

Barbey d'Aurévilly, JULES (1808-89), French author, born at St.-Sauveur-le-Vicomte (dep. Manche); wrote a great number of works characterized by the paradoxical boldness of his ideas and the brilliancy of his style. The best known are: novels *Une Vieille Maitresse* (1851), and *L'Ensorcellée* (2 vols. 1854), one of his best works; critical studies—*Les Quarante Médaillons de l'Académie Française* (1863), *Les Romanciers* (1866), *Goethe et Diderot* (1880), and *Les Œuvres et les Hommes du XIX^e^ Siècle* (12 vols. 1861-92). See Buet's *Jules B., Impressions et Souvenirs* (1891), and Grelé's *Jules B., sa Vie et son Œuvre* (1902).

Barbican, a word introduced during the crusades to describe an outwork to protect the entrance to a castle or fortified town; sometimes, also, an outpost communicating with the town or castle, and commanding the flank of a besieging force. Examples of the former can still be seen at Alnwick and Warwick castles, and examples of both in the mediæval town of Carcassonne, France. The word survives in the name of The Barbican, a street in the city of London.

Barbier. (1.) ANTOINE ALEXANDRE (1765-1825), a French bibliographer, and librarian successively to the Commission of the Arts and Sciences (1793), Directory (1798), Council of State (1803), Napoleon (1807), and finally was administrator of crown libraries under the Bourbons until 1822. Of his publications the most important is his *Dictionnaire des Anonymes et Pseudonymes* (1806-1808; new ed. 1872-9, with suppl. 1889). (2.) HENRI AUGUSTE (1805-82), a French author, of whose numerous works only one, a collection of satires called *Les Iambes* (1831; new ed. 1898), stands out by its literary merit and its scathing delineation of contemporary morals and manners. (3.) PAUL JULES (1825-1901), a French dramatic writer, whose pieces have been continuously before the Parisian public since 1847; more celebrated for his librettos for operas by Meyerbeer, Gounod, Thomas, and Massé than for his own plays, the chief of which are *Jenny l'Ouvrière* (1850), *La Loterie du Mariage* (1868), and *Jeanne d'Arc* (1873).

Barbieri. See GUERCINO.

Barbizon, hamlet, favourite residence of artists, dep. Seine-et-Marne, France, on the outskirts of the forest of Fontainebleau. Its fame is due to the Barbizon School (1840-75), an illustrious group of French artists—Corot, Millet, Diaz, Rousseau, Daubigny—and their followers. Characterized by a reaction against all pedantry and false romanticism, the work of Millet and Rousseau especially was the result of a consistent and serious return to nature, and to the most sincere and immediate impressions of nature and life. See Thomson's *Barbizon School* (1891), which gives other authorities; and Breton's *Nos Peintres* (1900).

Barbou, a celebrated family of French printers. The edition (in italics) of Clément Marot (Lyons, 1539), the Cicero, also in italics (Limoges, 1580), and a charming collection, in 76 vols. 12mo, of Latin classics (Paris, 1753 *ff.*), are among their most famous work. The business passed in 1808 to the firm of Delalain, by whom it is still continued. Barbou editions are highly prized for their neatness and accuracy, rivalling the Elzevirs of earlier date.

Barbour, SIR DAVID MILLER (1841), financier, went out early to India as a civil servant, and became member of council of the governor-general in 1887. In 1893 he was appointed a member of the Royal Commission on the Financial Relations of Great Britain and Ireland; in 1897, of the Sugar-growing Colonies of the West Indies; and in 1900 was sent to S. Africa as a special commissioner to inquire into and report upon the financial position of the Transvaal and Orange River Colony. He was made K.C.S.I. in 1889, and K.C.M.G. in 1899.

Barbour, JOHN (? 1316-95), Scottish poet, was archdeacon of Aberdeen in 1356. In 1372 he became clerk of the king's audit, and in 1374 one of the auditors of the exchequer. His fame rests on his heroic poem *The Bruce*, completed in 1375-6 (the best edition is that of Professor Skeat for the Scottish Text Society, 1894), detailing, in octosyllabic verse, the fortunes and adventures of Robert the Bruce and his companion, Sir James of Douglas. It is notable not merely as one of the best examples of early Scottish literature, but for its fine exposition of the spirit of ancient chivalry, and for its portrayal of the nobler aspects of early Scottish patriotism. Other works attributed to him are fragments of a translation of *The Siege of Troy* and the *Legends of the Saints* (Scottish Text Society, ed. Metcalfe, 1887-96), and *The Buik of Alexander* (Bannatyne Club, 1831). See *Wallace and the Bruce Restored* (1900), by J. T. T. Brown; and *John Barbour, Poet and Translator* (1900), by George Neilson.

Barbuda, isl. in Leeward group, British W. Indies, 25 m. N. of Antigua, of which it is a dependency. It produces tobacco and sugar, and has an area of 60 sq. m. The pop. in 1901 was 775.

Barby, tn., dist. Magdeburg, prov. Saxony, Prussia, on the Elbe, 14 m. S.E. of Magdeburg; manufactures sugar, and carries on a river trade. Pop. (1900) 5,136.

Barca. See BARKA.

Barcarolle (Ital. *barcaruolo*, 'a boatman'), a name given to songs, or instrumental compositions imitative of the songs, which originated with the gondoliers of Venice.

Barcellona, prosperous tn. of Sicily, prov. Messina, near the N. coast, 27 m. S.W. of Messina. It has silk industries and sulphur baths (season, May to September). Pop. (1901) 24,133.

Barcelona. (1.) Province, N.E. of Spain, in the centre of Catalonia; is the most populous and industrial province of Spain, having an area of 2,969 sq. m., and pop. (1900) 1,054,541. It is mountainous, containing branches of the Pyrenees—*e.g.* the Sierra del Cadi (8,000 ft.) in the N., Sierra de Monseny (5,571 ft.), and Montserrat (4,058). The coast lands are fertile, and agriculture is greatly developed, even in the mountainous parts, the chief products being cereals, wine, oil, fruit (especially nuts), and cork. The mountains are rich in minerals, as iron, lead, salt. The province is noted for its industries and commerce, the chief branches of manufacture being wool, cotton, lace, silk, cutlery, glass, and flour.

(2.) Town and seapt. on the Mediterranean, cap. of the above province, 440 m. by rail E.N.E. of Madrid; is the chief industrial and commercial city and port of Spain. It lies in the form of an amphitheatre, has a pleasant climate, and is one of the prettiest towns in Spain. Its principal street, the Rambla, is one of the finest thoroughfares in Europe. It begins at the imposing Columbus monument near the harbour, and ends at Plaza de Cataluña, a favourite promenade. There are a cathedral in the Gothic style (built 1298-1448), and another beautiful church, also in the Gothic style (the Santa Maria del Mar, built 1328-83); the university (founded in 1430), with over 2,000 students; a naval institute; commercial school; academy of arts; the Lyceum Theatre; several large libraries, with rich collections of MSS.; and the archives of Aragon, with documents from 844. Barcelona is the seat of a bishop. There is a good harbour (346 ac.), easy of access; entrance 300 yds. wide; 20 to 26 ft. deep. Barcelona played a great rôle in Mediterranean commerce in mediæval times. Here the famous sea-laws known as the 'Consulate of the Sea' were in all probability promulgated in 1279. It is in connection with this port, too, that we find the first mention of marine insurance. In 1903, 4,553 vessels, with a tonnage of 2,486,856, entered the port. The total trade is valued at an annual average of 35⅜ millions sterling, of which 49 per cent. are exports. In January 1904 a strike, involving 4,000 men employed on steamers and sailing ships, caused much dislocation of business, and led to several outrages. Pop. (1897) 334,000; with suburbs (1900), 533,000.

Barcelona was founded by the Carthaginian Hamilcar Barca about 230 B.C. It became a Roman colony under the name of *Faventia* in 200 B.C.; was conquered by the Goths in 415 A.D., and by the Moors in 713; and was from 762 capital of the independent county of Barcelona. In 1137 the county was united with Aragon. On several occasions it endeavoured, but unsuccessfully, to separate from Spain, and in 1640 it was the centre of the revolt against Philip IV. The town was bombarded and taken by the Duke of Berwick (1714), by the French general Duhesme (1809), and again by the French, after a long siege, in 1823. In more recent times Barcelona has been the centre of repeated Carlist, separatist, and republican movements.

Barcelona, cap., state Bermudez, Venezuela, now declining and largely in ruins. A railway runs to the port of Guanta, 12 m. distant. Pop. (1899) about 9,000.

Barcelona Nuts. See HAZEL.

Barclay, ALEXANDER (?1475-1552), poet and translator, supposed, on good grounds, to have been a native of Scotland. He became a 'prest and monke of Ely,' and subsequently a Franciscan at Canterbury. His fame rests on *The Shyp of Folys of the Worlde* (1509), printed by Pynson, which was partly a translation and partly an imitation of Sebastian Brandt's *Narrenschiff* (1494). He wrote also *The Myrrour of Good Manners* and some *Eclogues*, the first pastoral poems that appeared in English proper. He also translated Sallust's *Jugurthine War* and a French poem, *The Castle of Labour*. The best edition of *The Ship of Fools* is that of T. H. Jamieson (2 vols. 1874), which gives a full account of Barclay and his works.

Barclay, JOHN (1582-1621), English satirist, author of the *Argenis*, was the son of a French lady of distinguished birth. He wrote much in Latin verse, satirizing royal and other high personages of his time. The *Satyricon* (1603-5) was his first effort; the *Argenis* (1621, new ed. by Waltz, 1891), his masterpiece; his last a political allegory, containing allusions to the state of Europe. See Jules Dukas's *Etude Bibliographique sur le Satyrikon de J. B.* (1880), and Dupond's *L'Argénis de Barclai* (1875).

Barclay, JOHN (1731-98), founder of the Scottish sect of the Bereans (see Acts 17:11), otherwise called Barclayites, was the son of a Perthshire farmer. He became assistant minister of Fettercairn, Kincardineshire (1763), where his preaching drew large attendances; but his heterodoxy led to his deposition by the church courts. He formed a congregation of his own, which grew into a separate sect. From 1773 till his death he ministered to the Berean Church in Edinburgh. See Memoir attached to his *Works* (1852).

Barclay, JOHN (1758-1826), anatomist, nephew of the above, was licensed for the ministry, but turned to medicine (M.D. Edin. 1796). He gave special attention to anatomy and surgery, on which he lectured in Edinburgh. He left at least two sound and learned works—*Description of the Arteries of the Human Body* (1812), and *Inquiry into Opinions concerning Life and Organization* (1825). His collection of anatomical subjects now forms the Barcleian Museum in the Royal College of Surgeons, Edinburgh. See *Memoir* by Waterhouse (1843).

Barclay, ROBERT (1648-90), Scottish Quaker and writer, was born at Gordonstown, Morayshire. Educated at Paris in the Scots College, of which his uncle was rector, he returned to Scotland in 1664, and soon joined the Society of Friends, in whose defence he wrote *Truth Cleared from Calumnies* (1670), *Treatise on Universal Love* (1677), and *Apology for the True Christian Divinity, as the same is held forth and preached by the People called in scorn Quakers* (1678). Barclay suffered considerable local persecution in Aberdeen, where he astonished the lieges by walking (1672) through the streets in sackcloth and ashes (see Whittier's *Poems*). He took part in founding E. New Jersey (1682) as a Quaker settlement, of which he was appointed governor, although he never went to America. See *Lives* by J. G. Bevan (1802) and by W. Armistead (1850).

Barclay - Allardice, ROBERT (1779-1854), of Urie, pedestrian, generally known as 'Captain Barclay,' entered the British army in 1805, and served in the Walcheren expedition of 1809. He is remembered chiefly for his pedestrian feats, the most notable of which was his walking 1,000 miles in as many consecutive hours, at Newmarket, in 1809. See Walter Thom's *Pedestrianism* (1813), and *Gent. Mag.* (new series), vol. xlii.

Barclay de Tolly, MICHAEL, PRINCE (1761-1818), a celebrated Russian general, was a descendant of a branch of the same Barclay family as that to which Barclay the Quaker belonged, which had settled in Livonia. He took part in the campaigns against Turkey (1788), Sweden (1790), Poland (1792 and 1794), France (1807), and Finland (1808); was minister of war in 1810, an office which he held, with a few months' interval, until 1813. But his fame as a general rests upon the successful part he took in the opposition to Napoleon's advance into Russia in 1812. He led the Russian contingent of the allies at Leipzig (1813) and at Paris (1815).

Bar-cochba, SIMON ('Son of the Star'—Num. 24:17), Jewish impostor, leader of the revolt of the Jews against the Roman domination during the reign of the Emperor Hadrian (131-135). At first Bar-cochba, who claimed to be the Messiah, was successful, taking Jerusalem (132) and more than a thousand towns and villages from the Romans. But Hadrian sent Julius Severus from Britain to Syria, and the revolt was quelled. Severus retook Jerusalem, and utterly destroyed Bar-cochba and his army at Bether (135). See Schwarz's *Der Bar-Kochbaische Aufstand* (1885).

Barcoo. See COOPER'S CREEK.

Bard, one of an ancient Celtic order, whose province it was to celebrate in verse, song, and play the great actions of heroes and men of dignity. They flourished especially in Wales, and in the 6th century mention is made of the Welsh bards Taliesin, Aneurin, and Llywarch; but the history of the order is obscure until the 10th century, when it was reconstituted by King Howel Dha. In course of time the order became hereditary, and was regulated by laws enacted about A.D. 1000. Edward I. is credited with the hanging of all the Welsh bards, because he regarded them as promoters of sedition; but they were revived by the Tudors. They were especially active in recasting and adding to the Arthurian cycle. In Ireland they were divided into three classes—those who sang of war and religion, those who dealt with genealogy and family history, and those who chanted the laws. Many districts in the Highlands still retain the name of the bard's territory, and the second title of the Athole family, 'Tullibardine,' is taken from the lands appropriated to a bard. In Wales some attempts have been made towards the revival of bardism by means of the popular Eisteddfods. In modern usage the term signifies a poet, as the 'bard' of Avon (Shakespeare), the Ayrshire 'bard' (Burns). See Eastcott's *Sketches of the Origin, Progress, and Effects of Musick, with an Account of the Ancient Bards* (1793); Evans's *Specimens of the Ancient Welsh Poetry* (1764); *Myvyrian Archaiology of Wales*, ed. Jones, Williams, and Owen (new ed. 1862); and Douglas Hyde's *Literary History of Ireland* (1899).

Bardesanes = BAR-DAISAN (A.D. 154-222), a Syrian of Edessa, Mesopotamia, founder of a sect of Gnostics known by his name, who held peculiar views as to the origin of evil, which they regarded as independent of God, and only of temporary existence. They also believed that the body of Jesus was not real flesh and blood, but only appearance. Bardesanes taught these doctrines through 150 hymns, which were in use in the Catholic Church until the 4th century. See Smith and Wace's *Dict. of Christian Biography*.

Bardili, CHRISTOPH GOTTFRIED (1761-1808), German philosopher, born at Blaubeuren, in Würtemberg, was a strong opponent of the doctrines of Kant. His theories, known as rational realism, had little influence in Germany. They anticipated in certain respects the doctrines of Schelling and Hegel. Of his numerous works the *Grundriss der ersten Logik* (1800) is the chief.

Bardowick, a small town of Prussia, prov. Hanover, 5 m. N. of Lüneburg; was a large and important trading town in the time of Charlemagne, but was destroyed by Henry the Lion, Duke of Saxony, in 1189.

Bardsey ('Bards' Island'), isl., co. Carnarvon, Wales, S. of Braich-y-pwll, the legendary last retreat of the Welsh bards; has a lighthouse (fixed light, seen 17 m.), and is accessible only on the S.E. side. Area, 430 ac. Pop. (1901) 124.

Bardwan, or BURDWAN. (**1.**) District, Bengal, India; area, 2,689 sq. m. It is flat, and watered by the Bagirathi and other tributaries of the Hugli. Rice is the principal agricultural product. Gold, silver, and brass wares, silk saris and dhutis, are the chief manufactures. Raniganj, a subdivision of Bardwan, has important coal mines. Pop. (1901) 1,532,475. (**2.**) Principal tn. of the district, situated on the l. bk. of the Damodar R., 55 m. N.W. of Calcutta by rail. Pop. (1901) 35,022.

Barebone's Parliament (July 4 to Dec. 12, 1653), an assembly summoned by Cromwell after the 'Rump' had been expelled, was so called in derision after one of its prominent members, Praise-God Barbon or Barebone, a leather-seller of Fleet Street. It consisted of 139 members (122 for England, 6 for Wales, 5 for Scotland, and 6 for Ireland). On the accession of Charles II. Barebone spent some time in the Tower. He was not a lunatic, as some describe him, and many of his suggested reforms have since been adopted. See S. R. Gardiner's *Hist. of the Commonwealth and Protectorate* (1897).

Barefooted Monks and Nuns, certain reformed branches of the great monastic orders which adopted the habit to indicate the lowliness of their members. The chief branches are the Alcantarines, a division of the Franciscans, founded by St. Peter of Alcantara on the Tagus (1555); the Barefooted Carmelites, founded (1568) by St. Theresa in the convent of Avila, Spain, which included both monks and nuns; and the Barefooted Augustinians (1588). The nuns of 'Our Lady of Calvary' go barefoot for a season only.

Barège, a gauze-like fabric used for women's dresses, made of silk and worsted, or of cotton and worsted. Called in France *crêpe de Barèges*, after the Pyrenean watering-place of that name, it is really produced at Bagnères-de-Bigorre, 16 m. distant.

Barèges, summer health resort (uninhabited in winter), dép. Hautes-Pyrénées, S. France, 25 m. S. of Tarbes, and reached by coach from Pierrefitte (12 m. away). Its hot sulphur springs (89½°-113° F.) are famous.

Bareilly, chief town and municipality, Rohilkhand Division, United Provs. of Agra and Oudh, India, about 150 m. E. of Delhi. It manufactures furniture and carriages, superior cotton and silk cloth, and leather and metal work. Pop. (1901) 131,208.

Barents. (**1.**) ISLAND, in Spitzbergen group, 78° 30′ N. and 20° E. of Arctic regions, between Edge I. and W. Spitzbergen; named after Willem Barents, a Dutch navigator; highest point, 1,998 ft. (**2.**) B. SEA, div. Arctic Ocean, between Spitzbergen (W.) and Novaya Zemlya (E.) It is shallow (aver. depth, 100 fathoms), and in the N. is beset with pack ice. The S. part is open even in winter. The part near the Kola coast is sometimes known as the Murman Sea. See Nansen's *The Norwegian North Polar Expedition*, vol. iii. (1902).

Barents, WILLEM, a Dutch navigator, born in the island of Terschelling about the middle of the 16th century; died at Novaya Zemlya, 1597. Barents acted as pilot of three unsuccessful expeditions from Holland (1594-6) to discover the N.E. Passage. In the third he discovered Spitzbergen, doubled the N.E. cape of Novaya Zemlya, and there died. In 1871 the Norwegian, Captain Carlsen, came upon Barents's winter quarters, and in 1875 Captain Gardiner recovered part of his journal. See Van Campen's *Barents Relics* (1877), and Gerrit de Veer's *The Three Voyages of W. Barents* (2nd ed. 1876).

Barère de Vieuzac, BERTRAND (1755-1841), French journalist and revolutionist, was a native of Gascony. He became deputy to the National Assembly in 1789, a delegate from the Hautes-Pyrénées to the National Convention in 1792, and a member of the Committee of Public Safety. He voted for the king's death 'without appeal.' His flowery language induced Burke to call him 'the Anacreon of the guillotine.' (See also Carlyle's *French Revolution*, bk. v. ch. 6). When the Jacobins triumphed over the Girondists, Barère was the first to propose that 'terror should be the order of the day,' but was himself impeached and imprisoned in 1795 in the Prisons de Saintes, where he began to edit his *Mémoires*. He escaped, and eventually took refuge in Belgium. After the revolution of 1830 he returned to Paris, where he was again elected a deputy for his department. His *Mémoires*, so called, in 4 vols., appeared in 1842, and an English trans. by Payne, also in 4 vols., containing a long 'historical notice' of Barère, was published in 1896. See Macaulay's *Essay* on Barère (1875); Carnot's *Mémoires de Barère de Vieuzac* (1842).

Baretta. See BIRETTA.

Baretti, GIUSEPPE (1719-89), Italian poet and critic, born at Turin. In 1751 he came to London, where he became secretary of the Royal Academy of Painting, and made the acquaintance of Johnson, Garrick, and Boswell. His most important work, which was epoch-making for Italian literature, is *Frusta Litteraria*, a journal of literary criticism, in which he sharply combated the morbid spirit of his time, and laid down sound principles of criticism. It was published in Venice from 1763-5 in 33 numbers, reprinted, most recently in the collection *Classici Italiani del Secolo XVIII.* (2 vols. 1838-9). The attacks to which he exposed himself by this publication compelled him to return to London. To Englishmen he is best known as the author of a *Dictionary of the English and Italian Languages* (1760; new ed. 1873), long a standard work of reference. See his *Scritti Scelti*, ed. with biography by Custodi (1822-3), Piccioni's *Studi e Ricerche intorno a G. Baretti* (1899), and Carizio's *G. Baretti e i suoi Tempi* (1872).

Barfleur (anc. *Barofluctum*), bathing-place, dép. Manche, France, on N. coast, 15 m. E. of Cherbourg, with tidal harbour at Pointe de Barfleur, the N.E. cape of the Cotentin peninsula. It was an important port during the middle ages. Edward the Confessor embarked here in 1042 for England, and the *White Ship* left this port in 1120 on its disastrous voyage. Pop. 1,180. The BATTLE OF BARFLEUR was fought on May 19, 1692, by a fleet of 82 British and Dutch ships of the line, under Admirals Edward Russell and P. van Almonde, and a French fleet of but 44 ships of the line, under Comte de Tourville. The latter engaged in battle against his better judgment, but displayed remarkable ability, and got away in a fog. He was, however, chased by the allies on the 20th and 21st, and was finally driven with the bulk of his force into the Bay of La Hogue. Some of the ships which had entered the Bay of La Hogue escaped thence; but 12 still remained there on the 23rd, and on that and the following day all of them were destroyed by the English and Dutch, under the eyes of King James II., who had hoped that Tourville's fleet would be instrumental in winning back for him the throne of England. The victory was of vast importance, but more reputation, perhaps, was gained by Tourville than by the men who defeated him. See Clowes's *The Royal Navy* (1897); *Annuaire Bulletin de la Société de l'Histoire de France* (1877).

Barfleur, a British first-class battleship (10,500 tons) launched in 1892. The name, which dates in the navy from 1697, commemorates the Anglo-Dutch victory over the French off Cape Barfleur in May 1692.

Barfod, Poul Frederik (1818–96), Danish historian, assistant in the Royal Library in Copenhagen in 1866, was an ardent advocate of the 'Scandinavian idea,' or close union of the three Scandinavian kingdoms. His chief works are *Fortællinger af Fædrelandets Historie* (4th ed. 1872–4), and *Danmarks Historie, 1319–1670* (6 vols. 1885–93).

Barfrush. See Balfrush.

Bargain and Sale. (1.) As to Land, this was an old method of conveying land, and is now obsolete. A 'bargained' to sell land to B, and the 'sale' was completed by payment of the purchase money. The Statute of Uses (1535) enacted that the effect of the combined transactions should be to convey the legal as well as the equitable estate to B. (2.) As to Personal Property, a bargain and sale is a completed contract for the sale of specific goods.

Bargander. See Sheldrake.

Barga Pass, pass in Himalayas, Bashahr State, Punjab, 31° 16′ N., 78° 19′ E.; alt. 15,000 ft.

Barge, tn., prov. Cuneo, Piedmont, Italy, 28 m. S.W. of Turin; has slate quarries and a manufactory of arms. Pop. (1901) 9,319.

Barge, flat-bottomed boat for carrying freight on rivers and canals, or for loading and unloading ships (lighters). Canal and river barges have usually accommodation for the bargee and his family. The conditions of life on board barges and the education of the children living on them were investigated by George Smith of Coalville, and his efforts led to the Canal Boats Act of 1878, amended in 1884, by which all canal boats must be registered under the name of a place where there is a school for the children to attend. Moored barges are frequently used as house-boats. The long, double-banked boats used by flag-officers, and the elegantly adorned and appointed state craft, manned by many oarsmen, are also known as barges.

Barge-board, or Verge-board, is the inclined projecting board placed on the gable end of a house or on a window to hide the horizontal timbers of the roof, and to preserve them from the weather. It has been used from the 13th and 14th centuries; ancient specimens were elaborately carved and fretted. See Pugin's *Details of Ancient Timber Houses* (1836).

Barh, munic. tn., Patna dist., Bengal, India, situated on the r. bk. of the Ganges, 31 m. S.E. of Patna. Pop. (1901) 12,164.

Barham, Sir Charles Middleton, Lord (1726–1813), British admiral, controller of the navy from 1778 to 1790. Although he became a vice-admiral in 1793, and a full admiral in 1795, he never hoisted his flag afloat. In 1794–6, however, he served as a junior lord of the Admiralty. He was created Baron Barham in 1805, when he became First Lord of the Admiralty.

Barham, Francis Foster (1808–71), born near Penzance, attempted to form (1840–4) a new religion, which he called 'Alism.' He edited Jeremy Collier's *Eccles. Hist. of Great Britain* (1840).

Barham, Richard Harris (1788–1845), author of the *Ingoldsby Legends*, was born at Canterbury, took orders (1813), and in 1821 was appointed a minor canon of St. Paul's. The *Ingoldsby Legends* were published in *Bentley's Miscellany*, under Dickens (1837), and collectively (1840). See *Biography* by his son (1870; 4th ed. 1899).

Bar Harbor, a summer resort of Maine, U.S.A., situated on the E. shore of Mount Desert Island.

Bar-Hebræus. See Abulfaraj.

Bari. (1.) Or Bari delle Puglie ('Bari of the Apulias'), prov., S. Italy, forming part of the Apulian plain, on the Adriatic seaboard. The coast plain produces fruits in abundance, cattle and sheep are pastured on the limestone plateau of Murgie, and there is a salt industry on the shore. Area, 2,289 sq. m. Pop. (1901) 823,998. (2.) Anc. *Barium*, cap. of the above, seapt. and archiepiscopal see, on the Adriatic, 69 m. by rail N. by W. of Brindisi; has considerable trade in wine, olive oil, almonds, and cream of tartar. The Byzantine cathedral of San Sabino (1027–34) and the church of San Nicola (1087) are the most notable edifices, the former having paintings by Tintoretto and Paul Veronese. Pop. (1901) 78,341. (3.) District of Uganda, in the extreme N.W. of the protectorate, bounded by the Nile on the W., and by the Tu on the E. (4.) A formerly powerful negro tribe on the White Nile, Africa, between the districts of Madi and Gondokoro (4° and 6° N.). Their language is allied to that of the Dinka. See Friedrich Müller's *Die Sprache der Bari* (1864).

Bariatinski, Alexander Ivanovich, Prince (1814–79), Russian military commander, remembered for his campaigns against Shamyl, chief of the Tcherkesses, whom he captured in 1859.

Bari Doab, tract of country in the Punjab, India, lying between the Ravi on the N.W. and the Beas on the S.E. An important canal waters the N.E.; it was completed in 1860, at a cost of one and a quarter millions.

Barilla, the ash, containing about 20 per cent. of sodium carbonate, of certain plants that grow near the sea, principally in Spain. Until the introduction of the Leblanc soda industry the production of barilla was of some importance. Its principal use was in making glass and soap, but it is now superseded by carbonate of soda, made from common salt.

Barima River. See British Guiana and Mora Passage.

Barine, Arvède (1840), French writer, whose real name is Mme. Charles Vincens, born in Paris; writes chiefly about women, but has translated Tolstoy's *Souvenirs* (1886). She is the author of *Portraits de Femmes* (1887; 3rd ed. 1902), *Essais et Fantaisies* (1888), *Princesses et Grandes Dames* (1890; 6th ed. 1902), *Bernardin de Saint-Pierre* (1891), *Alfred de Musset* (1893; 3rd ed. 1900).

Baring. The commercial and financial house of Baring Brothers and Co. was founded in 1770 by Francis and John Baring, sons of John Baring, a German who settled in England early in the 18th century. Sir Francis Baring (1740–1810), the Francis Baring just mentioned, an active politician and financier, was a supporter and friend of Pitt, who created him a baronet (1793). His eldest son, Sir Thomas Baring (1772–1848), who succeeded him, devoted himself to collecting works of art. Alexander Baring (1774–1848), his second son, was raised (1835) to the peerage as Lord Ashburton. Charles Thomas Baring (1807–79), grandson of Sir Francis Baring, was bishop of Gloucester and Bristol (1856), and of Durham (1861). Sir Francis Thornhill Baring (1796–1866), son of Sir Thomas, was Liberal member for Portsmouth from 1826–65. He was successively a lord of the Treasury (1830–4), secretary to the Treasury (1835–9), Chancellor of the Exchequer (1839–41), and First Lord of the Admiralty (1849–52). In 1866 he was raised to the peerage as Baron Northbrook, and was succeeded by his son, Thomas George, second Lord Northbrook (1826), who was viceroy of India (1872–6) and First Lord of the Admiralty (1880–5). He was created Earl of Northbrook (1876). Thomas Baring (1799–1873), son of Sir Thomas Baring and uncle of the present Earl of Northbrook, was Chancellor of the Exchequer (1852, 1858). Edward Charles Baring (1828–97), son of Henry Baring and grandson of Sir Francis Baring, was created Baron Revelstoke (1885). In 1890 the firm became seriously embarrassed, but managed to tide over the crisis, and underwent reconstruction. Evelyn Baring (1841). See Cromer, Lord.

Baring-Gould, Sabine (1834), English divine, novelist, and miscellaneous writer, born at Exeter, and became incumbent of Dalton, Thirsk, in 1866, rector of E. Mersea, Essex, in 1871, and in 1881 rector of Lew Trenchard, Devon. His first important book was the *Curious Myths of the Middle Ages* (1866–7). This was followed by *The Origin and Development of Religious Belief* (1869–70), and by *The Lives of the Saints*, a laborious work in 15 volumes (1872–7; new ed. 1897), which was placed on the Roman *Index Expurgatorius*. Of his many novels, *Mehalah* (1880), *Richard Cable* (1888), *Cheap Jack Zita* (1893), and *The Broom Squire* (1896) are perhaps the best. He has written a few hymns, including the popular 'Onward! Christian soldiers' and 'Now the day is over;' and he is the author of the fine rendering of Ingemann's Danish hymn, 'Through the night of doubt and sorrow.' He is a very versatile author, having published sermons, books on Germany, fairy tales, *In Troubadours' Land* (1890), *The Tragedy of the Cæsars* (1892), and *A Book of Dartmoor* (1900).

Baringo. (**1.**) Lake in British E. Africa, its western shore nearly touching 36° E., and at its southernmost point only 30′ N. of the equator, standing 3,300 ft. above the level of the sea (Pringle), 18 m. long from N. to S. by 10 m. broad; without outlet; in the centre of the meridional rift, the greater part of the drainage of which enters this lake. The water is fresh, and abounds in fish. (**2.**) District of Uganda, including the lake mentioned above.

Barisal, tn. in Bakarganj dist., Bengal, India, 70 m. S. of Dacca. Pop. (1901) 18,978.

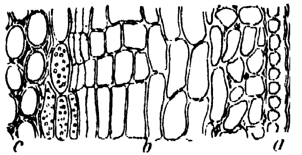
Barito, riv. (drainage basin estimated at 38,000 sq. m.) in Dutch Borneo, E. Indies, flows S. for 500 m., and enters the Java Sea below Banjermassing.

Baritone, the male voice intermediate between the bass and the tenor. Its compass is from about A on the first space of the bass clef to the F above the stave. The quality of voice should suggest a high bass rather than a low tenor.

Barium (Ba, 137·4) is a metallic element first obtained by Sir Humphry Davy in 1808, but found only in combination, chiefly in heavy spar and witherite. It is doubtful if the pure metal has ever been prepared, and its physical properties are, therefore, but little known. In its chemical properties it closely resembles calcium. Barium oxide, or baryta, is obtained by strongly heating the nitrate or carbonate. It is a grayish-white powder, infusible except by the heat of the electric arc, strongly alkaline and caustic, and when added to water it slakes like lime, with formation of the hydroxide. Until lately barium hydroxide was much used in sugar refining, but is now replaced by strontium hydroxide. Barium peroxide is obtained by heating the oxide in oxygen or air. When further heated to bright redness, or under reduced pressure, the oxygen is again evolved; this reaction is utilized in the Brin's process for making oxygen commercially. Barium chloride is prepared by dissolving native witherite in hydrochloric acid and crystallizing. Barium sulphate, 'permanent white,' or 'blanc fixe,' is prepared by adding sulphuric acid to barium chloride. Barium nitrate and chlorate are used in pyrotechny in the production of green fire, and the sulphide (Bolognian phosphorus) phosphoresces after exposure to light. Most barium salts are exceedingly poisonous. Barium compounds may be detected by their imparting a green colour to a bunsen flame if volatile, or if in solution by the formation of an insoluble white precipitate on addition of sulphuric acid.

Bar-jesus, nicknamed Elymas, a Jewish sorcerer and false prophet, who was smitten with blindness for withstanding Paul when he preached before the Roman proconsul, Sergius Paulus, at Paphos (Acts 13:6–12).

Bark of trees is, in its popular sense, everything outside the wood of the stems and branches. The outer portion of the rind consists of epidermis and green cortex, but the inner portion is pale coloured and fibrous; this forms the 'bast' region. The 'cambium' layer, which forms a new ring or cylinder of wood each year, adds to the thickness of the bast inside the bark. In the first or second year of growth a cylinder of cells, usually in the cortex, but sometimes in the epidermis, becomes an outer cambium, known as the 'cork cambium' or 'phellogen.' Cork is thus the outside tissue of most trees, and from the time it appears the rind is called 'bark.' It shows numerous horizontal channels, composed of loosely attached cells; and through these paths, called lenticels, air and moisture pass out and in during the growing season: in winter, however, the last-formed autumn cells in the innermost layers of the lenticels remain firmly attached, like the ordinary cork cells, and render the passage impervious. In spring these special cells again separate, and allow the lenticels to resume their function. As tree trunks grow old the outer cork cells die—indeed, they die soon after they are formed by the phellogen; and as the girth increases so does the pressure on the bark: the outer cork, therefore, often cracks, but the inner layers have greater elasticity, and remain complete. Each tree has its peculiar colour and type of bark. The cork of commerce is derived from a species of oak, *Quercus suber*, which grows extensively in the S. of Europe and in the N. of Africa. The trees are stripped every eight or ten years, and each successive crop of bark is better than the preceding one. In spite of the periodical removal of its bark, the *Q. suber* flourishes for over one hundred and fifty years. The *Q. suber* and other oak trees are very rich in tannic acid, and for this reason oak bark is employed by tanners in the preparation of leather from raw hide. It is utilized also as a mordant for certain dyes. The bark of many trees other than oak contains tannic acid—*e.g.* that of acacias and willows. More important still is the employment of the bast fibres of various plants in the textile arts. Thus flax (*Linum*), hemp (*Cannabis*), and jute (*Corchorus*) consist of the tough flexible fibres of the endophlœum, or inner bark, of the plants from which they are derived. With the exception of cotton, which is produced from the seed hairs of *Gossypium*, all the vegetable fibres used in the textile industries are derived from the bast region. Another great and increasing industry which depends on a bark product is the manufacture of india-rubber and gutta-percha goods. These juices are found in greatest amount in the lactiferous vessels of the middle layer (mesophlœum) of the bark of many trees belonging chiefly to the natural orders Euphorbiaceæ and Sapotaceæ.

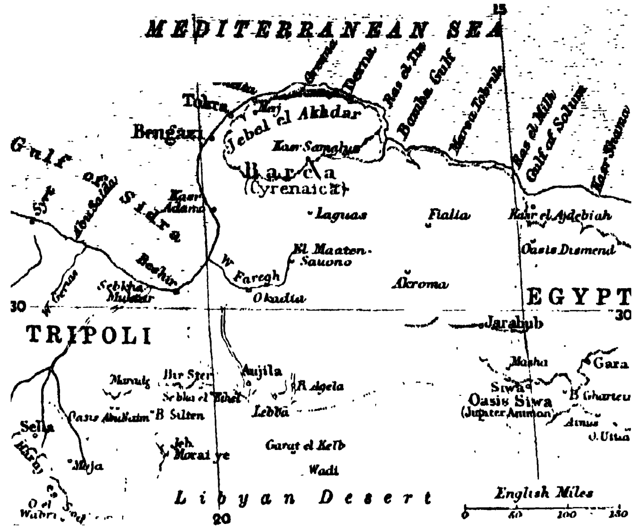


Bark.

a, Outside layer or epidermis; *b*, fibrous or bast layer; *c*, inside or cambium layer.

In the lactiferous vessels of other plants numerous gums, pigments, resins, balsams, and oils are found, many of them possessing great medicinal value. Cinchona is still known as 'Jesuits' bark,' having been brought to Europe from Peru by Jesuit missionaries. Of the numerous other drugs obtained from the cortical region of various plants, the following are in most common use: hamamelis, salicin, quassia, quillaia, eucalyptus, copaiba, the balsams of Peru and Tolu, myrrh, tragacanth, cascara, cinnamon, cassia, and angostura.

Barka, or BARCA (anc. *Cyrenaica*), a Turkish vilayet, N. Africa, bounded on the E. by Egypt, and on the W. by Tripoli and Gulf of Sidra, extends to the Libyan Desert in the S. It is for the most part a desert plateau, loftiest towards the sea, and possessing fertile tracts along the N. and E. In the N. and W. pine, olive, and date trees grow in abundance. The most important oases are Aujila and Jalo. Several caravan routes (ostrich feathers from Wadai and fruits from the interior) cross it to the seaports of Derna and Bengazi. In the time of the Ptolemies it was called Pentapolis, from the five large Greek cities of Berenice (now Bengazi), Arsinoë, Barca, Cyrene, and Apollonia. Numerous ruins of the same period are scattered all over the country. Sponge fishing on the Mediterranean coast is an important industry. The population is largely nomadic in the interior. The capital is Bengazi. Area, about 70,000 sq. m. Pop. (1900) about 500,000.

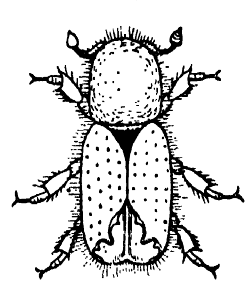


The Vilayet of Barka or Barca.

Bark Beetles, insects belonging to the family Bostrychidæ, of the order Coleoptera, and remarkable, in spite of their small size, for their destructive powers. All attack wood, on which they live, and which may be completely riddled by their burrows. Thus, *Bostrychus typographus*, or the printer, a beetle very common in Germany, bores a hole through the bark of a pine tree, and lays numerous eggs in recesses radiating from the central hole. From these eggs larvæ hatch out, which excavate radiating tunnels beneath the bark, so as to produce regular figures. At the end of these tunnels the larvæ pupate, and ultimately the perfect beetle bores its way through the bark and escapes. See Ormerod's *Injurious Insects* (1901).

Barker, EDMUND HENRY (1788-1839), translator of the classics, was born at Hollym, Yorkshire. After his marriage he lived at Thetford in Norfolk, and there edited many of the works of the Greek and Latin authors. See Memoir in *Literary Anecdotes of Porson*, vol. i. (1852).

Barker, ROBERT (1739-1806), artist, born at Kells, in Ireland, came to Edinburgh, where he worked as a portrait and miniature painter. He was the inventor of panoramas, the chief of which were those of Edinburgh (1789) and London (1794), the battles of Trafalgar and Aboukir, and the fleet at Spithead.



Bark Beetle (much enlarged).

Barker, THOMAS (1769-1847), artist, styled 'Barker of Bath,' and known for his pictures, *The Woodman* (engraved by Bartolozzi) and *Old Tom*, and his huge fresco, *The Inroad of the Turks upon Scio.*—THOMAS JONES (1815-82), his son, also an eminent artist, a pupil of his father and of Horace Vernet. His works include *The Meeting of Wellington and Blücher* (1851), *Nelson on Board the San Josef*, and other military pictures.

Barker's Mill, so called after its inventor, is the simplest form of hydraulic engine, or prime mover, and is analogous to the æolipile, the pressure of a head of water being used instead of the pressure of steam. The water is conducted into the hollow vertical axle, from which two or more horizontal radial pipes project, with their ends bent round tangentially in the same direction. The pressure of the escaping water upon the bent pipes causes the machine to rotate in the opposite direction.

Barking, munic. tn., Essex, England, suburb of London (N.E.), with factories and vegetable gardens. It has all the usual public buildings and institutions. The church of St. Margaret is noteworthy, and a few ruins of Barking Abbey remain. Pop. (1901) 21,500.

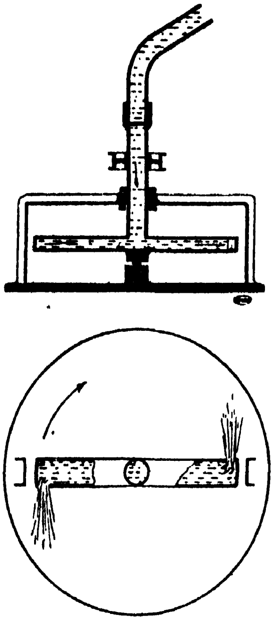
Barkly. (**1.**) EAST, dist. (pop. in 1891, 8,207) and tn. of Cape Colony; so named from Sir H. Barkly, governor (1870). (**2.**) WEST, dist. (pop. in 1891, 17,487) and tn. in Griqualand W., in the diamond-field country, 22 m. from Kimberley, on the N. bank of the Vaal R. At one time the most important trading centre of Griqualand W.

Barkly, SIR HENRY (1815-98), British colonial governor; M.P. for Leominster (1845-8); governor of British Guiana (1848-53), Jamaica (1853-6), Victoria (1856-63), Mauritius (1863-70), and the Cape (1870-7), where, in 1870, he acted as high commissioner in the settlement of the eastern frontier.

Barkul, tn. in the E. of Zungaria, Central Asia, 250 m. E. of Urumtshi, from which it is separated by a spur of the Tian-Shan Mts. It owes its importance to its position on one of the main roads from Peking *viâ* Hami (65 m. to S.) to Kulja. It comprises two towns, the one Manchu and the other Chinese. About 12 m. N. is Lake Barkul.

Barlaam and Josaphat, a religious romance which emanated from the East, and attained great popularity in Europe during the middle ages. It contains the history of the life of Josaphat, son of Abener, who was converted to the Christian faith by Barlaam, an eremite. The story is simply a Christianized version of the legendary history of Buddha, a fact first proved by Liebrecht in 1862. The Greek translation was first published by Boissonade in his *Anecdota*, vol. iv. (1832). Barlaam and Josaphat have both been canonized by the Greek and Roman Churches. See Max Müller's *Chips from a German*

Workshop, 'On the Migration of Fables' (1880); Rhys Davids's *Buddhist Birth Stories* (1880); Braunholtz's *Die erste nichtchristliche Parabel des Barlaam* (1884); Jacobs's *Barlaam and Josaphat* (1896).



Barker's Mill (*section and plan*).

Barlad. See BERLAD.

Bar-le-Duc, or BAR-SUR-ORNAIN, tn., cap. dep. Meuse, France, on l. bk. of the Ornain, 127 m. by rail E. of Paris. It is partly built in the valley (Ville Basse), and partly on the heights to the S. (Ville Haute). Preserves are largely made, and there are cotton and hosiery industries, as well as mines, in the vicinity. The church of St. Etienne or St. Pierre (14th century) contains the tomb of William of Orange. The great Duke of Guise (1519-63) and Marshal Oudinot (1767-1847) were born here. Pop. (1901) 17,693.

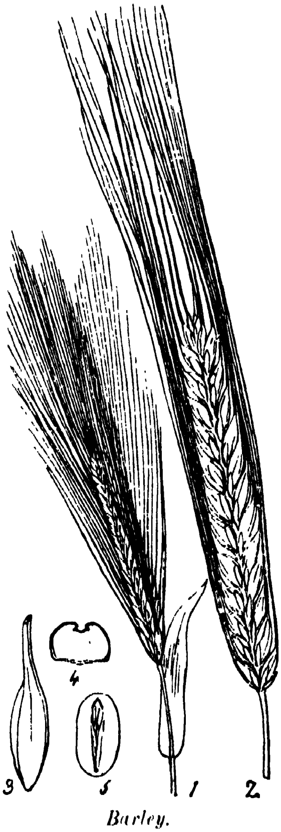
Barletta, seapt. tn., prov. Bari, Italy, on the Adriatic coast, 102 m. by rail N.W. of Brindisi. It has a colossal bronze statue of one of the Roman emperors (Heraclius ?), discovered in the sea. Tartaric acid is made, and salt is prepared. Pop. (1901) 41,969.

Barley (Lat. *Hordeum vulgare*), the most widely cultivated of all cereals, has been known from the most ancient times, and a form resembling the two-rowed kind is found wild in W. Asia. The ear of barley is a compound spike, consisting of a central axis bearing alternately on two sides spikelets of three flowers each. The outer glume of each flower terminates in a long awn roughened with very minute bristle-like hairs which point forwards. The commonest and most valuable has two rows of grain. The central flower in each spikelet ripens, the two lateral ones remaining barren. This kind is used chiefly for malting. In Norway, the Highlands of Scotland, and other cold countries the four-rowed variety, 'bere' or 'bigg,' is mostly grown. All its flowers are fertile, but instead of forming six rows, they arrange themselves so as to give the appearance of four. The six-rowed variety, with all its flowers fertile, is an ancient form, less valuable than the two foregoing. Sprat or battledore barley is a dwarf two-rowed kind, of no value, and rarely cultivated. All the above kinds have the husk (flowering glumes) attached to the ripe grain, but there are Siberian and Himalayan varieties which have naked grains like those of wheat. In Great Britain from two to four bushels per acre are sown in March, April, or even early in May in late springs. Although it is the last cereal sown, it is the earliest to ripen, being harvested thirteen to fifteen weeks after sowing. It thrives best on light, friable loams or calcareous soils. When ripe the ear bends over like the blade of a scythe, and becomes light yellow. As uniform germination is required by the maltster, it is important that the grain be quite ripe when cut. The average return of grain in a crop is from 30 to 40 bushels per acre, but it varies from 15 to 76 bushels in Great Britain. The best weighs from 54 to 56 lbs. per bushel. In January 1837 the average price in Edinburgh was 34s. per quarter; in 1850, 21s. 3d.; and in 1904, 21s. to 24s. A generation ago barley was much used for making bread; but this is now done only to a limited extent, in rural districts. Scottish or pot barley is the grain deprived of its husk, and is used in the making of broth. Pearl barley is the grain with husk and coat removed. The barley hummeller or barley awner is a machine for removing the broken awns from the grain after threshing. A barley huller is a machine for removing the husk and coats in the making of pot and pearl barley.

Barley-break, an old English country game played by six persons, three of each sex, arranged in couples, and placed in three contiguous plots of ground, the centre one called 'hell.' The couple in 'hell' attempted to catch the others as they passed through. Numerous allusions occur in literature to this game, among others by Massinger, Sidney, Suckling, and Herrick. The game is now chiefly confined to Cumberland, where it is called *barley-brigs*; and it is still played in Aberdeenshire, where it is called *barla-braks*.

Barleycorn, an old measure of length = ⅓ inch.

Barley Midge, a small two-winged fly of the family Cecidomyiidæ, similar to the Hessian fly, the clover-seed midge, and the wheat fly; so called from the attacks of its larvæ on growing barley.



Barley.

1, Four rows; 2, two rows; 3, side view of grain; 4, cross section; 5, pearl barley.

Barlow, HENRY CLARK (1806-76), English writer on Dante, born at Newington Butts, Surrey. In 1850 he published *Remarks on the Reading of the 59th Verse of the 5th Canto*, and in 1852 devoted some time to collating Dante MSS. on the Continent and in England. From 1857 to 1864 Barlow published many papers on his favourite subject, and in the latter year appeared his principal work, *Critical, Historical, and Philosophical Contributions to the study of the 'Divina Commedia.'* In 1865 he took a prominent part in, and wrote a description of, the sixth Dante centenary celebration at Florence. He endowed a course of lectures on Dante at the University College, London. He also published *Essays on Symbolism* (1866).

Barlow, JANE, Irish authoress, born at Clontarf, Co. Dublin, in 1860; became known by her volumes of studies of Irish peasant life—*Bogland Studies* (1892), *Irish Idylls* (1892), *Kerrigan's Quality* (1893), *The End of Elfintown* (1894), *The Battle of the Frogs and Mice* (1894), *Strangers at Lisconnel* (1895), *Creel of Irish Stories* (1897), *From the East unto the West* (1898), *From the Land of the Shamrock* (1900), and *Ghostbereft* (1902).

Barlow, JOEL (1754–1812), American poet and politician, who visited England (1788) and France (1792), where he received the rights of citizenship. In 1795 he was American consul at Algiers. After that he lived at Paris and in the United States (1805–11). Returning to Europe as commissioner to Napoleon, whom he found in Russia, he died in Poland during the disastrous retreat. Chief works: *The Vision of Columbus* (1787); *The Conspiracy of Kings* (1792); *Hasty Pudding* (1805); *The Columbiad* (1807), an enlargement of the first named. See *Life* by Todd (1886).

Barlow, PETER (1776–1862), English mathematician, born at Norwich; became a professor of mathematics at the Royal Military Academy, Woolwich. From 1811 he published works on mathematics, improved the mariner's compass (1821), and, by means of the 'Barlow lens,' produced a new and useful telescope of greater than ordinary magnifying power. See *Min. of Proc. of Inst. Civil Engineers*, vol. xxii. p. 615, 1862–3.

Barlow, THOMAS (1607–91), bishop of Lincoln, born at Orton, Westmorland; at Oxford was regarded as a master of casuistry, logic, and philosophy, and a decided opponent of Pelagianism, Socinianism, and Popery. He was librarian of the Bodleian (1642–60), prebendary of Worcester (1660), archdeacon of Oxford (1661), and bishop of Lincoln (1675). His works include *Exercitationes aliquot Metaphysicæ de Deo* (1637) and *Concerning the Invocation of Saints*. See Wood's *Athenæ Oxon.* (Bliss), iv. 333, 880 (1813–20).

Barlow, THOMAS OLDHAM (1824–89), English line and mezzotint engraver, who reproduced many of the works of the great contemporary artists, including John Phillip, Millais (*The Huguenot*, 1856, etc.), Turner (*Wreck of the 'Minotaur,'* etc.), Landseer, and others; R.A. in 1881.

Barlow, SIR THOMAS (1845), physician, graduate of London University (1874), and fellow of the Royal College of Physicians (1880); professor of clinical medicine and physician to University College Hospital; physician extraordinary to Queen Victoria and now to His Majesty the King.

Barlow, WILLIAM HENRY (1812–1902), English engineer, who was associated with the building of St. Pancras station, London, the Clifton Suspension Bridge (1861), the new Tay Bridge (1880–7), and advised on the plans of the Forth Bridge. He has had much to do with the adoption of mild (Bessemer) steel in construction of bridges and ships.

Barm. See YEAST.

Barmecides, a great Persian family who came to power under the Abbaside caliphs of Bagdad. One member of it, Khalid-ibn-Bermek, was prime minister to the first two Abbasides; he also acted as tutor to Haroun al-Raschid. Khalid's son, Yahya, became (786) Haroun's chief minister. One of Yahya's sons, Jaafar, became Haroun's intimate companion. He and all the Barmecide family were put to death (803), without known cause, by order of the caliph. Jaafar's virtues and tragic fate are a popular subject in Persian literature. BARMECIDE FEAST, applied to a visionary banquet, takes its name from a story in the *Arabian Nights' Entertainments*.

Barmen, tn., dist. Düsseldorf, prov. Rhineland, Prussia, in the valley of the Wupper, immediately adjacent to and E. of Elberfeld, 35 m. by rail E. of Dusseldorf. It is a pleasant, clean town, the seat of very extensive manufacture of ribbons, twine, thread, trimmings, buttons, chemicals, cottons, and silks, with dye works (Turkey red) and calico-printing works. Pop. (1900) 141,944.

Barmouth, wat.-pl. of Merionethshire, Wales, 7½ m. W. of Dolgelly. Across the estuary is Cader Idris (2,898 ft.). Old Barmouth is picturesquely situated on the side of a steep hill. Pop. (1901) 2,213.

Barn. See FARM and FARM BUILDINGS.

Barnabas, otherwise JOSES or JOSEPH, a Levite, born in Cyprus, and one of Paul's most distinguished fellow-workers. He comes before us in Acts 4 : 36 *f.* as one who has generously surrendered to the apostles the money he had received from the sale of a field. He afterwards introduces Paul to the church at Jerusalem, and a little later joins him in his first missionary journey. When about to start on a second expedition, a difference arose between the pair, and they separated; but they were ultimately reconciled. The later traditions about Barnabas (*e.g.* that he was bishop of Milan, martyred at Salamis, etc.) are worthless, as is also Tertullian's ascription to him of the authorship of the Epistle to the Hebrews. See BARNABAS, EPISTLE OF; *Life of St. Paul* by Farrar (1879), and by Conybeare and Howson (1862).

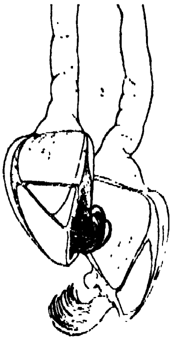
Barnabas, EPISTLE OF, an important Christian work found in some early MSS. of the Bible, and actually accepted as genuine by Origen and Clement of Alexandria. Its spurious character was generally admitted by the time of Eusebius. It consists of two parts: (1) ch. 1–17, designed to instruct the reader in true Christian knowledge (*gnosis*), especially as regards the relation of Christianity to the Old Testament dispensation; and (2) ch. 18–21, a delineation of the 'two ways'—the acceptance or rejection of the Christian life. The epistle is violently anti-Jewish in tone, and maintains that Christians alone are the true inheritors of the promises. The latter portion of the epistle is closely related to the Didache, and Holtzmann believes both to be redactions of a work called *The Two Ways*. Harnack dates the epistle about 130–131 A.D.; Lightfoot, earlier than 79 A.D. See W. Möller's *History of the Christian Church* (3rd ed. 1902), vol. i. (trans.), p. 110 *f.*

Barnabites, a religious order, founded in Milan in 1530, under the name of 'Regular Clerks of St. Paul,' but popularly styled 'Barnabites,' from St. Barnabas, the church in which they assembled. The order extended from Italy to Germany, France, and Austria. Expelled in 1880 from France, they now form some twenty colleges, in Italy, Austria, and Belgium.

Barnaby, SIR NATHANIEL (1829), British naval architect, was born at Chatham, and apprenticed as a shipwright at Sheerness in 1843. From 1855 to 1885 he was employed at the Admiralty, and assisted in the designing and construction of nearly all the vessels built for the navy during these years. From 1870 to 1885 (when he was knighted) he was chief naval architect and director of naval construction. He was one of the founders of the Institute of Naval Architects.

Barnacle, a name applied to the true or ship barnacle (*Lepas*), to the common acorn shell (*Balanus*), or generally to the members of the crustacean order Cirripedia, to which both of these belong. The ship barnacle consists of a fleshy stalk attaching the animal to floating wood, and a series of five white calcareous shells at the end of the stalk, enclosing six pairs of branched appendages (cirri). By means of these cirri the animal filters from the water the minute particles on which it feeds. Except for them, it shows in adult life practically no definite crustacean character; but the study of development shows that it must have arisen from a typically crustacean stock.

Barnacle or BERNICLE GOOSE (*Bernicla leucopsis*), an Arctic bird migrating southward during winter as far as the Mediterranean and Mississippi, and common on the west coast of Britain during winter. A baseless tradition once connected it with the barnacle. Max Müller derives the name from *Hiberniculæ*, or Irish geese. Like its allies, it is gray and black in colour, with white markings and black bill and feet, is smaller than the common wild goose, and weighs about five pounds.



Ship Barnacle.

Barnard, LADY ANNE, *née* LINDSAY (1750-1825), author of the ballad *Auld Robin Gray*, composed in 1771, but her authorship of it was unknown until she confessed it to Scott in 1823. Lady Anne's revised version of the ballad, with two 'continuations,' was edited, with a prefatory note, by Sir Walter Scott for the Bannatyne Club (1824). In 1901 was published *South Africa a Century ago: Letters written from the Cape of Good Hope, 1797-1801*, by Lady Anne Barnard. In 1824 a book was printed, but never published (only three copies of which are extant), entitled *Lays of the Lindsays: being Poems by the Ladies of the House of Balcarres.* The poems were by Lady Anne and her sisters.

Barnard, FREDERICK (1846-96), English humorous artist in black and white, contributed to *Punch* and *Fun* from 1863, and illustrated numerous books, of which the most famous is the 'Household Edition' of the works of Charles Dickens.

Barnard, HENRY (1811-1900), American writer on education; president of University of Wisconsin (1857-9); president of St. John's College, Annapolis (1865-6); first U.S. commissioner of education (1867-70). In addition, he organized the Bureau of Education, and founded (1855) the *American Journal of Education.* His numerous papers were published in 1886 as *American Library of Schools and Education.*

Barnard Castle, mrkt. tn., l. bk. of the Tees, co. Durham, England, 15 m. w. of Darlington. John Baliol, the Scottish king, was a native of the place. Among other buildings is an extensive art museum, the gift of Mrs. Bowes (1869-75). The manor of Rokeby (Scott's *Rokeby*) is in the neighbourhood. Flax-thread making is the chief industry. Pop. (1901) 4,421.

Barnard College, New York City, U.S.A., is an institution for the higher education of women, and for their preparation for the examinations of Columbia University, with which it is affiliated. It received its charter in 1889, and its students in 1901-2 numbered 431. Its foundation was largely due to the exertions of Frederick A. P. Barnard.

Barnardo, THOMAS JOHN (1845), usually called DR. BARNARDO, a native of Ireland, founder of the Barnardo Homes in E. London in 1866, for the waifs and homeless children gathered from the streets of all British cities. Of these 13,500 passed through the homes from 1866 to 1901, and in the same period 12,700 were successfully placed in Canada and other British colonies. At Ilford, in Essex, he founded in 1873 a 'village home' for training girls. The children of the well-to-do were enlisted in the work through the formation, in 1891, of the Young Helpers' League.

Barnato, BARNETT ISAACS (1852-97), S. African financier, was the son of humble Jewish parents (Isaacs) of Aldgate, London. In 1873 he went out to S. Africa as a conjurer and entertainer, assumed the name of Barnato, and soon became a diamond dealer at Kimberley. He there built up a great business, which, as Barnato Brothers in London (1880), and the Barnato Diamond Mining Company at Kimberley (1881), rivalled in power and enterprise the De Beers group, of which Cecil Rhodes was the head. In 1888 the two great companies amalgamated. Returning from S. Africa in ill health in 1897, he threw himself overboard from the liner *Scot.* See *Memoir* by H. Raymond (1897).

Barnaul, dist. tn. of Siberia, gov. Tomsk, on the l. bk. of the Ob, 254 m. s.w. of Tomsk. The administration of the mining district of the Altai is established here. The silver foundry is now closed, as the mines are nearly exhausted. Barnaul has a mineral museum and soda factories. Alt. 479 ft. Pop. (1897) 29,408.

Barnave, ANTOINE PIERRE JOSEPH MARIE (1761-93), French revolutionist, represented his native city, Grenoble, in the Assembly (1789); opposed personal violence towards the king and the royal family, and displayed great courtesy to them when acting as commissioner to lead Louis XVI. back from Varennes to Paris. His advocacy of moderate measures led him to be suspected of royalist sentiments. Denounced to the Assembly, he was guillotined on Nov. 29, 1793. According to Macaulay, he was 'the best debater in the National Assembly.' See De Salvandy's *Vie de Barnave* (1833), and Lamartine's *Girondins* (1846).

Barnay, LUDWIG (1842), German actor, born at Budapest, where he obtained his first great success in 1861. Afterwards he played in all the large towns of Germany and Austria, especially in Mainz, Weimar, and Frankfort-on-Main. In 1888 he founded in Berlin a theatre of his own, and conducted it until 1894, when he retired into private life. His principal characters were Hamlet, King Lear, Othello, William Tell, Wallenstein, and Kean.

Barnburners, a branch of the Democrats in America. The name, which was first used about 1844, originated in a comparison between their rigorous demands for reform and the policy of a Dutchman who set fire to his barn to drive out the rats. Failing to make themselves heard sufficiently in 1848 at the Democratic National Convention, they subsequently supported Van Buren's presidential candidature, but without success. A partial reconciliation between the Barnburners (then called 'Softs') and the Hunkers took place in 1852.

Barnby, SIR JOSEPH (1838-96), English musician and composer, was a native of York. Educated at the Royal Academy of Music, he held the following offices: organist of St. Andrew's, Wells Street, London (1862); conductor of Barnby's choir (1861-71); conductor of the Albert Hall Royal Choral Society from 1871 till his death; precentor and director of music at Eton (1875); and principal of the Guildhall School of Music (1892). He was knighted in 1892. Composer of numerous hymn tunes, part songs, and the oratorio *Rebekah* (1881).

Barnes, par., Surrey, England, on L. & S.W.R., and on r. bk. of R. Thames, 7 m. s.w. of London. Area, 909 ac. of land and 119 of water. Pop. (1901) 17,822.

Barnes, THOMAS (1786-1841), educated at Christ's Hospital (along with Leigh Hunt) and at Pembroke College, Cambridge. He was from 1817 till his death editor of the *Times*, which under his guidance first assumed its commanding position in journalism. He was at first violently radical, but moderated his views with advancing years, although he was a vigorous supporter of the Reform Bill.

Barnes, WILLIAM (1800-86), poet and clergyman, was born at Rushay, near Salisbury. His first volume—*Orra: a Lapland Tale*—was published in 1822. He became master of a school at Mere in Wiltshire in 1823, returning to Dorchester in 1835. He was ordained in 1847, and became curate at Whitcombe in 1847, and rector of Winterbourne Came, near Dorchester, in 1862, where he died. He began to write his Dorset poems in 1833, publishing *Poems of Rural Life in the Dorset Dialect* (1844), *Hwomely Rhymes* (1857), and a third volume in 1863. A combined edition was published in 1879, under the first title. He was a lyric writer of a high order. In his verses, which are homely and tender, and full of the joy of life, he never leaves the pleasant fields of his native Dorsetshire. They are entirely free from foreign influence, save where he takes the Persian and Italian as models in metre and rhyme. See his *Life* (1887) by his daughter, Mrs. Baxter ('Leader Scott').

Barnet, HIGH BARNET, or CHIPPING BARNET, mrkt. tn., Hertfordshire, England, 11 m. N. of London, on G.N.R. Here, in 1471, Edward of York defeated the Lancastrians under Warwick. An obelisk marks the spot where Warwick made his last stand. It has three suburbs—New Barnet, Friern Barnet, and East Barnet. Pop. (1901) 7,876.

Barnett, JOHN (1802-90), English musical composer and singer, born at Bedford, pupil of Arnold; composed songs, part songs, instrumental music, and operas, including *The Mountain Sylph* (1834) and *Fair Rosamond* (1837), and an oratorio, *The Omnipresence of the Deity*. In 1844 he published *School for the Voice*.

Barnett, JOHN FRANCIS (1837), English musical composer, nephew of John Barnett; studied at Royal Academy of Music and Leipzig, and became professor at the Royal College of Music and the Guildhall School of Music. He has written an oratorio, *The Raising of Lazarus* (1876), produced with great success at Birmingham; *The Ancient Mariner* (1867), *Paradise and the Peri* (1870), *The Lay of the Last Minstrel* (1873), *The Building of the Ship* (1880), and *The Wishing Bell* (1893), mostly cantatas composed for the Birmingham, Liverpool, and Leeds musical festivals.

Barnett, SAMUEL AUGUSTUS (1844), canon of Bristol (1893), founder and first warden of Toynbee Hall, Whitechapel (1884), which was organized for the purpose of raising the moral and intellectual level of a poorer part of London through the personal example of university men. Author of *Practical Socialism* (1893).

Barneveldt, JAN VAN OLDEN (1547-1619), Dutch statesman, was born near Utrecht. After taking part in an embassy to England, he became advocate-general of the prov. of Holland (1585), and the head of the republican party in the state, in opposition to Maurice of Nassau, whose designs and warlike policy he successfully opposed, concluding (1609) a twelve years' truce with Spain. Having been appointed 'grand-pensionary,' he took the side of the Arminians against Maurice's support of the Gomarists, who were favoured by the army, the clergy, and the people of Holland. In 1619, after the condemnation of the Arminians by the Synod of Dort, Barneveldt was convicted of treason and beheaded. See Motley's *Life of Barneveldt* (1874).

Barnfield, RICHARD (1574-1627), English poet, born at Norbury, Shropshire, lived as a country gentleman at Stone, Staffordshire. He wrote sonnets and pastorals in the Spenserian manner. His best verses, 'As it fell upon a day,' were printed as Shakespeare's in *The Passionate Pilgrim* (1599). He wrote *The Affectionate Shepherd* (1594); *Cynthia* (1595); *The Encomion of Lady Pecunia, with Poems in Divers Humours*, etc. (1598). *Collected Works*, ed. A. B. Grosart (1876) and E. Arber (1882).

Barnim, a district in Brandenburg, Prussia, divided into Upper and Lower Barnim, the latter containing Berlin.

Barnsley, par. and munic. bor. (incorporated in 1869), W. Riding, Yorkshire, on R. Dearne, 12 m. N. of Sheffield, on L. & Y., M.R., and M.S. & L. Rys. Coal is abundant in the vicinity, and the town has a linen and paper industry, and manufactures of iron, steel and glass, ready made clothing, boots and shoes, bobbins, etc. It is connected with Leeds and Wakefield by the Barnsley Canal, and contains a fine public hall and park. Acreage of par. 2,386. Pop. of munic. bor. (1901) 41,083.

Barnstaple, munic. bor. and seapt. in Devonshire, England, 6 m. from the mouth of the river Taw, and 35 m. N.W. of Exeter, on G.W.R. and L.S.W.R. The bridge (with 16 arches) over the river is said to be of the 12th century, and the grammar school dates from the 14th. The tidal harbour is 13 ft. deep at high water. There are manufactures of lace and gloves, and large cabinet works, tanneries, and potteries ('Barum ware'). In Elizabethan days it was a considerable seaport, and sent ships to fight the Spanish Armada. Its broadcloth manufacture, once an important industry, has now died out. Area of par. 1,361 ac. Pop. of munic. bor. (1901) 13,732.

Barnum, PHINEAS TAYLOR (1810-91), American showman, who accumulated great wealth by touring throughout the world with a huge variety entertainment, known as 'Barnum and Bailey's.' His first success was achieved as manager for Jenny Lind (1847-50). See his *Autobiography* (1854 and 1888); *Humbugs of the World* (1865); *Struggles and Triumphs* (1869); *Money-getting* (1883); and *Life* by Benton (1902).

Barocchi. See VIGNOLA.

Baroche, PIERRE JULES (1802-70), a French lawyer and politician, who allied himself with the party of Napoleon III., and was successively Minister of the Interior (1850) and of Foreign Affairs (1851). After the *coup d'état* of 1851 he held office as president of the Council of State. In 1863 he was Minister of Justice; but after Napoleon's fall, in 1870, he fled to Jersey, where he died.

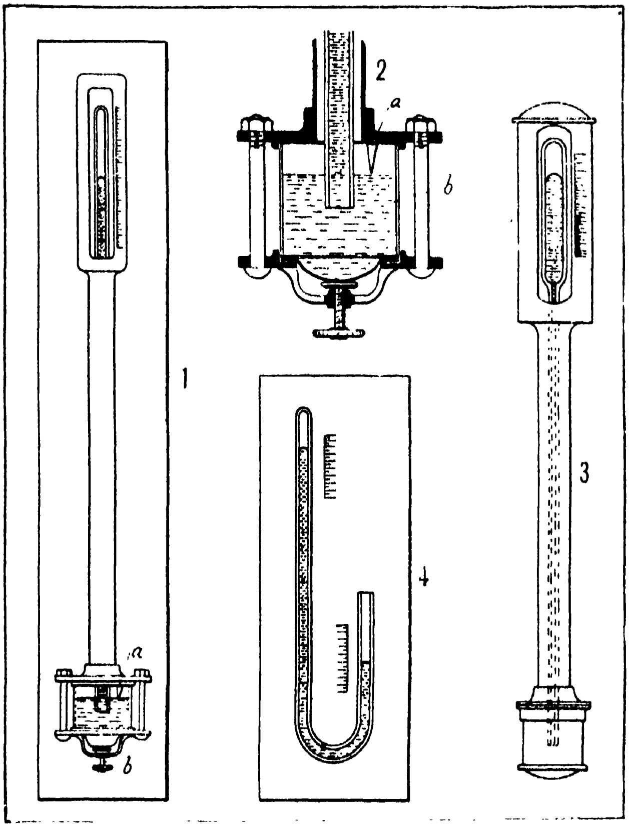
Baroda. (1.) State, situated in the Gujarat div. of Bombay, India; is one of the three large Mahratta feudatories of the British Indian empire, and is ruled by a chief called the Gaekwar. The greater portion of the dominion is concentrated about the centre of Gujarat, but strips of Baroda territory are scattered over adjacent British districts, and intermingle with the lands of other native chiefs in Kathiawar. Area, 8,570 sq. m. Pop. (1901) 1,950,927 (1,007,944 males, 942,983 females). (2.) Capital of the feudatory state of the same name, situated 250 m. by rail N. of Bombay, in Gujarat; Bombay, India. Pop. (1901) 103,782.

Barograph. See BAROMETER.

Barometer (Gr. 'a measure of weight'), an instrument for determining the pressure of the atmosphere. An observation by Galileo, who remarked that water would not rise in a pump more than 'eighteen cubits,' led to the discovery, in 1643, of air-pressure by his pupil Torricelli. His classical experiment consisted in filling a tube about three feet long, and closed at one end, with mercury. This he inverted, immersing its lower end into a basin filled half with mercury and half with water. The mercury descended in the tube, remaining stationary at a height of thirty inches, a vacant space of about six inches being thus left at the top of the tube, which is still known as the 'Torricellian vacuum.' On raising the open end of the tube above the level of the mercury, but still under the surface of the water, all the mercury in the tube rushed rapidly out, its place being taken by the water, which completely filled the tube. He thus concluded that the elevation of the column of liquid which will stand in any tube is determined by the specific gravity of the liquid composing the column and by the atmospheric pressure. In 1648 Pascal of Clermont proved the accuracy of Torricelli's surmises by carrying a barometer from Clermont to the summit of the Puy de Dome, the mercury falling 3·33 in., indicating a height of 3,458 ft. (A historical account of the barometer will be found in an address by Ellis, *Quar. Jour. Roy. Met. Soc.*, vol. xii. p. 131.) As air is about 10,000 times lighter than mercury, the height of the atmosphere should be 10,000 times 30 in., or about 4·7 m. As, however, its density diminishes according to its height, the actual elevation of the gaseous envelope surrounding the globe is much greater than 4·7 m.

In the construction of a barometer much care has to be taken that pure mercury, of sp. gr. 13·594, is employed. This is introduced into a glass tube about 34 in. long, and the mercury is boiled in the tube, so that any air and moisture may be got rid of. The tube, which in first-class instruments is of large bore, stands vertically in a cistern of mercury. The height of the mercurial column in the tube above the level of the cistern is measured by means of a graduated scale; but if great accuracy is required, a cathetometer is employed. The glass tube is fixed in a frame to protect it from damage, and the divisions of the scale, unless the instrument is intended for use on a mountain, vary from 26 to 32 in. In barometers for scientific purposes the scale and the frame are both made of brass, of which metal the expansive coefficient is well known. It is thus possible to make allowances for the alteration by heat in the length of the scale, which has to be taken into account in the reduction of barometric observations to a fixed temperature. The scales of wooden barometers are liable to serious alteration in length and shape, owing to changes in the humidity of the air.

In the construction of the barometer several difficulties have to be overcome. It will, for example, be readily understood that the level of the mercury in the cistern varies with every movement of the mercury. If it rises, mercury is transferred from the cistern to the tube, and the level of the cistern falls. On the other hand, should the reverse process take place, and mercury flow from the tube to the cistern, the level of the mercury rises. As the height of the barometer is calculated from the level of the mercury in the cistern, a correction, known as the 'error of capacity,' is introduced. Another source of difficulty is how to cover the cistern so as to keep the mercury from escaping, and at the same time render the instrument portable without affecting the pressure of the atmosphere on the mercurial surface contained in the cistern. In the Fortin barometer this difficulty is eliminated by making the bottom of the cistern of leather, while in the Kew barometer a small cavity in the roof of the cistern is covered with the same material. The two barometers specified are those employed for scientific observation, and in them the 'capacity correction' referred to is done away with. In the Fortin barometer (Fig. 1) the starting-point of the scale is formed by an ivory pin, which is placed in the cistern of mercury. When a reading is to be made, the mercury is raised or lowered by means of a screw until its surface just touches the pin, the lower end of which corresponds with the zero of the scale. In Fig. 2 an ingenious device is shown which facilitates the adjustment of the ivory point and its image as reflected on the bright surface of the mercury below. The Kew barometer (Fig. 3) is admirably suited for observations on shipboard, or in situations where there is much oscillation. In order to check the irregular oscillation of the mercury due to the motion of the ship, a tube of small calibre throughout the greater part of its length is employed. A closed cistern is used, and a scale of contracted inches, which are shortened from the upper part of the tube downwards in proportion to the relation existing between the diameter of the tube and cistern. In this way the error of capacity is allowed for. In the siphon barometer (Fig. 4) the capacity error is got over by dispensing with the cistern and using a ɩ-shaped tube, in which the long leg is closed and the short leg open. The ordinary wheel barometer, or 'weather-glass,' is of this description, and was invented in 1665 by Robert Hooke, secretary to the Royal Society. In this instrument a float attached to a silk cord rests on the mercury in the open leg of the siphon, the cord being coiled two or three times round a fixed pulley. A light counterpoise at the other end keeps the cord tight. The float rising or falling,



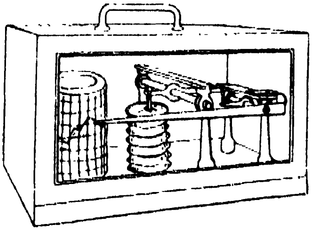
Barometers.

1. Fortin Barometer. 2. Lower part enlarged: *a*, ivory pin adju Barometer. 4. Siphon Barometer.

according to the motion of the mercury in the shut leg of the tube, causes a needle indicator to move round a graduated dial on which the height of the mercurial column is engraved. As mercury expands one 9,990th of its bulk for every degree of Fahrenheit's thermometer, it is necessary, in taking observations of scientific accuracy, to apply a correction for temperature. A thermometer is thus usually attached to the barometer in such a way as to give the temperature of the barometer tube itself. Tables have been prepared showing at a glance the corrections to be applied for the varying temperature of the mercurial column, the readings being reduced to 32° F. We have seen that the barometer reads lower on the top of a hill than at its base, so that every barometrical observation has to be reduced to mean sea-level. For Great Britain the mean half-tide level at Liverpool is always taken as the standard. In reducing to sea-level, the temperature of the air and the actual atmospheric pressure at sea-level have to be allowed for. In pursuance of the recommendation of the Meteorological Conference (Munich, Aug. 1891), a further correction, known as the 'gravity correction,' is given effect to, in order to allow for the difference of gravity at any given station from that at lat. 45°.

Barometrical fluctuations are of two kinds—regular or periodic, and irregular or non-periodic. Of the regular oscillations the most marked is the diurnal one, which varies from a maximum of 0·150 in. in the tropics to barely $\frac{1}{1000}$ of an inch in polar regions. The seasonal swing in pressure is also well marked in most regions of the globe. The non-periodic or irregular variations hitherto observed amount to about 4½ in., the highest pressure observed (reduced to 32° and sea-level) being a reading of 31·717 in. at Irkutsk (Dec. 20, 1896), and the lowest 27·135 in., at False Point, on the coast of Orissa, India (Sept. 22, 1885). In the British Islands the highest pressure recorded was on the morning of Jan. 9, 1896, when at Ochtertyre, Perthshire, a reading of 31·108 in. was observed; the absolute lowest, 27·333 in., being also recorded at this station on Jan. 26, 1884. In Edinburgh, where a register of the barometer has been kept since 1769, sea-level pressures exceeding 31 in. were recorded on Feb. 25, 1808, Jan. 9, 1825, and Jan. 9, 1896, the highest being 31·071 in., on the latter date; the lowest readings, on the other hand, were 27·451 on Jan. 26, 1884, and 27·651 on Dec. 8, 1886, those being the only readings under 28 in. since 1769.

BAROGRAPHS, or self-registering barometers, are employed to give a continuous automatic record of pressure fluctuations on a revolving drum driven by clockwork. In this class of instrument the record may be either mechanical or photographic, the latter method being the more reliable owing to the elimination of friction. The best-known form of this instrument is the Richard barograph, or recording aneroid. See ANEROID; also works on meteorology, such as the treatises by R. H. Scott (1883), H. C. Russell (1871), F. Waldo (1893), A. Buchan (1868), W. M. Davis (1894), and J. W. Moore (1894).



Barograph, or Self-Registering Barometer.

Baron (A.S. 'a man'), a word which has come to mean first a 'king's man' and afterwards a 'noble.' The title was unknown in Britain prior to the Norman conquest, and its earliest usage shows that it was applied to *all* the feudatories of princes, irrespective of other titles they held, and therefore it included all the nobility. Feudatories were, in early times, of two classes—(1) barons *in capite*, holding their lands from the king, these being the greater barons; and (2) the lesser barons, who held their lands from the great vassals of the king by military tenure *in capite*. In Magna Charta this distinction is observed. By the time of Edward I. only the greater barons could claim to be summoned to the House of Lords; the summoning of the lesser barons fell into desuetude. The creation of barons by patent dates from the time of Richard II.—*i.e.* the year 1387. At the present time barons are of three classes, being the lowest rank of the nobility to have a seat in the House of Lords—(1) *barons by prescription*, their ancestors having sat since an unknown and indefinite date in the House of Lords; (2) *barons by patent*, the dignity being granted to them and their heirs under the conditions of the patent; and (3) *barons by tenure*, who hold the title as annexed to land. In Scotland and Ireland, barons have seats in the House of Lords only when elected as representative peers by their order. A baron's coronet consists of a gold circlet with six pearls set on it, surrounding a cap of crimson velvet and ermine. Certain judges of the English and Irish Courts of Exchequer were formerly called barons; but in England the last holder of the title died in 1897, and the last holder of the title in Ireland is now (1904) sitting in the Court of King's Bench.

Baron and Femme, or FEME, in heraldry terms equivalent to husband and wife; applied where the coats of arms of a man and his wife are borne *per pale* in the same escutcheon—the husband's coat being placed on the dexter side and the wife's on the sinister. The term is also used in law.

Baronet, originally a title given to the lesser barons, a meaning now obsolete, is a title of hereditary rank, in degree next to that of baron, instituted by James I. in 1611, professedly to support the English and Scottish colonization of Ulster. Each baronet had to pay the king £1,080. The number was limited to 200, but this limit was soon departed from, and the payment annulled. A similar Irish order was instituted by James in 1619, and a Scottish (the so-called baronets of Nova Scotia) by Charles I. in 1625; but of the latter none have been created since the Union (1707); of the former, none since 1801. In their stead there has been instituted the baronetcy of the United Kingdom or of Great Britain. The badge of the order is the 'bloody hand of Ulster.' A baronet has precedence of all knights except bannerets, knights of the Garter, and Privy Councillors.

Baronius, CÆSAR (1538-1607), controversial historian of the Roman Catholic Church; born in S. Italy; studied under St. Philip Neri, of whose congregation of the Oratory he was chosen superior (1593); appointed cardinal (1596), and librarian of the Vatican (1597). He failed to attain the papal chair in 1605 because of Spanish political opposition. His demonstration of the historical identity of the Western with the primitive Church is elaborated in his famous *Annales Ecclesiastici a Christo Nato ad Annum 1198* (12 vols. 1588-1607), written in reply to the Protestant *Magdebury Centuries*. Though uncritical, this chronicle is still of value to ecclesiastical historians; continued by Raynaldus and others to 1585, the *Annals* now extend to nearly 40 vols. (last ed. 1864-83). His *Martyrologium Romanum* (1586) is a great store of tradition. See *Life* (Ital.) by Sarra (1862).

Barons' War THE, (1263-7). See ENGLAND—*History* (Henry III.).

Barony, strictly the domain of a baron, but also applied to the tenure by which a baron held of his superior; also military or other 'honourable' tenure. Originally every peer of superior rank had also a barony annexed to his other titles, but the rule is not now universal. Baronies appertain also to bishops, as they formerly did to abbots, William the Conqueror having converted the spiritual tenure by which they held their lands under the Saxon rule into the Norman or feudal tenure by barony. In Scotland barony is applied to a large freehold estate or manor, even though the proprietor is a simple commoner. A *burgh of barony* is a corporation consisting of the inhabitants of a determinate tract of territory within the barony erected by the king, and subject to the government of magistrates. Whatever jurisdiction belongs to the magistrates of the burgh, the superior's jurisdiction is cumulative with it. A *court baron* is the necessary court of a manor. It was partly judicial and partly administrative. Other manorial courts were the customary court and court-leet. The word barony is used in Ireland for a subdivision of a county.

Barony. See GLASGOW.

Baroque, a term at first applied to ill-shaped pearls, now denotes fantastic, bizarre, and decadent forms in art, and even in nature. It is specially used in connection with an architectural style, a degeneration of the Renaissance.

Barosma, a genus of small evergreen S. African shrubs having a strong odour; the leaves are used in medicine as a diuretic, under the native name buchu.

Barotse Land, or NORTH-WESTERN RHODESIA, a region in the Upper Zambezi, British C. Africa. It extends from 23° to 27° E., and from 16° S. to its S. boundary, the Zambezi. It is well watered and populous. The administrator of N.W. Rhodesia has his official residence at Lialui, near the Zambezi, from which a monthly postal service to Buluwayo has been established. The inhabitants are Bantus.

Barpeta, tn., Kamrup dist., Assam, India, 48 m. N.W. of Gauhati. Pop. (1901) about 10,000.

Barque, a three-masted ship, square-rigged on the fore and main masts, and fore-and-aft on the mizzen. A BARQUENTINE differs from a barque in being only square-rigged on the fore mast.

Barquisimeto, tn. and episc. see, cap. of the state of Lara, Venezuela, 170 m. W. of Caracas. It stands above the valley of the Rio Barquisimeto, and is connected by rail with its port, Tucacas, 100 m. to the N.E. Alt. 1,840 ft. Pop. (1900) about 32,000.

Barr, ARCHIBALD (1855), Scottish inventor, born at Paisley, and educated at Glasgow University, where he has been professor of civil engineering and mechanics since 1889. He has invented range-finders for fortress and field service, and, with Professor Stroud, a naval range-finder, electrical transmitting and receiving instruments for use between the conning tower and gun stations of war vessels, and several other scientific instruments and machines.

Barr, ROBERT (1850), British novelist, born at Glasgow; educated in Toronto, but returned to Britain in 1881. His chief works are: *In the Midst of Alarms* (1894; new ed. 1900); *A Woman Intervenes* (1896); *The Mutable Many* (1897); *The Countess Tekla* (1899); *The Strong Arm*, and *The Unchanging East*, a book of travels (1900). One of the founders of the *Idler* magazine (1892).

Barra. (1.) Small tn. 4 m. E. of Naples, and midway between that city and Mt. Vesuvius, Italy; a suburban residence of Neapolitans. Pop. (1901) 11,973. (2.) Island and par., Inverness-shire, Scotland, near S. extremity of the Outer Hebrides, 5 m. S.W. of S. Uist, and 108 m. by sea from Oban. The parish includes several other islands. Area of par. 22,212 ac. Pop. (1901): isl. 2,362; par. 2,545. (3.) State, N. side and near mouth of R. Gambia, W. Africa, N. of British Gambia. It is fertile but marshy. The chief port is Albreda. Pop. about 200,000.

Barrackpur, munic. tn., dist. of the Twenty-four Parganas, Bengal, India, 15 m. N. of Calcutta. The natives call it 'Charnak,' after Job Charnock, the founder of Calcutta. Here is the country residence of the viceroy of India. It was the scene of sepoy mutinies in 1824 and 1857. Pop. (1901): N. Barrackpur, 12,600; S. Barrackpur, 19,307.

Barracks. Barracks were until recently designed, constructed, and repaired by the Royal Engineers, but their design and construction have now been entrusted to a new Barrack Department of the War Office under an architect with a civil staff. The following are the chief parts of a barrack:— (1.) Officers' mess and quarters. The commanding officer is allowed a suite of rooms, usually a house; a field officer, two rooms; and other officers, one each. As units are constantly changing station, the rooms are not furnished luxuriously, and officers practically live in the mess. The latter generally consists of a mess-room, anterooms, billiard and card rooms, lavatory, etc. As a rule it is handsomely furnished, and is chiefly maintained by monthly subscriptions (usually a day's pay from each officer) and entrance subscriptions of thirty days' pay. (2.) Sergeants' mess, consisting of a dining and reading room and a kitchen. It is maintained by small monthly subscriptions. The sergeants, as a rule, are provided with separate sleeping accommodation. (3.) Men's quarters. The men live from ten to twenty in a room. The beds are placed with their head against the wall, and fold back in the daytime. On a shelf above his bed the man keeps his kit, neatly folded; and below are hung his accoutrements, rifle, etc. Tables and forms are placed in the centre of the room for meals. (4.) Orderly room, where the commanding officer deals with defaulters, and, with his staff, transacts regimental office work; company offices, from which the captains and their subalterns administer the companies, and where the men are paid; guard-rooms, cells, etc. (5.) Cook-houses and kitchens. (6.) Lavatories, where all washing is done, and where a bath is now provided. In many barracks nowadays men can obtain a hot bath for a payment of one or two pence. (7.) Regimental institute, including the canteen (*i.e.* grocery shop, coffee-room, and beer bar), the reading, writing, play, and billiard rooms, library, skittle ground, and occasionally a theatre. Every effort is made to render life within barracks attractive to the men. (8.) Married quarters for those men married on the strength. These are usually secluded from the men's quarters. A man with two children or under is entitled to two rooms. (9.) Wash-houses for the convenience of the wives, who often do the washing of the whole regiment. (10.) Drill sheds, Morris tube range, etc. See *Army Book for British Empire* (1893), and Richter's '*Gebäude für Militär. Zwecke*,' in *Handbuch der Architektur* (1887).

Barraconda. See GAMBIA.

Barracouta, a British third-class cruiser (1,580 tons) launched in 1889. The ship-name, dating from 1782, is associated with the capture of Java (1811), Chinese war (1856), Ashanti war (1873).

Barracuda, or BARRACOUTA, a name applied to tropical and subtropical fishes of the genus Sphyræna, belonging to a family related to the mulets. They are large, voracious fishes, dreaded by bathers, and though edible, have at times poisonous properties. The name is sometimes applied to *Thyrsites atun*, a fish which forms an important article of export from New Zealand.

Barrafranca, tn., prov. Caltanissetta, Sicily, 11 m. S.E. of Caltanissetta, 1,470 ft. above sea-level. Pop. (1901) 11,068.

Barra Manza, tn., on r. bk. of the Parahiba do Sul, Brazil, 70 m. N.W. of Rio de Janeiro. Pop. 12,000.

Barramunda, a name applied to the fish Ceratodus, but used in Australia in a loose sense for more than one large fish.

Barranquilla, or BARANQUILLA, tn., Colombia, Bolivar dep.; stands at the head of navigation on the river Magdalena, which is not navigable at its mouth. It is in communication by rail with the seaport Sabanilla, 3 m. to the W. Pop. 40,000.

Barrantes, VICENTE (1829-98), Spanish poet and publicist; member of the Spanish Academy (1872); author of satiric articles which brought a heavy fine on him for their audacity, philosophic and political verses—*Narraciones Extremeñas* (1872 3), *Cuentos y Leyendas* (1875); and novels *Siempre Tarde* (1851), *Juan de Padilla* (1855-6), *La Viuda de Padilla* (1857). He was also a learned bibliophilist on subjects connected with Estremadura (1875-9), and wrote a history of the Philippine Isles, *Guerras Piraticas de Filipinas* (1878).

Barraquete, ALONZO (d. 1561), Spanish sculptor, who studied in Florence under Michael Angelo. On his return to Spain he executed commissions for Charles V. at Toledo, Granada, and Valladolid. His bas-reliefs in the Alhambra, *The Triumphs of Charles V.*, representing the emperor as Hercules, are held in esteem. At 80 he executed the tomb of Cardinal Tavera in the Hospital of St. John the Baptist at Toledo. See Leader Scott's *Sculpture: Renaissance and Modern* (1886).

Barras, PAUL FRANÇOIS JEAN NICOLAS, VICOMTE DE (1755-1829), who played a conspicuous part in the French revolution, was born at Fos-Emphoux, Var. Officer in the Pondichery regiment, he took part (1776 80) in the campaign in India. Returned by Var to the States-general, he voted for the king's immediate execution. As commander of the army besieging Toulon, he shares the responsibility for the cruel measures attending the reduction of that city to the republic. Again in Paris, he arrested Robespierre at the Hôtel de Ville. Nominated general-in-chief, he, or rather Bonaparte, whom he had selected as general of artillery, crushed the insurgents (Oct. 5, 1795). Thereupon appointed one of the five members of the Directory, and next (1797) practically dictator, he set up quite a royal establishment at the Luxembourg, which led to his overthrow (Nov. 9, 1799). Carlyle (*French Revolution*, bk. i. ch. 7) describes him well as 'a man of heat and haste; defective in utterance; defective indeed in anything to utter; yet not without a certain rapidity of glance, a certain swift transient courage.' He ultimately settled near Marseilles, and under the Bourbons lived the rest of his life in Paris. His *Mémoires* (4 vols.) were published by H. Duruy in 1895-6.

Barratry is the fraudulent act of the captain or crew of a vessel through which the owners or the freighters suffer injury, and is a risk often taken in policies of marine insurance. It is punishable, according to circumstances, with various terms of imprisonment up to penal servitude for life (Malicious Damage Act, 1861; Piracy Act, 1837). COMMON BARRATRY consists in frequently or habitually stirring up suits and quarrels at law or otherwise. It is a misdemeanour punishable by fine and imprisonment. In old Scots law, barratry was a form of simony, consisting of the purchase of ecclesiastical benefices from Rome. It is also used to mean judicial corruption.

Barré (*i.e.* 'comrades'), collective name of numerous S. American aborigines who constitute a semi-independent confederacy about the head-waters of the Rio Negro, an affluent of the Amazons, and range thence across the Cassiquiari into the Upper Orinoco basin. They comprise eight main groups—Barré proper, Mandamaca, Guariguena, Cunipusana, Pacimonari, Yabahana, Masaca, and Tariana. They are one of the few progressive nations of S. America, and since about 1800 their speech (a stock language radically distinct from all others) has become a sort of *lingua franca* throughout an extensive region above the Orinoco cataracts and in the Brazilian province of Amazonas. The Barré retain the old tribal organization, reject the preaching of the missionaries, and carry on independent commercial relations with settled and more civilized neighbours from San Carlos del Rio Negro.

Barré, ISAAC (1726-1802), the son of a French refugee in Dublin, was with Wolfe at Quebec, where he was wounded (1759), in consequence of which he ultimately (1790) became blind. (He is represented in West's picture of the death of Wolfe. See reproduction on p. 25.) He held office under Bute, Pitt, and Shelburne, and gained the favour of the Americans by a spirited speech against the Stamp Act in 1765, and by his subsequent actions. Barré is one of those to whom the *Letters of Junius* have been ascribed.

Barrel. A barrel of wine contains 31½ gallons; a barrel of ale, 36 gallons; a barrel of flour, 196 lbs.; a barrel of butter, 224 lbs.; and a barrel of pork or beef, 200 lbs. But the dry barrel is not a legalized measure, and quantities should be specified in pounds or bushels. The Italian *barile* varied from 7 to 31 gallons; the French *barrique* of Bordeaux contained 50 gallons. For manufacture of barrels, see COOPERING.

Barrel Organ, a portable mechanical organ played by a rotary handle. The handle turns a wooden cylinder set with brass pins, which raise certain trigger-shaped keys, and so open the valves to the pipes of the instrument. The date of the manufacture of the first barrel organs is uncertain, but at one time they were frequently used in rural churches and chapels. The ordinary barrel organ is made chiefly in the Black Forest, and is used principally by itinerant beggars; the cylinder is set with nine or ten tunes.

Barrenwort (*Epimedium alpinum*), a naturalized herbaceous plant of the barberry order, found rarely in hilly districts in the N. of England.

Barrett, ELIZABETH. See BROWNING.

Barrett, LAWRENCE (1831-91), American actor of very varied powers, was trained to the stage from boyhood. He was for many years (from 1857, and again from 1887) associated with Edwin Booth, of whom he wrote a *Life* (1881), and a critical study, *Edwin Booth and his Contemporaries* (1886). He played many of the leading Shakespearean parts, as well as Richelieu, Garrick, etc.

Barrett, WILSON (1846-1904), actor, novelist, dramatist, and poet, was born in Essex. He made his début at Halifax in 1863, and in 1874 became manager of the Amphitheatre, Leeds. In 1879 he succeeded Mr. Hare in the management of the Court Theatre, London. Here he produced *Heartsease* (an adaptation of *La Dame aux Camélias*, in which he introduced Madame Modjeska to the English stage), *Romeo and Juliet* (himself appearing as Mercutio, a part well suited to his romantic style), and *Juana*. Barrett became lessee and manager of the Princess's Theatre in 1881, and produced *The Lights of London*, *Romany Rye*, *The Silver King*, *Claudian*, and *Junius, or the Household Gods*. In 1884 he produced *Hamlet*, which ran for 118 nights. Then followed *Hoodman Blind* and *The Lord Harry*. After a successful American tour (1886-7) he became manager of the Globe Theatre, and produced his own and G. R. Sims's *The Golden Ladder* and *The Lady of Lyons*. In 1888 he returned to the Princess's, and there played in *Ben-my-Chree* and *Good Old Times*, followed by his own play of *Nowadays*. After a third visit to America, he produced *The Manxman* (1894). Early in 1895 his great spectacular religious drama, *The Sign of the Cross*, appeared with great success at St. Louis, U.S.A., then at the Lyric Theatre, London, for over five hundred nights. In 1898 he paid a very successful visit to Australia, and on his return appeared again at the Lyceum, reviving old plays, and producing his *Man and his Makers*, written in collaboration with Louis N. Parker. He dramatized Sienkiewicz's *Quo Vadis?* (1900; new ed. 1902), and also wrote several novels.

Barrhead, par. and tn. on R. Leven, Renfrewshire, Scotland, on C.R., 9 m. S.W. of Glasgow, and 3½ m. S.E. of Paisley. The chief industries are calico printing, shawl-weaving, cotton spinning and bleaching, and engineering. Pop. (1901) 9,855.

Barrias, LOUIS ERNEST (1841), French sculptor, born in Paris; gained the 'prize of Rome' (1865), and has exhibited in the Salon the *Spinning Girl of Megara* (1870), now in the Luxembourg Museum; *The Oath of Spartacus* (1871); *Fortuna and Amor* (1872); *The First Funeral*—Adam and Eve with Abel's corpse (1878), a bas-relief of great artistic value; *Nature Unveiling* (1899); and monuments to Palissy (1881), Augier (1895), Carnot (1896), the Madagascar Expedition (1897), Victor Hugo (1898), and Lavoisier (1900).

Barricades, obstructive works thrown up in haste to arrest an enemy's progress through a street or give cover to the besieged, were used by the city of Saguntum against Hannibal. At the siege of Carthage the Romans took some six days to surmount the barricades opposed to them. In the wars of the League, the barricades raised by the Parisians compelled the retirement of Henry III.'s troops (May 12, 1588)—'journée des barricades.' Another 'journée des barricades' is Aug. 26, 1648, when, in the war of the Fronde, barricades were erected in Paris from Notre Dame to within a pistol-shot of the Palais Royal. Other historic barricades of Paris are those of July 27–30, 1830, when Charles X. was dethroned, and of June 23-26, 1848. Although Napoleon III. widened and macadamized the streets of Paris, barricades were again raised in the insurrection of 1871.

Barrie, JAMES MATTHEW (1860), Scottish novelist and dramatist, was born at Kirriemuir, Forfarshire; went to Nottingham in 1883 as leader-writer on the staff of the *Nottingham Journal;* then to London, where he wrote articles for the *St. James's Gazette*, *Speaker*, *National Observer*, *British Weekly* (as 'Gavin Ogilvy'), etc. His first notable book was *Auld Licht Idylls* (1888). This was followed by *A Window in Thrums* (1889) and *My Lady Nicotine* (1890). *The Little Minister* (1891) was his first serious attempt at a long novel. *Margaret Ogilvy* (a biography of his mother) and *Sentimental Tommy* appeared in 1896, the latter being followed by a sequel, *Tommy and Grizel*, in 1900. His first play, *Walker, London* (1892), was produced by Mr. J. L. Toole. It was followed by *Jane Annie* (1893), written in collaboration with Conan Doyle. *The Professor's Love Story* was produced at the Garrick Theatre in 1894, followed at the Haymarket in 1897 by *The Little Minister*, a successful burlesque of his own novel. *The Wedding Guest*, an attempt at a modern problem play, was produced at the Garrick in 1900. Other dramatic successes have been *The Admirable Crichton* and *Little Mary*. For Christmas 1904 he produced a children's play, *Peter Pan*, and in April 1905 his *Pantaloon* and *Alice-sit-by-the-Fire* were produced. See Hammerton's *J. M. Barrie and his Books* (1900).

J. M. Barrie.

(Photo by Barrand.)

Barrier Act, an act passed in 1697 by the General Assembly of the Church of Scotland, with the intention of preventing undue haste in ecclesiastical legislation. It provides that, before any change can be made in the laws of the church, such proposed legislation must first be approved by a majority of the presbyteries, and afterwards by the General Assembly itself.

Barrière, THÉODORE (1823-77), French dramatic author, born and died in Paris. He wrote over fifty plays, some of them in collaboration with other authors; the best known being *Les Filles de Marbre* (1853) and *Les Faux Bonshommes* (1856), his masterpieces. He created the character of the *raisonneur* (*cf.* his Desgenais), who is now found in many new French plays, accompanying the action as a sort of moralizing chorus. Other well-known plays by him are a clever dramatization of Murger's *La Vie de Bohême* (1851), his first great success, *Cendrillon* (1858), *Le Feu au Couvent* (1859), *Les Jocrisses de l'Amour*, and *Malheur aux Vaincus* (1865).

Barrier Reef. See GREAT BARRIER REEF.

Barrier Treaty, a treaty concluded in 1709 at the Hague between England and the Netherlands, by which the Netherlands republic obtained the right to occupy certain fortified places (Namur, Tournai, Menin, Furnes, etc.) in the Spanish Netherlands. In 1715 a similar treaty was concluded between the Netherlands and Austria. In 1830 these same fortresses became part of Belgium, and were mostly destroyed after the erection of the fortifications of Antwerp. See Willequet's *Histoire du Système de la Barrière* (1847).

Barrili, ANTONIO GIULIO (1836), Italian writer, was born at Savona. After taking part in the military campaigns of 1859, 1866-67, he devoted himself entirely to literature, eventually becoming professor of Italian literature at the university of Genoa. He has published more than fifty novels, of which the early ones (simple tales of love, told in an admirable style) are the best—*Santa Cecilia* (1866), *Come un Sogno* (1875), *Val d'Olivi* (1873), *L'Olmo e l'Edera* (1877), etc. Several of his later works have been translated into English.

Barring Out, the practice of barring out the master from the schoolroom till he complied with the scholars' demands. A barring out at the High School of Edinburgh in 1595 cost the life of a magistrate. The custom was general in the north of England in the 17th and 18th centuries. Addison was leader of a barring out at Lichfield Grammar School (1685). Ormskirk Grammar School, Lancashire, was, early in the 19th century, the scene of a well-organized barring out. One of Miss Edgeworth's tales is founded on the custom.

Barrington, GEORGE (1755-*c.* 1840), whose proper name was WALDRON, was of Irish birth; early became a professional thief in London, and in 1790 was transported to Botany Bay. Released two years later, he rose to be high constable of Paramatta, N.S.W. A versatile author, he left *A Voyage to Botany Bay* (1801) and Histories of New South Wales (1802) and of New Holland (1808). See *Life, Times, and Adventures of George Barrington* (1820?). The oft-quoted line, 'We left our country for our country's good,' occurs in his prologue to Young's tragedy, *The Revenge.*

Barrington, JOHN SHUTE (1678-1734), son of a London merchant, was called to the bar (1699). His essay on *Protestant Dissenters* (1704-5) led to his being commissioned to proceed to Scotland, where he gained the Presbyterian interest in favour of the union of the two kingdoms. His *Dissuasive from Jacobitism* (1713) brought him the favour of George I. In 1720 he was made baron and viscount in Ireland. Twice returned to Parliament for Berwick-on-Tweed (1715 and 1722), he was expelled the House (1723) for his connection with the Harburg lottery.

Barrington, SAMUEL (1729-1800), British admiral, son of the preceding, served under Hawke in the Basque Road affair; in 1760 with Hon. J. Byron at Louisburg in Nova Scotia; and in 1761 with Keppel at Belle Isle. In command of the *Achilles*, he captured, in 1759, the *Comte de St. Florentine*. In 1778 he became commander-in-chief in the W. Indies, where he reduced St. Lucia, and defeated the French under D'Estaing. In the action off Grenada, in 1779, he was second in command to Byron, and in 1782 to Lord Howe at the relief of Gibraltar. He became an admiral in 1787.

Barrios, JUSTO RUFINO (1835-85), president of Guatemala, rose to the supreme military command under the administration of President Granados. He obtained the presidency in 1873, and held it until he met his death in the war with Salvador, Nicaragua, and Costa Rica.

Barrister, an advocate or pleader in the higher law courts and tribunals of England and Ireland. A barrister was originally entitled to plead a case by the side of his client at the bar which separates the court and its officers from the public. In England he must be called by one of the Inns of Court, after keeping generally twelve terms at the inn by eating six (or, if a member of a university, three) dinners a term, passing examinations (see EXAMINATIONS, LAW), and paying fees, including a stamp duty of £50. The benchers of the inn may refuse to call any individual to the bar, subject to an appeal to the judges, who are visitors of the inn, and originally had the right of calling to the bar. Barristers have an exclusive right of audience in the High Court and Court of Appeal, and may have the same right in quarter sessions on an order by the justices. They have a right to conduct their client's case, including a right to compromise it, and are not liable for mistakes or for negligence. They are privileged from arrest on their way to and from the courts. They may be guilty of contempt of court, and for any misconduct may be disbarred by the benchers of their inn. They cannot sue for their fees, even though the solicitor has received them; and they are not liable to return their fees, even though they cannot attend a case. In litigious business, etiquette requires that a barrister should be instructed by a solicitor. See ADVOCATE, the Scottish equivalent of barrister; KING'S COUNSEL; and INNS OF COURT.

Barros, JOÃO DA (1496-1570), Portuguese historian, called the 'Livy of Portugal.' In 1522 he was made governor of the colony of Elmina (Guinea), W. Africa, and in 1532 treasurer of India. Barros wrote the great historical work *Asia Portugueza* (1552-63, 3 vols.), the discovery, conquest, and deeds of the Portuguese in India. It was this book which inspired Camoens to write his great poem *Os Lusiadas*.

Barrosa, vil., 15 m. S.E. of Cadiz, Spain; scene of the victory of the British, under Graham, over the French, under Victor (Mar. 5, 1811).

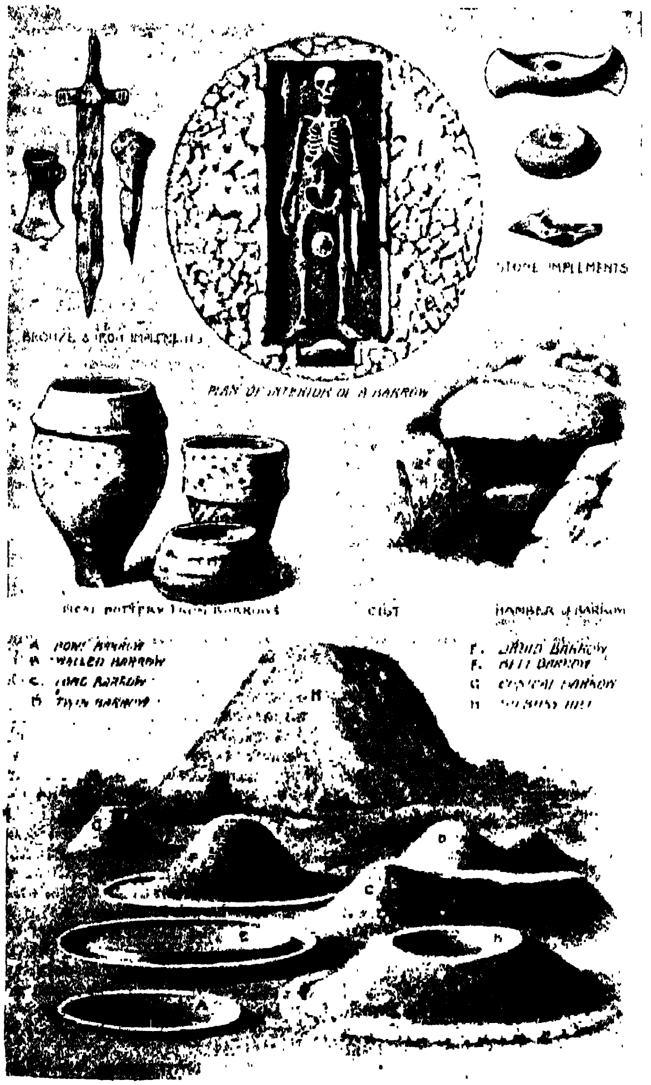
Barros-Arana, DIEGO (1821), Chilean historian and geographer, born at Santiago; has published a *Hist. of Chilean Independence* (1854-8); *Hist. of the War of the Pacific* (1881); *Hist. of Chile* (12 vols. 1884-93).

Barrot, CAMILLE HYACINTHE ODILON (1791-1873), French statesman, took an active part in the revolution of July 1830, and was one of the three commissioners who conducted Charles X. to Cherbourg. In 1840 he supported Thiers, but subsequently led an active opposition against Guizot and the conservatives, and was at the height of his popularity during the reform fever of 1847. He deplored the revolution of 1848, however, and after the flight of Louis Philippe supported the claim of the Count of Paris to the throne. Under Louis Napoleon he became president of the council; but the siege of Rome made him very unpopular, and he retired in 1851. In 1870 he was appointed president of the Decentralization Committee, and in 1872 councillor of state and vice-president of the Council. Barrot's *Mémoires Posthumes* (4 vols. 1875-6) attracted great attention.

Barrow (O.E. *beorh*, 'a little hill') is a term applied by antiquaries to the sepulchral mounds which are so numerous in the British Isles, and indeed throughout a great part of the world. Sometimes they are earthen mounds, sometimes heaps of stones or cairns; and in the latter instances the name *barh* (a variant of *beorh*) is usually applied to them in the Outer Hebrides. Their ground plan is in most cases round, although frequently it is oval; and in height and extent of superficies they vary in a marked degree. The largest specimen in England is Silbury Hill, 130 ft. high. 'The manner in which the dead have been disposed within them differs very considerably,' observes Canon Greenwell, speaking of British barrows. 'Sometimes the body, whether burnt or unburnt, has been placed in the mound without anything to protect it from the surrounding earth or stones. Sometimes it has been placed in a small box of stone, a cist; at other times in the hollowed trunk of a tree, or in a grave sunk below the surface of the ground; and, when a burnt body, often in an urn; whilst in some instances the mound encloses a large structure, suggestive rather of an abode for the living than of a resting-place for the dead.' The Vikings were frequently buried in their ships, over which earth was piled up till a barrow was formed. The skulls found in the round barrows of Britain are usually brachycephalic; but Dr. Thurnam's 'round barrows, round skulls; long barrows, long skulls' cannot be unreservedly accepted. See Nilsson's *Primitive Inhabitants of Scandinavia* (Eng. trans. by Sir J. Lubbock, 1868), Greenwell's *British Barrows* (1877), Dall's *Cave Relics of the Aleutian Islands* (1878), and Satow's *Ancient Sepulchral Mounds*, Japan (1880).

Barrow. (1.) The 'Birgos of Ptolemy' (Joyce), riv., rises N. side of the Slieve Bloom Mts., Queen's Co., Leinster, Ireland; flows generally S.; joins the Suir about 29 m. from the sea, to form, as its estuary, Waterford harbour. Its chief tributaries are the Nore, Blackwood, and Greese rivers. Length, 119 m. Area of basin (including Suir), 3,555 sq. m. Navigable for vessels of 200 tons to New Ross, and for barges to Athy (70 m.), where it joins the Grand Canal. (2.) B. STRAIT, between Lancaster Sound and Melville Sound, Canada, 74° N., 90° to 100° W.; 40 m. broad. So named by Captain Parry (1879), after Sir John Barrow.

Barrow, ISAAC (1630-77), English mathematician and divine, born in London, was appointed (1660) professor of Greek at Cambridge. Two years later he was nominated to the chair of geometry at Gresham College, London, and subsequently (1663) became Lucasian professor of mathematics at Cambridge. This, again, in 1669 he resigned in favour of his pupil, Isaac Newton. He was appointed master of Trinity College in 1672, and then laid the foundation of the famous Trinity College Library; in 1675 he was vice-chancellor of the university. Barrow was a man of strong character, and an eloquent and vigorous preacher—his sermons, according to Hallam, displaying a strength of mind, a comprehensiveness, and fertility which have rarely been equalled. His mathematical works included three able treatises—*Lectiones Opticæ* (1674), *Lectiones Geometricæ* (1670), and *Lectiones Mathematicæ* (1685). The best edition of the English theological works was that by Napier (9 vols. 1859), with a memoir by Dr. Whewell, the editor in 1860 of his Latin mathematical works. See *Life of Barrow* (new ed. 1859), by Abraham Hill.



Sepulchral Barrows and their Contents.

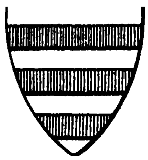
Barrow, Sir John (1764-1848), English patron of Arctic exploration, was a poor, self-taught Lancashire boy. As secretary to Lord Macartney, he went with the first British embassy to China in 1792; in 1797 was employed in the settlement of affairs at the Cape of Good Hope, of which colony he subsequently wrote a history. Lord Mulgrave appointed him in 1804 second secretary of the Admiralty, a post which he held for nearly forty years. In 1835 he was made a baronet. He was a great—perhaps the greatest—promoter of Arctic discovery, and the chief founder of the Royal Geographical Society (1830). Among other works, he wrote books of travel in China (1804), Cochin-China (1806), and S. Africa (1801-3); *Lives* of Macartney (1807), Howe (1838), Anson (1839), and Peter the Great (new ed. 1883); histories of modern Arctic exploration (1818 and 1846); and an autobiography (1847). See *Life* by Staunton (1852).

Barrow-in-Furness, munic. bor., parl. bor., co. bor., seapt., and manufacturing centre on the s.w. tip of detached portion of Lancashire, England, opposite Walney I., and 9 m. s.w. of Ulverston. Walney channel affords safe anchorage for vessels drawing 21 ft. of water. Once a fishing village, Barrow has since 1847 made extraordinary progress owing to the discovery of pure hæmatite iron ore at Park, in the neighbourhood. The county borough (21,009 ac.) was incorporated in 1867, and has been several times enlarged. Furness Abbey forms a picturesque feature towards the N. The docks (280 ac. in extent) are four in number—Devonshire, Buccleuch, Ramsden, and Cavendish; the first two opened in 1867 and 1873 respectively. The third is the Anchor Liner dock. The Cavendish is the timber basin, and is 142 ac. in extent. Shipbuilding forms an important industry: the Naval Construction and Armament Company have accommodation for building fifteen ships at a time; the Barrow Shipbuilding Company have yards in Barrow I., whence came the *City of Rome* (8,453 tons) in 1881, and H.M.S. *Dominion* (16,350 tons) in 1903. There are huge steel and iron works (Bessemer steel works dating from 1865), engineering shops, foundries, jute factories, paper and pulp works, etc. The imports include general merchandise, cattle (from Belfast), flour, grain, ore, timber, petroleum (Russian); the exports, iron ore, pig iron, steel rails, etc. The total trade is valued at £2,075,000 annually, of which £1,518,000 are exports. Pop. (1847) 325; (1901) 57,584.

Barrow-upon-Soar, par., Leicestershire, England, 3 m. s.e. of Loughborough, and 10 m. N. of Leicester; has limestone quarries, and is engaged in the manufacture of cement and hosiery. Pop. (1901) 21,614.

Barrulet, in heraldry, a diminutive bar, generally one-fourth of a bar in width.

Barry, in heraldry, is the term used when the field is divided by horizontal lines into an even number of equal portions. *Barry of six* is one of the most common of parted coats, both with straight and compound lines, in the armoury of all countries, and is borne by many great houses. *Barry-bendy* is the term used when a field is divided barwise and bendwise also, the tinctures being countercharged. *Barry-pily* is the name given to the field when it is divided by long narrow, pile-shaped indentations lying horizontally, or barwise, across it.



Barry.

Barry, coast par. (5,328 ac.) and vil. of S. Forfarshire, Scotland, 8½ m. N.E. of Dundee. There are extensive links where large artillery and volunteer camps are annually formed. Pop. (1901) par. 4,652.

Barry, seapt., Glamorgan, S. Wales, on G.W.R., 7 m. by rail S.W. of Cardiff, and opposite the small island of Barry, in the Bristol Channel. The docks (the property of the Barry Docks and Railway Company) were opened in 1889. They are 114 ac. in extent, and have accommodation for the largest vessels afloat. There are three large graving docks of modern construction. Pop. (1891) 4,722; (1901) 27,028.

Barry, ALFRED (1826), late bishop of Sydney and primate of Australia (1884-9), second son of Sir Charles Barry, architect, was principal of Cheltenham College (1852-8), and of King's College, London (1871-81); canon of Worcester (1871-81), dean of Westminster (1881-4), and assistant bishop to the diocese of London (1897). Published *Introduction to O.T.* (1850); *Boyle Lectures* (1876, 1877, 1878); *Christianity and Socialism* (1891); *Bampton Lectures* (1892); *Hulsean Lectures* (1895). His *Life* of his father appeared in 1867.

Barry, SIR CHARLES, R.A. (1795-1860), architect of the Houses of Parliament, Westminster, was born at Westminster, and in 1820 commenced practice as an architect in London. He was early entrusted with some notable buildings, including King Edward VI.'s Grammar School at Birmingham, and the Travellers' and Reform Clubs in Pall Mall; and in 1835 his design was accepted for the new palace of Westminster. He was knighted by Queen Victoria at the opening ceremony in 1852. He died in 1860, before the whole building was completed, and was buried in Westminster Abbey. See *Life* by his son, Alfred Barry (1867).

Barry, MRS. ELIZABETH (1658-1713), English actress who, between 1673 and 1709, created no fewer than one hundred characters, both in tragedy and comedy, of which the most famous were Belvidera, in Otway's *Venice Preserved;* Zara, in Congreve's *The Mourning Bride;* and Lady Brute, in Vanbrugh's *The Provoked Wife.* Otway conceived for her a hopeless and pathetic passion. See Cibber's *Apology*, p. 133 *et seq.* (1741).

Barry, JAMES (1741-1806), Irish artist, a native of Cork, studied art under West of Dublin, and also as a protégé of Burke at Paris and Rome. He was elected R.A. in 1773. At the Academy he was appointed (1782) professor of painting, but was deprived of his office in 1799 for having made false accusations against several of the members. The mural paintings at the Society of Arts form his best work.

Barry, JOHN ARTHUR (1851), Australian novelist, spent twelve years at sea; was then gold-digger and bushman. Has written *Steve Brown's Bunyip* (1893), *In the Great Deep* (1895), *The Luck of the Native Born* (1898), *A Son of the Sea* (1899), *Against the Tides of Fate* (1899), and *Old and New Sydney* (1901).

Barry, SIR JOHN WOLFE (1836), English engineer, youngest son of Sir Charles Barry, entered the office of Sir John Hawkshaw, leaving in 1867 to undertake the Blackfriars, Kew, and Tower bridges over the Thames, the construction of the Barry docks, docks at Hull and Middlesbrough, and numerous railways in England, Scotland, India, and elsewhere. He has served on several royal commissions, including that on the port of London. He was knighted in 1897, on the completion of the Tower Bridge. He has written *Railway Appliances* (1874-92), *Lectures on Railways and Locomotives* (1882), and *The Tower Bridge* (1894).

Barry, SIR REDMOND (1813-80), Australian judge and educationist, of Irish parentage, was called to the bar at Dublin (1838). Having settled in Melbourne, he rose to be first solicitor-general of the colony of Victoria (1850), judge (1851), and was founder of Melbourne University (1854), and its first chancellor (1855), and founder of the Melbourne Public Library, National Gallery and Museum (1853). Knighted in 1860, Barry was created K.C.M.G. in 1877.

Barry, SPRANGER (1719-77), Irish actor, was the son of a Dublin silversmith, which occupation he abandoned for the stage. He played (1744) in Dublin with immediate success, and then removed (1746) to London, where he became the friend, and later the rival, of David Garrick. 'Garrick,' it is said, 'commanded most applause, Barry most tears.' See Murphy's *Life of Garrick* (1801).

Barry Cornwall. See PROCTER.

Barry Railway Viaduct, across the Taff R., in Glamorganshire, Wales, spans two other railway lines and a canal; is 1,420 ft. long and 112 ft. high.

Bars (pron. *Barsh*), co. of Hungary, in the W., on the middle course of the Gran. Mountainous in N., where cattle are pastured. Gold, silver, copper, iron, lead, and antimony are mined in the N. Area, 1,031 sq. m. Chief town, Aranyos-Maroth. Pop. (1900) 164,852.

Bars-gemelles, or BARS-GEMEL, in heraldry, twin bars crossing the field, and placed so that the parts of the field above and below them are greater than the part between them.

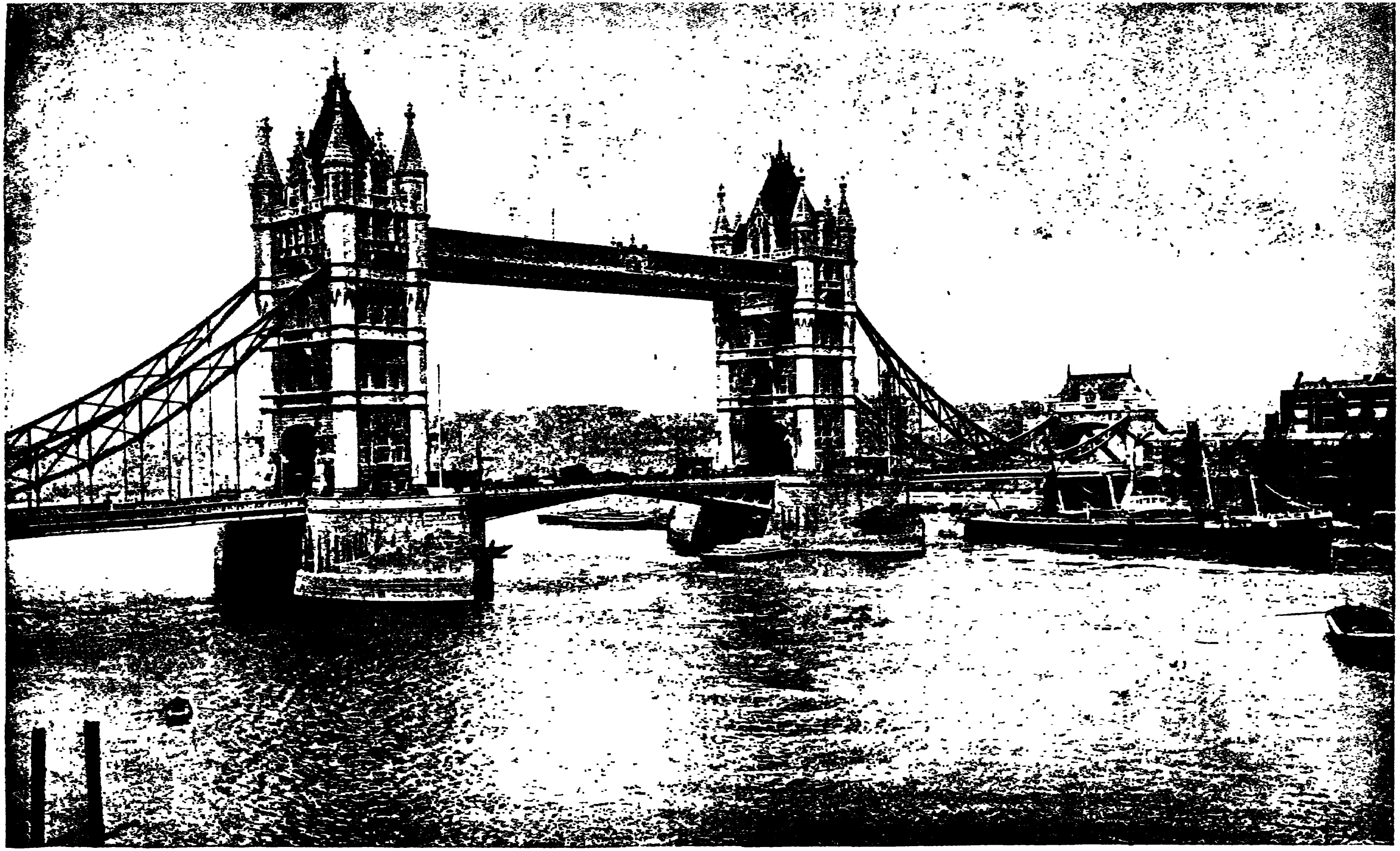
Barsi, tn., Sholapur dist., Bombay Presidency, India, 43 m. N. of Sholapur and 128 m. E. of Poona. Pop. (1901) 24,242.

Barsine. (1.) Daughter of Artabazus, and wife of Memnon of Rhodes, after whose death she was married by Alexander the Great, and bore him a son, Hercules. Both she and her son were put to death by the orders of Cassandra in 309 B.C. (2.) Also called STATIRA, elder daughter of Darius III.; was married by Alexander at Susa (324 B.C.). After his death she was murdered, at Roxana's instigation.

Bar-sur-Aube, dist. tn., dep. Aube, France, 34 m. E. of Troyes, with manufactures of flour, brandy, and cotton. The site has been occupied since Roman times, and the town was destroyed by the Huns. Here, on Feb. 7, 1814, a fierce battle took place between the Allies and the French under Oudinot. Pop. (1901) 4,587.

Bart, JEAN (1650-1702), French corsair, born at Dunkirk. Having, under Ruyter, taken part in the campaigns of 1666 and 1667 against England, he entered (1672) the service of France, and (1686) became captain. After performing many brilliant exploits as a cruiser in the Mediterranean and off the English coasts, he was appointed by Louis XIV. chief of a squadron in 1697, having previously obtained letters of nobility from the king for having captured a Dutch fleet laden with corn. See Vanderest's *Hist. de Jean Bart* (1844).

Bartas, GUILLAUME DE SALLUSTE, SIEUR DU (1544-90), French Huguenot poet. His chief work, *La Semaine, ou Création du Monde* (1578), is said to have given ideas to Milton and Tasso. He served in diplomatic missions to England, Scotland, and Denmark on behalf of Henry of Navarre. Joshua Sylvester's *Du Bartas: His Divine Weeks and Works* (1598) was once extensively read in America. See Pellissier's *Vie de Du Bartas* (1883).



The Tower Bridge, London. Designed by Sir John Wolfe Barry.

(Photo by Eyre & Spottiswoode.)

Bartels, ADOLF (1862), German man of letters, has lived as a journalist in Berlin and Weimar; has written *Geschichte der Deutschen Literatur* (1901-2), *Der Bauer in der Deutschen Vergangenheit* (1900), and a biography of *Jeremias Gotthelf* (1902), and edited the works of Klaus Groth 1899) and Hebbel (1900).

Barter. See ECONOMICS.

Bartfeld (Hung. *Bartfa*), tn. of Hungary, co. Saros, at the foot of the E. Beskid Mts., 28 m. by rail N. of Eperjes; is famous for its chalybeate waters, and as the meeting-place of the first general Protestant synod of Hungary. Pop. (1900) 6,096.

Barth, tn. in the Prussian prov. of Pomerania, dist. Stralsund, on the S. shore of the Barther Bodden (lagoon), 21 m. by rail N.W. of Stralsund, with a small harbour. Pop. (1900) 7,070.

Barth, HEINRICH (1821-65), German traveller, born at Hamburg. In 1845 he visited N. Africa, voyaged up the Nile, and explored Arabia and the provinces of Asia Minor. He was requested by the British government to take part in the expedition for the exploration of Central Africa, for which he set out in 1849, along with Mr. Richardson and Dr. Overweg. The explorations lasted for nearly six years; but after the death of his two companions, Barth returned to Europe in 1855, and in 1857 published his *Travels and Discoveries in North and Central Africa* (5 vols. 1857-9; new ed. 1890). In 1862 he explored Eastern Turkey. He also wrote *Wanderungen durch die Küstenländer des Mittelmeers* (1849), *Reise von Trapezunt nach Skutari* (1860), and several others.

Barthélemy, AUGUST MARSEILLE (1796-1867), French political verse-writer, born at Marseilles. At Paris (1825) he attacked the Bourbons in a series of squibs, which were followed up by the *Villéliade* (1826), *Napoléon en Egypte* (1828), and *Fils de l'Homme* (1829), for which he was imprisoned, and, in conjunction with Méry, the *Dupinade* (1831). The revolution of July was celebrated by the two authors in *L'Insurrection* (1830). Thereafter he founded the *Némésis* (1831-2). His political changes he defended in the oft-quoted line, 'L'homme absurde est celui qui ne change jamais.'

Barthélemy, JEAN JACQUES (1716-95), French writer and scholar, born at Cassis, in Provence. In 1753 he was appointed keeper of the Royal Cabinet of Medals. His *Voyage du jeune Anacharsis en Grèce* (4 vols. 1787) occupied him thirty years. It obtained great popularity, and was translated into several languages—into English by W. Beaumont (5th ed. in 6 vols. 1817).

Barthélemy Saint-Hilaire, JULES (1805-95), French statesman and scholar, commenced his career as a journalist and politician, but in 1838 was appointed to the chair of Greek and Roman philosophy in the Collège de France, and member of the Academy (1839). After the revolution of 1848 he entered the Assembly, and was imprisoned on the *coup d'état*. On his release he resigned his professorship, and was not reinstated until 1862. He was elected to the Assembly at Bordeaux in 1871, and gave consistent support to Thiers, whose secretary he was in 1872-3. He was minister of foreign affairs in Jules Ferry's cabinet (1880-1). His principal works are translations of Aristotle (1839-44), *De l'Ecole d'Alexandrie* (1838), *Des Védas* (1854), *Du Bouddhisme* (1855), *Le Bouddha et sa Religion* (1866), *Mahomet et la Coran* (1867), *Pensées de Marc-Aurèle* (1876), *L'Inde Anglaise* (1887), *La Philosophie dans ses Rapports avec les Sciences et la Religion* (1889), and *François Bacon* (1890). Barthélemy Saint-Hilaire was the literary executor of Thiers and Victor Cousin, and wrote the *Life* of the latter (1895).

Barthez, PAUL JOSEPH (1734-1806), French physician, born at Montpellier, where he became professor of medicine in 1759, and chancellor of the university in 1785. His *Science de l'Homme* (1778) was translated into most European languages, and people came from all parts to consult him as a physician.

Barthold, FRIEDRICH WILHELM (1799-1858), German historian, born in Berlin; appointed professor of history at Greifswald on the publication of *Der Römerzug König Heinrichs von Lützelburg* (1830-1), his greatest work. Other publications were *Geschichte von Rügen und Pommern* (1839-45), and *Geschichte der Deutschen Städte und des Deutschen Bürgertums* (1850-2).

Bartholdi, FRÉDÉRIC AUGUSTE (1834-1904), French sculptor, of Italian descent; born in Colmar, Alsace. He was commissioned by the French government to execute a huge statue of Liberty (*Liberté éclairant le Monde*) for presentation to the American government in commemoration of the centenary of its independence. This statue, about 200 ft. high, was completed in 1884, and in 1886 was erected at the mouth of New York harbour (Bedloe's I.). Most of his other works have been of a quasi-historical or patriotic character—*e.g.* *The Lion of Belfort* (1880), a monument to *Lafayette* in New York (1873), another to *Vercingetorix* at Clermont-Ferrand (1902), and *Helvetia carrying Help to Strassburg* (1895).

Bartholomé, PAUL ALBERT (1848), French painter and sculptor, born at Thiverval (Seine-et-Oise). Exhibited at the Salon from 1879-86 many genre pictures, the best being *The Meal of the Old People at the Workhouse* (1880) and *Recreation* (1885). Since 1891 he has exhibited in the same place sculptures, the best being a *Girl Weeping* (1892), and *Girl Praying* (1894). In 1899 his impressive series of sculptures, *Monuments to the Dead*, was bought by the city of Paris and placed in the Père-la-Chaise cemetery.

Bartholomew (son of Tolmai), one of the twelve disciples of Jesus, frequently, though not conclusively, identified with Nathanael. In the lists of apostles he is always associated with Philip. The later accounts of his preaching in India, Armenia, Egypt, etc., and the various stories of his martyrdom, are wholly untrustworthy.

Bartholomew, MASSACRE OF ST., the massacre of the Huguenots, which began at Paris on St. Bartholomew's day, Aug. 24, 1572. The atrocities in Paris, inaugurated by the murder of Coligny and Téligny, reached Orleans (Aug. 27), Lyons (Aug. 30), and Rouen (Sept. 17). Brantôme estimates the corpses thrown into the Seine at 4,000. Those massacred throughout France are reckoned at the least at 30,000. Only sudden conversion saved Henry of Navarre and Condé. Gregory XIII. celebrated the massacre with a *Te Deum* and a specially-struck medal. See H. Baumgarten's *Vor der Bartholomäusnacht* (1882); H. White's *Mass. of St. Bartholomew* (1867); Pennington's *Epochs of the Papacy* (1881).

Bartholomew, EDWARD SHEFFIELD (1825-58), American sculptor, who studied at Rome. His most famous statues are *Blind Homer led by his Daughter*, *Ganymede and the Eagle*, and *The Repentant Eve*. Hartford, Connecticut, has a large collection of his works. He died at Naples. See Leader Scott's *Sculpture: Renaissance and Modern* (1886).

Bartholomew Fair, an English market held annually from 1133 to 1840 in W. Smithfield, then up to 1855 at Islington, London, on the festival of St. Bartholomew (Aug. 24, old style). Originally connected with the church, miracle plays and mysteries were represented, and in early times it was the principal cloth fair in England—leather, pewter, and cattle being also extensively sold. Shows of all kinds attracted large crowds, till, in 1855, the fair was abolished as a nuisance. See Ben Jonson's comedy of this name, and H. Morley's *Memoirs of Bartholomew Fair* (1859).

Bartholomew's (St.) Hospital, Smithfield, London, founded in 1123 by Rahere, also founder and prior of the adjoining priory, the church of which is now known as St. Bartholomew the Great. It was made a sanctuary by Edward II.; but both hospital and priory were dissolved by Henry VIII., who refounded the hospital in 1546. It was rebuilt in 1729. Attached are a medical school, founded in 1843, for which new buildings were opened in 1879; and a Convalescent Home at Swanley, Kent (1885), with 70 beds. The further extension of the hospital was under consideration in 1904. Its income in that year was £67,666.

Bartizan, a term first used by Sir Walter Scott, to denote a small overhanging turret, with loopholes and embrasures, projecting from an angle of tower or wall: a characteristic feature of the so-called Scottish-baronial style of architecture.

Bartlett, SIR ELLIS ASHMEAD (1849-1902), politician, son of a Dissenting minister at Plymouth, Mass., was born at Brooklyn. He was called to the bar (1877); became M.P. for Eye (1880), and for Ecclesall Division, Sheffield (1885-1902); and served as civil lord of the Admiralty (1885-92). He was knighted in 1892. A Conservative and Russophobe, he was the champion of the Sultan of Turkey in the House of Commons. In 1897 he was captured by a Greek warship as a suspected spy. He published in the same year *The Battlefields of Thessaly.*

Bartlett, JOHN RUSSELL (1805-86), American author and statesman. A banker at Providence, and a successful foreign bookseller in New York, he was (1850-3) appointed one of the commissioners for the delimitation of the Mexican frontier. (See his interesting narrative in 3 vols., 1854.) Secretary (1855-72) of Rhode I., he published the Records of the Colony from 1636 to 1790 (1856-65); *Index to Printed Acts, 1758-1862; Progress of Ethnology* (1848); *Dict. of Americanisms* (4th ed. 1877); and *Bibliotheca Amer.* (1865-71).

Bartlett, WILLIAM HENRY (1809-54), English artist and author, was born in London and apprenticed to an architect. His life was devoted to making drawings of scenes in England, on the continent of Europe, in Palestine, and in the United States and Canada. The greater number have been published, with letterpress by himself. See Beattie's *Brief Memoir* (1855).

Bartoli, ADOLFO (1833-94), Italian literary historian, born at Fivizzano; held the professorship of literary history at the Florentine Institute of Higher Studies from 1874 till his death. His principal work is the *Storia della Letteratura Italiana* (7 vols. 1878-89), which remained a fragment, breaking off with the 14th century. It was the first critical history of Italian literature, though it is now to some extent superseded by the work of Gaspary. He also edited Marco Polo (1859), dealt with the evolution of the renaissance (1877), and with the predecessors of Boccaccio (1878), and in 1881 published *Scenari Inediti della Commedia dell' Arte.*

Bartoli, TADDEO (1363-1422), Italian painter, born at Siena. He painted frescoes depicting the life of the Virgin, in the cathedrals of Siena, Pisa, Perugia, and Genoa; others are in the municipal palace in Siena (1414). One of his earliest works, *The Virgin among the Saints* (1390), is now in the Louvre. Among his other works are altar-pieces in the cathedral, Montepulciano (1401); in the Sardi chapel of S. Francesco, Pisa (1395). See Kugler's *Schools of Painting in Italy* (1851).

Bartolini, LORENZO (1777-1850), Italian sculptor, was born at Vernio, near Florence, and came to Paris in 1797. Here the bas-relief *Cléobis and Biton* established his fame. He was a favourite of Napoleon, of whom he executed a bust, and who entrusted him with the establishment of a school of sculpture at Carrara in 1808. After Waterloo he retired to Florence, where he died. Among his many works, the most celebrated are the group of *Charity, Hercules and Lichas, Faith in God,* and *Pyrrhus hurling Astyanax from the Walls of Troy.* He also executed busts of Byron, Thiers, and Pius IX.

Bartolommeo DI PAGHOLO DEL FATTORINO, FRA (1475-1517), one of the greatest of Florentine painters, known also as BACCIO DELLA PORTA. Born at Savignano, near Florence, he studied under Cosimo Rosselli and Leonardo da Vinci. Fired by Savonarola's eloquence, he gave up his profession, burned his nude studies in the public square, and finally took the habit of the Dominicans. In 1498-9 he painted the celebrated fresco of the Last Supper in Santa Maria Novella, in Florence, finished in the lower part by Albertinelli. In 1506 Raphael visited Florence, and a strong friendship grew up between the two artists. In 1514 Fra Bartolommeo went to Rome, and there he painted the figure of St. Peter, and part of a St. Paul finished by Raphael. Fra Bartolommeo's influence on Italian art was fourfold: he preceded Raphael in a scientific system of composition, based on principles of strict symmetry; he combined harmony of tone with brilliancy of colour; he elaborated his landscape backgrounds beyond the practice of his contemporaries; and he was the inventor of the lay-figure. His finest work is characterized by calm beauty and adoration. His best work is in Florence and in Lucca (especially the beautiful *Madonna and Saints* in the cathedral). In the National Gallery, London, a *Virgin and Child with St. John* is attributed to him. See Leader Scott's *Fra Bartolommeo* (1880); Vasari's *Lives of Italian Painters* (1895); Kugler's *Schools of Painting in Italy* (1851).

Bartolozzi, FRANCESCO (1728-1813), Italian engraver, born at Florence; produced a series of engraved portraits for Bottari's *Vasari* (1756-60). In London (1764) he became engraver to George III. An original R.A. (1769), he executed from Cipriani's design the Academy's diploma, still in use, and gave vogue to stipple engraving. In 1802 he became director of a school of engraving at Lisbon. His works number over seven hundred. Among the best are *Clytie* and *Silence*, after Annibale Caracci; *Virgin and Child*, after C. Dolci; *Venus, Cupid*, and *Satyr*, after L. Giordano. Among his portraits are *Clive* and *Thurlow*. He was the grandfather of Madame Vestris. See A. W. Tuer's *Bartolozzi and his Works* (2nd ed. 1885).

Barton, ANDREW (d. 1511), was the father of the Scottish navy. He is called Sir Andrew Barton in the popular ballad on his career. His mercantile transactions were considered piracy by the English and Portuguese, though protected generally by Scottish letters of marque. He was shot in a sea fight with the English.

Barton, BERNARD (1784-1849), the 'Quaker poet,' was a native of Carlisle. He first engaged in trade, but afterwards became a bank clerk at Woodbridge, in Suffolk, where he worked for forty years. His poems (1812, 1818, 1820) are distinguished by pious sentiment, pathos, and tenderness. He is chiefly known, however, as the friend of Charles Lamb. See *Letters and Poems* (1849; new ed. 1860), edited by his daughter, with a Memoir by Edward Fitzgerald.

Barton, CLARA (1830), a native of Oxford, Mass., U.S.A., who devoted herself to the care of the sick and wounded during the American civil war, and afterwards was associated with the work of the International Red Cross Society during the Franco-German war (1870-1). Miss Barton had charge of the Red Cross operations during the war in Cuba (1898), and in the Anglo-Boer war (1899-1902) in S. Africa. She has written *History of the Red Cross in Peace and War* (1898).

Barton, RIGHT HON. SIR EDMUND, K.C. (1849), Australian statesman, born near Sydney, N.S.W. After a distinguished career in the legislative assembly of his native colony from 1879, in the course of which he held several important offices, including that of Speaker (1883-7) and attorney-general (1889, 1891), he became in 1901 prime minister and minister for external affairs in the first Australian Federal cabinet, the Federation Act of 1900 having been due largely to his untiring advocacy. In 1902 he represented Australia at the coronation of Edward VII. in London and in the Colonial Conference. He then received the honour of knighthood and the freedom of the city of Edinburgh.

Barton, ELIZABETH (1506-34), the 'Maid of Kent.' A servant at Aldington in Kent, she came out of an illness in a hysteric condition, and, under priestly influence, gave herself out (1525) as a prophetess, and delivered, as a revelation, the warning that should Henry VIII. persist in carrying out his divorce from Catherine of Aragon, he would not survive that act seven months. Events falsified her prediction, she confessed the imposture, and, along with six accomplices, was executed at Tyburn. See G. Burnet's *Hist. of the Reformation in England* (1737).

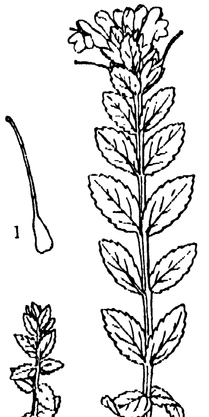
Barton, GEOFFRY (1844), British soldier, entered the army in 1862; went through the Ashanti war of 1873-4, and five years later was in the Zulu war. In the Egyptian war of 1882 he fought at Kassassin and Tell-el-Kebir. He served in the Sudan campaign of 1885; and on the outbreak of the Boer war (1899-1902) was appointed to the command of the 6th Brigade. Barton bore a distinguished part in the final attack on the Tugela position (Feb. 27, 1900). He received the C.B. and C.M.G.

Barton Clay is well known for the number, variety, and excellent preservation of its fossil shells, belonging chiefly to genera characteristic of warm seas. They are mostly molluscs—*Voluta, Conus, Murex, Fusus, Phorus*, etc. The beds are well exposed in the sea cliffs of Barton in Hampshire, and belong to the highest division of the Eocene strata. See Bristow's *Geol. of I. of Wight* (1846).

Barton-upon-Humber, tn., Lincolnshire, England, 6 m. S.W. of Hull; carries on tanning, and manufactures bricks, tiles, pottery, and sailcloth. Pop. (1901) 5,671.

Barton-upon-Irwell (10,824 ac.), par., Lancashire, England, on R. Irwell, 5¼ m. W. of Manchester. Here at one time the Bridgewater Canal was carried over the Irwell by an aqueduct built by Brindley. Pop. (1901) 8,068.

Bartsch, KARL (1832-88), Germanic and Romance scholar, was custodian of the Germanic Museum at Nuremberg (1855), and then occupied the chair of Germanic and Romance philology at Rostock (1858) and at Heidelberg (1871) successively. He edited a number of early German texts, and wrote several treatises on Germanic, of which the most important is the *Untersuchungen über das Nibelungenlied* (1865). In Romance, his two Provençal Chrestomathies (4th ed. 1882) and the similar work for Old French (5th ed. 1884) have been much used. Indispensable to the student of Provençal is the *Grundriss zur Geschichte der prov. Litt.* (1872). As a translator he rendered into German, among other works, Burns's songs and ballads (1865), Dante's *Commedia* in the original metre (1876), and Old French popular songs (1882). His version of the *Nibelungenlied* reached a second edition in 1880.



Bartsia alpina.

1, Pistil; 2, corolla (opened) and stamens.

Bartsia, in botany, a genus of the order Scrophulariaceæ, including three British species—red bartsia, found by the roadsides and in moist ground; yellow bartsia, confined to marshy ground on the west coast; and the rare purplish blue alpine bartsia, found in hilly districts in the north of England and Perthshire. These plants, like some others of the same order, are semi-parasitic on grass roots, into which they send suckers.

Barttelot, MAJOR EDMUND MUSGRAVE (1859-1888), son of Sir W. Barttelot Barttelot, distinguished himself in Afghanistan and Egypt; accompanied H. M. Stanley on the expedition for the relief of Emin Pasha, and is supposed to have been murdered by Manyema carriers. For refutation of charges of cruelty brought against him, see the *Life* written by his brother (1890).

Baru, a fluffy, cotton-like fibre obtained from an E. Indian sago palm; used instead of feathers to stuff pillows, and as a substitute for tow in calking boats.

Baruch ('blessed'), the friend and amanuensis of Jeremiah. He shared many of the prophet's misfortunes, notably his exile in Egypt, and subsequently, according to Josephus (*Antiq.*, X. ix. 7), in Babylon. Bunsen erroneously identifies Baruch with the 'great unknown' prophetic writer of Isa. 40-66. See Jer. 32, 36, etc.; Cheyne's *Jeremiah: his Life and Times* (1888); and the two following articles.

Baruch, a book of the Apocrypha, purporting to have been written in the main by the above. It falls into four parts—(1) ch. 1:1-14, a historical introduction, quite unreliable; (2) 1:15-3:8, confession and prayer of the captives in Babylon, probably from a Hebrew original, and dating from the 3rd century B.C.; (3) 3:9-4:4, a eulogy of wisdom, addressed to the exiles, from about 70 A.D.; and (4) 4:9-5:9, odes celebrating the return from captivity, still later. These heterogeneous elements were joined together probably towards the close of the 1st century A.D. Attached to Baruch (as ch. 6) is the Epistle of Jeremy. See Gifford's commentary in *Speaker's Apocrypha* (1888).

Baruch, THE APOCALYPSE OF, a remarkable work, made known to scholars by the discovery of a Syriac MS. in 1866. The friend of Jeremiah is made to speak throughout in the first person, and relates the divine disclosures made to him in Jerusalem. The work comes from four or five different hands, probably Pharisees, and assumed its present form about the first quarter of the 2nd Christian century. See R. H. Charles's *Apocalypse of Baruch* (1896), and W. J. Deane's *Pseudepigrapha*, pp. 130-62 (1888).

Barwick, JOHN (1612-64), dean of St. Paul's, born in Westmorland. In the civil war he adhered to the Royalist cause, for which he suffered imprisonment (1650-2). At the restoration he was made dean of Durham (1660), and later dean of St. Paul's (1661). See *Life* (in Latin) by Peter Barwick, trans. by H. Bedford (1724).

Barwood. See CAMWOOD.

Barye, Antoine Louis (1795–1875), one of the greatest of French sculptors. He served in the army from 1812 to 1814. For years he fought against poverty and opposition, till recognition of his talent came from America through his friend Mr. Walters, whose fine art collection at Baltimore contains many of his finest bronzes, such as *The Orleans Group*, *The Hunt of the Wild Ox*. Barye was unexcelled in illustrating groups of animals in vigorous action, the best example being his *Lion Struggling with a Snake* (1832). Another notable work is the *Lion Resting* (1847). Both are in the Tuileries. Barye also, in the façade of the specimens on the façade of the new wing of the Louvre (*War, Peace, Force, Order*), treated the human figure in heroic sculpture with equal mastery. See Brownell's *French Art* (1892); Gruelle's *Notes on the Walters Collection, Baltimore*; and Ballu's *L'Œuvre de Barye* (1890).

Barytes, a mineral consisting of sulphate of barium, and known also as 'heavy spar' from its high sp. gr. (4·5), which is exceptional for a mineral without metallic lustre. It crystallizes in the rhombic system, in forms of great diversity, and is generally white, gray, or pink, but the crystals may be transparent and colourless. Its hardness is 3½, and it has a very good cleavage. One of the commonest of veinstones, it usually accompanies silica and ores of lead. Very fine specimens, lining cavities, are obtained at Dufton in Westmorland. It occurs not only in crystals, but also, more frequently, in fibrous, granular, stalactitic and other forms. It is used as a source of barium preparations; as a paint when finely ground, alone or mixed with white lead; and occasionally as an ornamental stone.

Baryton, or Viola di bardone, a stringed instrument, invented in 1700, but not now in use, somewhat resembling the viola da gamba. Leopold Mozart eulogized its beauty of tone, and Haydn, who tried hard to learn it, left 175 compositions for the instrument.

Basalt, one of the most abundant and widely distributed of igneous rocks, covering large districts in the north of Ireland, west of Scotland, Germany, America, India, Africa. From many active volcanoes—*e.g.* Etna, Vesuvius, and those of Iceland and the Sandwich Islands—it is emitted in lava flows, sometimes of vast extent. Basaltic rocks are usually black or very dark when fresh, and may be fine-grained (often called anamesite), or contain large scattered porphyritic crystals of olivine, augite, and plagioclase felspar, with a finer-grained ground mass between them. Their minute structure, as shown in microscopic sections, varies greatly, the ground mass consisting of augite, plagioclase, and magnetite, with often a considerable quantity of residual non-crystalline glassy matter. Some basalts contain leucite in large, gray, rounded crystals—*e.g.* many of the lavas of Vesuvius—and are known as leucite basalts; the nepheline basalts contain nepheline. Dolerite and diabase are closely allied to basalt, but are more coarsely crystalline, and of somewhat different structure. As a group the basalts are typical lavas of basic character *i.e.* they contain a relatively small proportion of silica, and much magnesia, iron, and lime. Their dark colour is due to the abundance of augite and magnetite, the latter being often present in sufficient quantity to attract a magnetic needle, and to interfere with the exactness of surveyors' instruments. Native iron in large masses occurs in the basalt of Ovifak in Greenland. A feature of basaltic lava flows is their columnar jointing, which produces the characteristic scenery of the Giant's Causeway and Fingal's Cave.

Base, in chemistry, is not a term that admits of very exact definition, but includes those oxides and hydroxides of metals and alkyls, ammonia and its substitution derivatives, that react with acids to form salts.

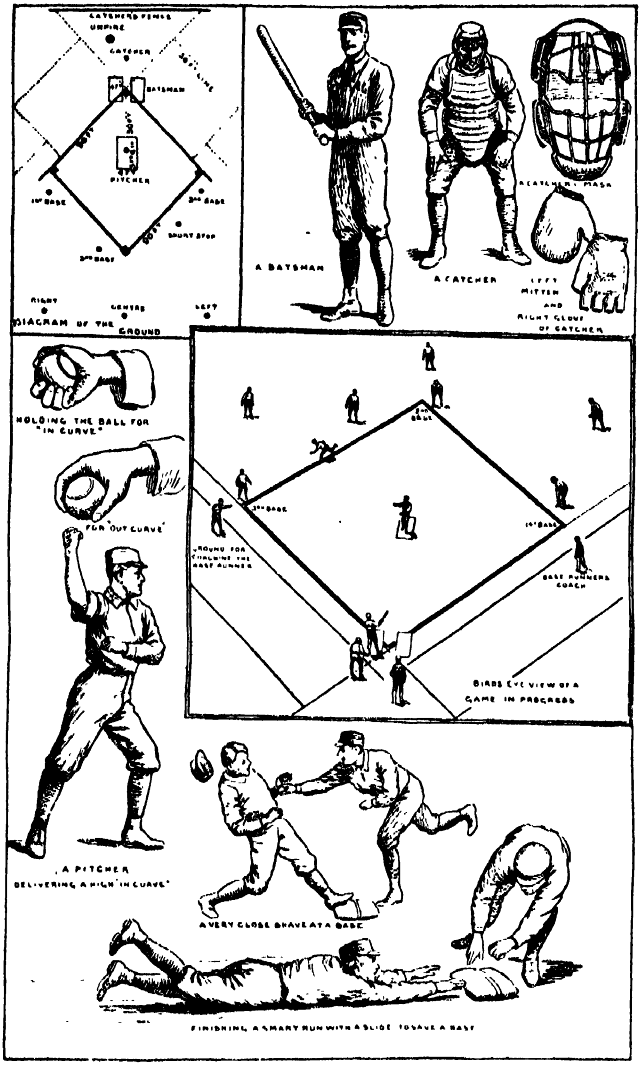
Base, in heraldry, the lower portion of a shield. Charges borne therein are blazoned *in base*, and particularly in *dexter* base, *middle* base, or *sinister* base, according as they appear to the right, the centre, or the left.

Base, Military. See Army in the Field.

Base-ball, an outdoor game having a strong superficial resemblance to the British 'rounders.' Base-ball has for the past forty years been as much the national game of the United States as cricket and football are the national games of Great Britain. There are comparatively few genuine amateur base-ball clubs of importance, the majority of organizations, other than those of frankly professional constitution, being dependent upon 'gate' receipts. The majority of clubs in the large American cities belong to this semi-professional class, and form a recruiting ground for the regular professional clubs. There is, however, in the metropolis a leading and purely amateur association, the Amateur League of New York, which embraces six noted clubs largely composed of retired college players.

In 1871 the first professional base-ball association was established in New York, and was followed in 1875 by the formation of the National League of Professional Base-ball Clubs. After a somewhat troublous history, this became, in 1892, the great major league of the professional class, and is to-day, in co-operation with the American association, responsible for the issue of rules, and for base-ball legislation generally, so far as professional players are concerned. It should be mentioned in this connection that base-ball professionalism in America is, as regards individuals, on quite a different footing from cricket and football professionalism in Great Britain. It is no uncommon thing to find among professional base-ball teams college students, lawyers, artists, and others pursuing avocations in which education and special talent are required.

Base-ball is played with bat and ball upon a diamond-shaped ground, at one point of which is the home base, the remaining three points being 1st, 2nd, and 3rd bases respectively. The following are the latest official rules (1901) for laying off the lines governing the positions and play of base-ball:—*Rule 2*. From a point A within the grounds project a right line AE out into the field, and at a point B, 154 ft. from point A, lay off lines BC and BD at right angles to the line AB; then with B as centre, and 63·63945 ft. (roughly, 63 ft. 7¾ in.) as radius, describe arcs cutting the lines BA at F and BC at G, BD at H and BE at I. Draw lines FG, GI, IH, and HF, and said lines will be the containing lines of the diamond or infield. *Rule 3. The catcher's lines.*—With F as centre, and 10 ft. radius, describe an arc cutting line FA at L, and draw lines LM and LO at right angles to FA, and continue same out from FA not less than 10 ft. *Rule 4. The foul line.* From the intersection point F continue the straight lines FG and FH until they intersect with the lines LM and LO, and then from the points G and H in the opposite direction until they reach the boundary lines of the grounds. *Rule 5. The players' lines.*—With F as centre and 50 ft. radius, describe arcs cutting lines FO and FM at P and Q; then with F as centre again, and 75 ft. radius, describe arcs cutting FG and FH at R and S; then from the points P, Q, R, and S draw lines at right angles to the lines FO, FM, FG, and FH, and continue same until they intersect at the points T and W. *Rule 6. The captain and coacher's line.*—With R and S as centres, and 15 ft. radius, describe arcs cutting lines RW and ST at X and Y, and from the points X and Y draw lines parallel with lines FH and FG, and continue same out to the boundary lines of the ground. *Rule 7. The three-foot line.*—With F as centre, and 45 ft. radius, describe an arc cutting line FG at 1, and from 1 out to the distance of 3 ft. draw a line at right angles to FG, and marked point 2; then from point 2 draw a line parallel with the line FG to a point 3 ft. beyond the point G, and marked 3; then from the point 3 draw a line at right angles to line 2, 3, back to and intersecting with line FG, and from thence back along line GF to point 1. *Rule 8. The pitcher's plate.*—With point F as centre, and 60·5 ft. as radius, describe an arc cutting the line FB at a point 4, and draw a line 5, 6, perpendicular thereto, passing through point 4 and extending 12 in. on either side of line FB; then with line 5, 6, as a side, describe a parallelogram 24 in. by 6 in. *Rule 9. The bases.*—Within the angle F describe a five-sided figure two of the sides of which shall coincide with the lines FG and FH to the extent of 12 in. each, thence parallel with the line FB 8½ in. to the points X and Y, a straight line between which (17 in.) will form the front of the plate; and within the angles G and H describe squares the sides of which shall be 15 in., the two outer sides of said square lying upon the lines FG and GI and FH and HI, and at the angle E describe a square whose sides shall be 15 in., and so described that its sides shall be parallel with GI and IH, and its centre immediately over the angular point E. *Rule 10. The batsman's line.*—On either side of the line AFB describe two parallelograms 6 ft. long and 4 ft. wide (marked 8 and 9), their length being parallel with the line AFB, their distance apart being 6 in. added to each end of the length of the diagonal of the square within the angle F, and the centre of their length being upon said diagonal.


CATCHER'S FENCE
UMPIRE
CATCHER
BATSMAN
FOUL LINE
PITCHER
1st BASE
3rd BASE
SHORT STOP
2nd BASE
RIGHT
CENTRE
LEFT
DIAGRAM OF THE GROUND
A BATSMAN
A CATCHER
A CATCHER'S MASK
LEFT MITTEN AND RIGHT GLOVE OF CATCHER
HOLDING THE BALL FOR "IN CURVE"
FOR 'OUT CURVE'
A PITCHER DELIVERING A HIGH 'IN CURVE'
2nd BASE
3rd BASE
1st BASE
GROUND FOR COACHING THE BASE RUNNER
BASE RUNNERS COACH
BIRDS EYE VIEW OF A GAME IN PROGRESS
A VERY CLOSE SHAVE AT A BASE
FINISHING A SMART RUN WITH A SLIDE TO SAVE A BASE

The Game of Base-ball.

A game of base-ball is played by two sides, each consisting of nine players. An inning is completed when three men on the batting side are out, and a game consists of nine innings played by each side. The batsman takes his position in the batsman's box at the home base, armed with a round hard-wood bat not exceeding 2½ in. in diameter at the thickest part, nor exceeding 42 in. in length. To him the pitcher, standing in front of the pitcher's plate, delivers a ball weighing not less than 5 nor more than 5¼ oz. avoirdupois, and measuring not less than 9 nor more than 9¼ in. in circumference. The batsman must strike at every ball that passes over any portion of the home base not lower than the batsman's knee nor higher than his shoulder. After three failures to hit the ball the batsman is 'out,' provided that the ball on the third occasion is caught by the catcher before it touches the ground. The batsman's endeavour is to hit the ball inside the foul lines in such a manner as to enable him, without being put out, to run round the bases in a variety of ways provided for by the rules. After making a successful hit, and in certain other contingencies, the batsman becomes a base-runner, and is said to have scored a run after running the 120 yards necessary to enable him to touch 1st, 2nd, 3rd, and home bases in succession without being put out in the process. The skilful batsman, however, does not, as a rule, hit so much to secure 'homers' as to forward those of his side who are engaged in base-running and have not yet got home, and, at the same time, to 'earn a base' for himself. When the first base is earned, subsequent bases may be secured by clever 'stealing,' which demands great quickness of perception and promptitude of movement even more than fast running. An extremely important feature of scientific base-ball is effective pitching, to excel in which a considerable amount of 'head work' is necessary, coupled with a practical knowledge of speed, and experience in the use of the various 'curves,' 'drops,' and other niceties of delivery. In base-ball language, good pitching is said to show skill in 'box work,' while the essence of good batting is 'team work at the bat.'

Base-ball has made considerable headway in Canada, having for years flourished in Toronto, and latterly spread among the French Canadians in Quebec. It has also become popular in Australia, and is played by several 'nines' in France. But in England it has made slow progress everywhere except in Derbyshire, where in 1900 there were five clubs. Spalding's *Official Base-ball Guide* (issued monthly), published by the American Sports Publishing Co., New York, is the recognized authority on the game, and contains the latest rules approved by the National League.

Basedow, JOHANN BERNHARD (1723-90), German educational reformer, taught for some time at Sorö in Denmark, and was professor at a school in Altona from 1761-71. His ideas were appreciated by Leopold of Anhalt, who invited him to Dessau as an educational expert. He was thus enabled to realize a cherished plan, and opened his Philanthropinum in 1774. Owing to his violent temper and lack of business capacity, he had to surrender the direction of it in 1778, and the school was closed in 1793. In spite of its apparent failure, it was Basedow who did most to hasten a reform in the educational system of Germany. In his earliest writings there is much to suggest Rousseau; and on the publication of the *Emile* (1762) Basedow became Rousseau's most enthusiastic champion. The keynote of his system was 'everything according to nature.' The most important of his numerous works are the *Methodenbuch für Väter und Mütter* (1770) and the *Elementarwerk* (1774). See *Biographies* by L. H. Fischer (1890) and R. Diestelmann (1897).

Basedow's Disease. See GOITRE.

Basel. See BÂLE.

Base-line, or BASE, in surveying, is a straight line measured on the ground, from the two ends of which angles can be taken with the purpose of laying down a triangle or triangles, thus mapping out the country to be surveyed. The base, or base-line, must be measured with the most rigid accuracy, for upon it the accuracy of the entire survey depends.

Bashahr, tributary hill state in Punjab, India. Area, 3,862 sq. m. Pop. (1901) 84,636.

Bashan, an extensive region of ancient Palestine lying to the E. of the Upper Jordan, and divided from Gilead on the S. by the river Hieromax or Yarmuk. Og, its king, having been defeated and slain by the Israelites (Num. 21 : 33 *f.*), his territory was assigned to the half-tribe of Manasseh. Bashan (properly The Bashan—*i.e.* 'rich earth') is a fertile table-land, broken by volcanic cones, both sporadic and grouped, and furrowed by deep valleys, some 2,000 ft. above sea-level. It was famous for its oak forests (Ezek. 27 : 6) and for its cattle - *cf.* the 'bulls' and the 'kine' of Bashan (Ps. 22 : 12; Amos 4 : 1).

Bashi-bazouks, Turkish irregular troops, who serve without uniform or direct pay, are usually mounted, and are addicted to pillage. They were notorious in the Bulgarian atrocities of 1876.

Bashkires, or BASHKIRS, people inhabiting Ural slopes, Ru [illegible] Ural-Alta[illegible] Mohammedan in religion; partly nomadic, partly settled; Tartars in habits and speech. Their wealth consists chiefly in horses; from the milk of the mares they prepare *kumiss*. They number over three-quarters of a million, and make good horse soldiers.

Bashkirtseff, MARIE (1860-84), Russian painter, born of noble family near Poltava. After making the tour of Europe, she settled at Paris. Devoting herself from 1878 with inordinate enthusiasm to art, she exhibited the *Umbrella* (1882), *Jean et Jacques* (1883), *The Meeting* (1884), now in the Luxembourg. She had real genius, though immature. Her *Journal* (1887), translated into English (1890), and *Further Memoirs* (1901), reveal the inner life of a profoundly emotional, egotistic, and unbalanced nature. See *Catalogue des Œuvres*, with preface by F. Coppée (1885).

Basidium. See FUNGI.

Basil, various herbaceous plants of the order Labiatæ. Wild basil (*Calamintha clinopodium*) and common basil (*C. officinalis*) are natives of Great Britain. *Ocimum basilicum* is sweet basil, a native of India; the whole plant is fragrant and of a sweet taste, the young leaves being used for seasoning dishes, and the leafy stems cut and dried for winter use. Holy basil (*O. sanctum*) is another Indian species. Bush basil is *O. minimum*, and is cultivated like sweet basil. Basil vinegar is made by steeping basil plants in vinegar, which absorbs and retains their flavour. Sweet basil occurs in the old story of Isabella and the Pot of Basil, which has been the subject of works of art by Boccaccio, Keats, and several painters.

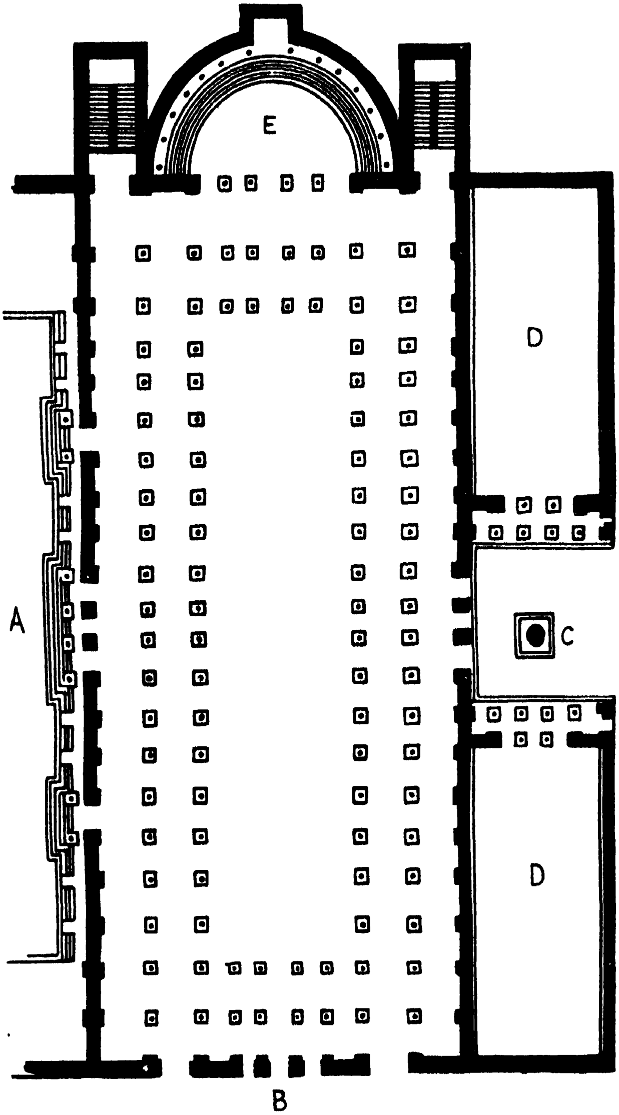
Basil, ST., THE GREAT (about 329-379), one of the fathers of the Greek Church, born at Cæsarea, of which he became bishop (370). He was much involved in the religious controversies of the time, an insight into which is afforded by his letters to Gregory Nazianzen, with whom he was united in tender friendship. He resolutely opposed Arianism. Threatened by Valens with exile and death if he did not open the churches to the Arians, he continued inflexible. To him is also largely due the triumph of monachism over the hermit life. He embellished Cæsarea, and raised in it numerous workshops and schools. The works he has left include the *Hexameron*, *Ascetics*, *Reading of Profane Authors*, and 365 *Letters*. His efforts at reforming the services of the church were embodied in the liturgy which bears his name, and is still in use in the East. There is a Benedictine edition of his works in 3 vols. (1739), and a complete French translation of his works in 12 vols. by Roustan (1847).

Basil, two Byzantine emperors. (**1.**) BASIL I. (867-886), born at Adrianople, assassinated Michael III. and seized the throne. Basil was founder of the Macedonian dynasty, and his reign opens a new era in the history of the Byzantine empire. (**2.**) BASIL II. (957-1025), Byzantine emperor, only six years old at the death of his father, Romanus II., became emperor in 976. For nearly thirty years (990-1018) he carried on a protracted struggle against Samuel, king of Bulgaria. For the ruthless severity with which he finally destroyed his rivals he was nicknamed 'Slayer of the Bulgarians.' He converted to Christianity Vladimir, the prince of Kiev (998).

Basilan, str. and isl., in Sulu Archipelago, Philippine Is., S.W. of Mindanao; 300 sq. m. in area; mountainous; valuable teak forests; pearl fisheries. Capital, Isabella. Pop. 12,000.

Basilica. (**1.**) The ancient basilica was that part of the palace wherein justice was administered to the people. These structures were first erected by the Romans in 184 B.C., and continued to be built by them to the end of the 3rd century A.D. They consisted of a long central hall or nave, with aisles the aisles being separated from the nave by pillars supporting the roof. At the end of the nave was a dais for the judges, who sat in a semicircular recess called an apse. The name was afterwards transferred to the first buildings for Christian worship. The term is also applied by Palladio to those buildings in the cities of Italy which are analogous to English town halls. (See APSE, ARCHITECTURE.) (**2.**) A code of laws begun by the Byzantine emperor Basil I., and completed by his son Leo VI., who issued it in sixty books in 887. In it was embodied much of Justinian's *Corpus Juris Civilis*. A good edition is *Basilicorum Libri LX. Gr. et Lat.*, issued by Heimbach (1833-50). See Haubold's *Manual Basilicorum* (1819), and Montreuil's *Histoire du Droit byzantin*.

Basilicata, the ancient Lucania, compartimento, S. Italy, coincident with the province of Potenza (name used since 1871), stretching from the head of the Gulf of Tarentum N.W. through the middle of Italy. It pastures sheep and cattle, and produces grain, wine, fruits, olive oil, and timber. Chief town, Potenza. Area, 3,845 sq. m. Pop. (1881) 524,504; (1901) 490,705.



Ground Plan of Ulpian Basilica in the Forum of Trajan, Rome.

A, Main Entrance from Forum. B, Entrance from street. C, Trajan's Column. D, Greek and Latin Libraries. E, Tribunal for the Judges (the Apse).

Basilicon, an ointment composed of yellow wax, resin, and olive oil, with suet and turpentine added for basilicon proper, black pitch for black basilicon, Burgundy pitch for yellow basilicon, and verdigris for green.

Basilides, founder of the Basilidian sect of the Gnostics, lived under the Emperors Trajan and Hadrian in Alexandria. He is the apostle of 'the Abraxas religion' and the doctrine of 'emanation.' From the Supreme Power, Abraxas, emanated mind; from mind, the word; from the word, providence; from providence, virtue and wisdom; from these two, principalities and powers; and from them, an infinity of angels—who, in turn, created the heavens, 365 in number. It is from this number (365) that the name Abraxas is formed, as its letters, according to the Greek computation, make up 365. The later Basilidians became more and more imbued with the philosophy of the Stoics, and they abandoned altogether that obedience to the moral law which their master strongly inculcated.

Basilikon Doron, a work on the art of government, written (1599) by James VI. of Scotland for his son Prince Henry, and memorable as containing the king's own statement of the doctrine of divine right.

Basilisk, the name given by the Greeks and Romans to a fabulous monster possessed of many marvellous attributes, its glance alone being sufficient to kill, and its breath being the concentration of the most deadly poisons. It has been applied by zoologists to certain American tree-lizards which, despite their hideous appearance, are both harmless and edible. In *Basilicus mitratus* the head is covered by a scaly, distensible cap, the so-called helmet.

Basim, munic. tn. in Berar, India, 145 m. S.W. of Nagpur; alt. 1,758 ft. Pop. (1901) 13,823.

Basin. A geological basin is found where the beds of rock dip or incline inwards on every side towards a centre, and is a form of syncline. Most of the British coal fields are basins; these are often very unsymmetrical, though in the S. Wales and Lanarkshire coal fields the structure is well shown. The uppermost beds occupy the centre of the area, while the edges or outcrops of the lower beds form more or less perfect circles around them; thus, the coal measures are surrounded by areas of millstone grit, and outside these by Carboniferous limestone. The beds were laid down in horizontal sheets, the basin structure subsequently developing by folding.

Basingstoke, par., munic. bor., and mrkt. tn., Hampshire, England, 14½ m. S.W. of Reading, on G.W. and L.S.W.R.; is the centre of an agricultural district, and has manufactures of agricultural implements. There are also breweries and cloth factories. The Basingstoke Canal, 37 m. long, begins here. The castle was burned by Cromwell in 1645. Acreage, 4,172. Pop. of munic. bor. (1901) 9,793.

Baskerville, JOHN (1706–75), English printer, born at Wolverley in Worcestershire. Without any special training he started type-founding (1750) and printing in Birmingham. His books are chiefly reprints, including Virgil (1757), Milton (1758), Juvenal (1761), Addison (1761), Horace (1770), and a Bible and Greek New Testament (1763). He was also the inventor of vellum paper.

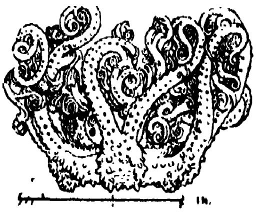
Basket, a vessel made of willows, osiers, twigs, or splits interwoven, mentioned frequently in the Bible, and represented in the monuments of ancient Egypt. The ancient Britons were famed for their baskets, which found favour in Rome after the occupation of Britain.

For the ordinary basket in modern use osiers and willows are generally used. These are either taken entire, cut from the root, split asunder, or only stripped of their bark, according to the nature of the work to be produced; in the latter case they are previously well soaked. The stripping is performed by drawing the willows through an iron-edged instrument called a 'brake,' which removes the bark, and the willows are then cleaned by means of a sharp knife. Next they are exposed to the sun and air, and afterwards placed in a dry situation. It is not less necessary to preserve willows with their bark in the same manner, submitting them, previous to use, to a thorough soaking in water for several days. The barked or white osier is then divided into bundles or fagots, according to size, the larger being reserved to form the strong work in the skeleton of the basket, and the smaller for weaving the bottom and sides. Should the latter be applied to ordinary work, they are taken whole; but for implements of slight and finer texture, each osier is divided into 'splits' and 'skeins.' Splits are osiers cleft into four parts by an implement consisting of two edge tools placed at right angles, whereby the rod is longitudinally divided down the pith. These are next drawn through a machine resembling the common spokeshave, keeping the grain of the split next the wood or stock of the shave; while the pith is presented to the edge of the iron, which is set in an oblique direction to the wood. In order to bring the split into a shape still more regular, it is passed through another instrument called an 'upright,' consisting of a flat piece of steel, each end of which is fashioned into a cutting edge like that of an ordinary chisel. The flat is bent round, so that the two edges approach each other at a greater or less interval by means of regulating screws, and the whole is fixed in a handle. By passing the splits between the two edges they are reduced to skeins, the thickness of which is determined by the interval between the edges of the tool.

The implements required by a basket-maker are few and simple. In making an ordinary basket, the osiers are laid out in a length considerably greater than that of the finished work. They are ranged in pairs on the floor parallel to each other, at small intervals, in the direction of the longer diameter; and this may be called the woof, for basket-work is, in fact, a web. These parallel rods are then crossed at right angles by two of the larger osiers, with the thick ends towards the workman, who places his foot upon them, and weaving each alternately over and under the parallel pieces first laid down, he confines them in their places. The whole now forms what is technically called the 'slat' or slate, which is the foundation of the basket. Next, the long end of one of the two rods is taken and woven under and over the pairs of short ends all round the bottom, until the whole is woven in. A similar process is applied to the other rod, and then additional long osiers are woven in until the bottom is of the desired size, and the woof is occupied by them. Thus the bottom, or foundation on which the superstructure is to be raised, is completed, and this latter part is accomplished by sharpening the large ends of as many long and stout osiers as may be necessary to form the ribs or skeleton. They are forced or plaited between the rods of the bottom, from the edge towards the centre, and are turned up in the direction of the sides; then other rods are woven in and out between each of them, until the basket is raised to the requisite height. The brim is finished by turning down the perpendicular ends of the ribs, while a handle is made by forcing two or three osiers, sharpened at the end, down the weaving of the sides, close together. They are then pinned fast about two inches from the edge. After the osiers have been bound or plaited the basket is complete.

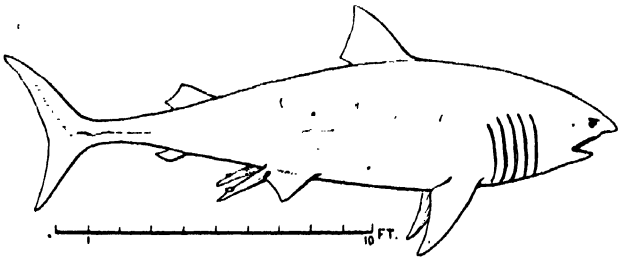
In many parts of the world houses, fences, and gates are formed of basket or wicker work; as also are screens, chairs, and trays. On the Continent there is still in use the Holstein wagon, composed of basket-work. Not a century ago the same material was employed in Britain for the bodies of gigs, and for an appendage of the stage-coach, which was called 'the basket.' In the United States a basket-work of rattan is, for its lightness, still used in the bodies of sleighs and pony phaetons.

Basket Ball is a popular game which James Naismith devised in 1891, in the United States. It is played in a space not exceeding 3,500 sq. ft., and oblong in shape. The opposing teams, each of five members, endeavour to throw the ball into the basket defended by the other, on much the same principle as that of football. The 'basket' is a net suspended at a height of 10 ft. from the ground, and the ball is an inflated bladder with a diameter of about 10 in.



Basket-Fish.

Basket-Fish, a group of the Echinodermata, the latter including also star-fishes, sea urchins, etc. The basket-fish belongs to the Ophiuroida, but is distinguished by the peculiar and elaborate ramification of its arms. Its body, which is five-sided, is 2 or 3 in. broad, while its arms are about 12 in. long. Its name is derived from its habit of folding its branching arms around itself when threatened, so that it resembles a basket. It is found in various parts of the ocean, especially in tropical waters.



Basking Shark.

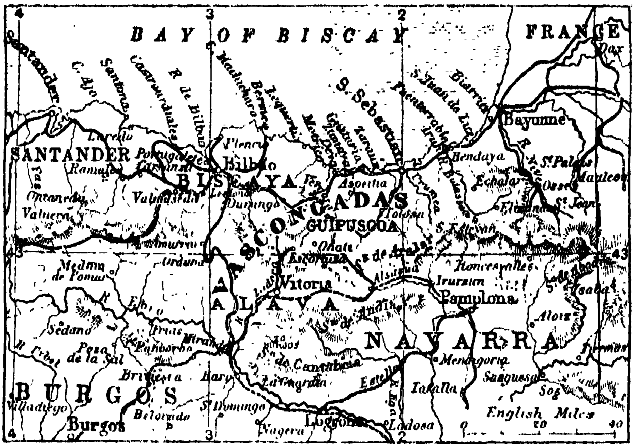
Basking Shark (*Selache maxima*), the largest shark of the Atlantic, exceeds thirty feet in length. It does not attack man unless molested, but feeds on small fishes. The liver yields oil, and the shark, which is not rare in British seas, especially off the west coast of Ireland, is hunted on this account. The common name refers to the fact that the animal is fond of lying at the surface of the water, with the upper part of the back exposed.

Basnage, Jacques (1653-1725), French Protestant clergyman; born at Rouen, where he became minister of the Reformed church. At the revocation of the Edict of Nantes he went to Rotterdam, where he was chosen (1691) pastor of the Walloon church; and in 1709 he was transferred, in the same capacity, to the French church at the Hague. He is one of the best of the church historians, his books being accepted by Catholics and Protestants alike. He published *Histoire de la Religion des Eglises Réformés* (1690; much enlarged in 1725), *Histoire de l'Eglise depuis Jésus Christ jusqu'à présent* (1699), and *Histoire des Juifs depuis Jésus Christ* (1706). See Mailhet's *J. Basnage* (1881).

Basoche, or Bazoche, a corporation of clerks of the Parliament of Paris, to which, about 1303, Philip the Fair granted special privileges, exempting its members from the jurisdiction of the common law. It survived to the revolution. See Fabre's *Etudes Historiques sur les Clercs de la Basoche* (1856).

Basque Road, The Action in. The French fleet, which had escaped from Brest, was, in April 1809, ranged below the island of Aix, and was there assailed by Lord Cochrane with a British fleet. The boom was broken by one of Cochrane's fireships. The French began hurriedly to get under way, and panic and confusion arising among them, all but two ran aground. The vessels actually destroyed beyond repair were three ships of the line, a 50-gun ship, and a 40-gun frigate. Had Cochrane been properly supported by Gambier, all would have been destroyed. See Cochrane's *Autobiography of a Seaman* (1890); Chatterton's *Memorials of Gambier* (1861).

Basques (Span. *Vascongados*), a race with a language out of relation to every other European language, whose habitat is now restricted to the west end of the Pyrenees, including, on the south side, the Spanish provinces of Biscaya, Guipuzcoa, and Alava, and the Pamplona district of Navarra; on the north, one-third of Basses-Pyrénées. A language of Basque type was in prehistoric times common to the inhabitants on both sides of the Pyrenees. Euskaldunac, Euskalderia, and Euskara are the native names of the people, country, and language respectively. The primitive Iberians have further, according to latest ethnographic evidence, to be grouped with the Ligurians of Italy, whose original home is traceable to the Mediterranean. The Ligurians, again, are, from evidence of craniology, archæology, etc., concluded to have been prehistorically settled in the valley of the Po and Rhineland. The Ligurians, it is further held, were spread over all Italy, as also Sardinia, Corsica, and Sicily. There are data lending colour to the conclusion that beyond the Garonne the Iberians shared community of race with the Pictones and the British Picts. Professor J. Rhys combines the Iberians and Picts in the term 'Ibero-Pictish.' Gabelenz has (1894) compiled 780 examples of verbal resemblance and structural correspondence between the Basque tongue on the north and the Berber tongue on the south of the Mediterranean. There seems ground, then, for the assumption that the Basques are descended from the aboriginal race of Europe.



The Basque Country.

The Basque language belongs to the agglutinative type, modifications of meaning and grammatical relations being denoted, not by inflection nor by prepositions, but by adjunction and postfix. It lacks general and abstract concepts. Basque has only two conjugations one for the intransitive verb, and to express the verb *to be*; the other for the transitive verb, and to express the verb *to have*. To the European the enunciation is about as hard as the grammar. The tongue is differentiated into as many as twenty-five dialects (L. L. Bonaparte), many mutually unintelligible.

R. Collignon, after most searching investigations, concludes that the physical traits of the Basques, out of all relation to those of any other type, assign them indisputably to the Hamitic branch of the whites, N. African or European (Afro-European). According to E. Reclus, 'there is no Basque type.' Among the Basques there are two forms of physique: the one tall, fair, and long-headed; the other short, dark, and round-headed. The two are blended in a long range of proportions, yet, on the whole, the Basques are rather taller than the average of the people of Spain. The prevailing type has the forehead broad and square, overhanging deeply-set eyes; cheek bones rather broad; the lower half of the face narrowing rapidly towards the pointed chin. The complexion is generally fair; the eyes gray or blue; with blond hair, high-ridged nose, upright figure, square shoulders, strong limbs. The Basques are further distinguished by their vigour and hardihood, sobriety and industry, gaiety, proneness to sing, dance, and play games, by their frankness, hospitality, pride, love of independence, and promptitude to avenge insult. They are noted as the best sailors of Spain. Peculiar are certain usages, such as the *couvade*, the wearing of the *béret* and the *cinta* (belt), etc. The Basque dramas, in large part survivals of the morality plays, still, in spite of curés, are yearly performed and witnessed with great enthusiasm in the French cantons of Tardets and Mauléon. Peculiar are also some of the agricultural implements.

On the seaboard the Basques are engaged in commerce and fishing; inland, in agriculture and pastoral pursuits. The Basque Provinces are the centre of the iron-mining of Spain.

Pamplona (*Pompeiopolis*) testifies to the foundation of this town by Pompeius (74 B.C.). The Romans did not, however, succeed in imposing their language on the Basques. Routed, after a long and obstinate resistance, by the Visigoths about 580, a portion of the Basques sought refuge in Gascony. About 920 the Basque countries were consolidated into the kingdom of Navarra, which was ultimately incorporated in the kingdom of Spain. The Basques still, however, retained their *fueros* or assemblies, one in each province, safeguarding their home rule. When, in 1832, the *fueros* were abolished by the Cortes, the Basques offered such stout resistance as to cause their reinstatement. In the insurrections of 1833-7 and 1873-6 the Basques fought gallantly for Don Carlos, grandfather and grandson. The *fueros* ended with the year 1876. They still, however, retain a certain administrative autonomy and some commercial privileges.

The literature of the Basques is of very narrow compass. A few words in Basque occur in L. Marineo Siculo's *Cosas illustres y excellentes de España* (1539). The oldest printed relic of the Basque tongue dates from 1545 - B. Dechepare's *Linguæ Vasconum Primitiæ*. There are some five hundred volumes in the Basque language, nearly all translations from Latin, French, and Spanish. Other Basque books betray the French or Castilian culture of their authors. The Basque dramas—*pastorales* - are, it appears from the discoveries of Mr. W. Webster, editions of French chap-books. The Basque traditionary legends, comprising forty-seven stories, have been published (1877) by Mr. W. Webster. There is a collection of wider range published by Vinson, *Le Folk-lore du Pays Basque* (1883). Ignatius Loyola and Francis Xavier were Basques.

The total population is reckoned at about 610,000, of whom 65,000 are in Bayonne, 60,000 in Mauléon, 150,000 in Navarra, 180,000 in Guipuzcoa, 10,000 in Alava, and 145,000 in Biscay. Of recent years there has been a heavy emigration, especially to the Argentine Republic, Mexico, and Cuba, where Basques are counted to the number of 200,000.

See Michel's *Le Pays Basque: sa Population, sa Langue* (1857); Garat's *Origines des Basques de France et d'Espagne* (1869); J. F. Bladé's *Études sur l'Origine des Basques* (1869); Gabelentz's *Die Verwandtschaft des Baskischen mit den Berbersprachen Nordafrikas* (1894); Gèze's '*De Quelques Rapports entre les Langues Berbère et Basque*,' in *Mém. Soc. Archéol. du Midi de la France*; '*La Civilisation Primitive dans la Sicile Orientale*,' in *L'Anthropologie* (1897); Cénac-Moncaut's *Hist. des Peuples Pyrénéens* (1874); Vinson's *Les Basques et le Pays Basque* (1882); Mahn's *Denkmäler der Baskischen Sprache* (1857); Prince L. L. Bonaparte's *La Langue Basque et les Langues Finnoises* (1862); Inchauspe's *Le Peuple Basque: sa Langue, son Origine*, etc. (1894); A. H. Keane's *Man, Past and Present* (1899).

Basra, Bassora, or Bussorah, tn. and riv. pt. on the Shat-el-Arab, 70 m. from Persian Gulf, Asiatic Turkey; head of navigation for steamers drawing nineteen feet of water. River steamers ply between this port and Bagdad, 200 m. farther N. The district around is marshy and unhealthy. The exports for 1903 exceeded 1¾ millions, the bulk of which was in barley and dates. Its imports consist of silk, woollen, and cotton goods. Founded in 632 by Caliph Omar, Basra was long one of the most important centres of trade, and a place of historic note in Arabic literature. It was visited by Marco Polo in the 13th century. Pop. 18,000.

Bas-reliefs from the Parthenon, Athens.

Bas-relief (Fr. 'low relief'), or Basso-rilievo (Ital.), in sculpture, a form of relief in which the figures or objects represented are raised upon a flat surface or background, slightly projecting, so that no part of them is entirely detached from it. When the figures stand out half of their proportions, the term used is *mezzo-rilievo* ('middle relief'); and when they project more than half, the words used are *alto-rilievo* ('high relief'). The finest known example of bas-relief is the frieze of the Parthenon, copied in the design of the Athenæum Club in London. Bas-reliefs were invented by the Egyptians, and their use in sculpture extended to India, Media, Persia, Greece, and Rome. See Sir C. Eastlake's *Basso-rilievo*.

Bass, in music, is the lowest and most important part of all harmony. In earlier times it was common to write the bass notes alone of a composition, and place figures to indicate the construction of each chord; this was termed a 'figured bass.' Bass is also the name given to the lowest male voice.

Bass, a Scottish term for fibrous door-mats, which are sometimes made from bast; also applied to a mat used for packing bales of goods, and to a mat on which hot dishes are placed at table.

Bass, or Basse, a fish allied to the perch, formerly much esteemed as food. All the European bass are marine, but in America fresh-water species occur. From the more familiar perch all differ in the somewhat smaller scales, the more elongated body, the roughened tongue, and the fact that the dorsal fins are farther apart from one another than in the perch. The common bass (*Labrax lupus*) is excessively voracious, and is not uncommon off the Irish coasts and the south coast of England. Together with two other species, it occurs in the Mediterranean. The American marine striped bass, or rockfish, affords excellent sport to the angler, as also do the two fresh-water black basses. All three are very good eating.

Bass, George (d. 1812), English explorer, was a native of Asworthy, Lincolnshire. After qualifying as a surgeon in London, he was appointed to H.M.S. *Reliance*, in which he served on the Australian coast with Flinders in 1795-1800. The strait between Tasmania and Australia which bears his name was, with Flinders Island, charted by the two officers in 1798. See Flinders's *Observations on the Coasts of Van Diemen's Land* (1801).

Bass, MICHAEL THOMAS (1799-1884), was a member of the great brewing firm (established in 1777) at Burton-on-Trent, where he was born. As a Liberal he sat in Parliament for Derby (1848-83), and took a lively interest in the welfare of the working classes. He acted as the friend of the railwaymen in the agitation of 1870.

Bassam, or GRAND BASSAM, tn. on Ivory Coast, W. Africa, at mouth of Como; gold dust, palm oil, and ivory. Pop. 2,500.

Bassandyne, or BASSENDYNE, THOMAS (d. 1577), was a printer and bookseller at the Nether Bow, Edinburgh, who issued the first Bible printed in Scotland. Bassandyne commenced with the New Testament, which bears his imprint on the title, and the date 1576; while the Old Testament bears the name of Arbuthnot, and the date 1579. See Dobson's *Hist. of the Bassandyne Bible* (1887).

Bassano, tn., prov. Vicenza, Italy, 53 m. by rail N.W. of Venice; stands on the high l. bk. of the Brenta, and is still surrounded with walls and dominated by a mediæval castle. It possesses a cathedral, manufactures straw hats and silk, and in the vicinity grows wine, olives, and asparagus. Here, in 1796, Napoleon defeated the Austrians. Bassano gave the title of duke to Maret, Napoleon's secretary of state. Pop. (1901) 15,097.

Bassano, or JACOPO DA PONTE (1510-92), Italian painter, called IL BASSANO from his birthplace; noted as the first Italian painter of *genre*, and of landscape treated in the modern spirit. In his Biblical subjects he introduced episodes of contemporary country life; his colouring is of fine Venetian quality; his horizons are bathed in delicate gray twilight. His best work is an altar-piece of *The Nativity*, in Bassano. Among his other works are—*Rest during Flight* (Ambrosian Library, Milan); *Assumption* (S. Luigi, Rome); *Presentation* (Pinacoteca, Vicenza); *The Good Samaritan*, once belonging to Sir Joshua Reynolds; two portraits in the National Gallery, London; and three pictures in Edinburgh. See Kugler's *Italian Schools of Painting* (Layard ed., 1887).

Basse, or BAS, WILLIAM (d. 1653), poet, was the author of numerous poems on country life. He lived most of his life near Thame, in Oxfordshire, as the retainer of a nobleman there. He is chiefly known by his *Epitaph on Shakespeare* (1633); and was also the author of *Sword and Buckler* (1602) and *Urania* (1653), though this latter has been assigned to a second William Basse. See Corser's *Collectanea Anglo-Poetica*, i. 199-208 (1860-83).

Bassein. (1.) Town in Thana dist., Bombay Presidency, India, 28 m. N. of Bombay. In 1534 it was ceded to the Portuguese by the king of Gujarat. In 1739 it was taken by the Mahrattas after a protracted siege, and in 1818 came under the British rule. It contains the ruins of a Portuguese fortress and of many churches. Pop. (1901) 10,702. (2.) Town in dist. of same name, Pegu division, British Burma, situated on the l. bk. of the Bassein R.; is said to have been founded in 1250 A.D. Pop. (1901) 31,372.

Basses-Alpes, dep., S.E. France, on W. slope of Alps, forming the Italian frontier on the N.E. The area is 2,685 sq. m. The whole department is drained by the Durance R. On all sides high mountains (reaching 10,000 ft.) surround it. The chief peaks are Chaîne du Parpaillon in the N., Mt. Pélat in the E., Mt. des Trois Evêches in the S. The climate is severe, except in the lower valleys, where even the olive tree grows. Good pastures are found, but deforestation has spoiled large tracts of mountains. The natural beauties of the department attract many visitors. Cap. Digne. Pop. (1901) 115,021.

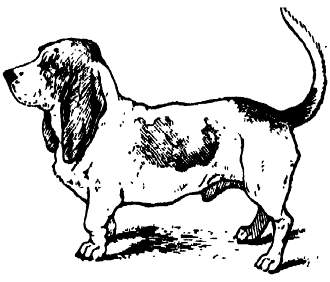
Basses - Pyrénées, the most S.W. department of France, forming the boundary of Spain along the ridge of the Pyrenees, and facing the Bay of Biscay for 17 m. between the Adour and the Bidassoa. The ridge of the Pyrenees rises slowly from W. to E.; the principal peaks are Pic du Midi d'Ossau (9,465 ft.) and Pic du Palais (9,765 ft.). Some twenty-six passes lead from France to Spain, including the famous Pass of Roncevaux. The department has about the same limits as the former province of Béarn, but the S.W. is really Pays Basque. The inhabitants, Basques and Béarnais, have for centuries kept their characteristic customs, especially in the mountainous districts. The plain of Béarn is well cultivated. Extensive forests clothe the mountains, and the streams yield abundance of fish. There are copper mines and stone quarries. Pau and Biarritz are noted health resorts. Area, 2,943 sq. m. Pop. (1901) 426,347.

Basse-Terre, seapt., S.W. side of Basse-Terre or Guadéloupe proper, W. half of Guadéloupe, W. Indies; cap. of island. Pop. (1901) 7,838.

Basseterre, seapt., S.W. side of St. Christopher (St. Kitts), Leeward Group, W. Indies; cap. of island, and has good trade, especially in sugar and salt. Pop. (1901) 9,962.

Basset Horn (Ital. *corno di bassetto*), a rich-toned wind instrument, invented in Bavaria about 1770. It is similar to and fingered like the clarionet, but has additional low keys and a prolonged bore, which enable it to sound the octave C, this being equivalent to F below the bass clef, as the instrument is tuned in F.

Basset Hound is an importation from France, where it is used to turn game out of cover. Its appearance is not in accord with the accepted standard of sporting requirements in Britain. With a long body, a heavy head, and the shortest and most crooked of legs, it seems to combine the foxhound's body, the bloodhound's head, and the dachshund's legs. It possesses, however, a wonderful scent, and a few packs are kept for hare-hunting in England, where the dog's slowness and inability to overcome obstacles are forgiven on account of its sagacity in the chase, which it wins by the sure, if slow, method of wearing down its quarry. The basset hound is marked like a foxhound, and there are smooth and rough varieties. The recognized points are: head long, narrow, and well peaked; ears of good length, curling inward, and set in low; eyes dark and well set, showing the haws; body long and low, with powerful shoulders and quarters; legs very short, with plenty of bone, the fore legs being crooked; stern carried gaily; colour black, white, and tan. The crook of the fore legs should incline inwards, giving the animal a grossly knock-kneed appearance. In France it is sometimes seen with straight legs, but English fanciers will not allow this formation. Her Majesty Queen Alexandra is a patron and exhibitor of basset hounds, which has doubtless helped to bring the breed into fashion.

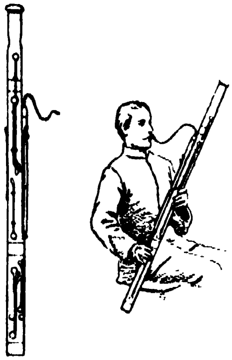


Basset Hound.

Bassia, a genus of tropical trees, found in the E. Indies and Africa, of the order Sapotaceæ. From the seeds of several species a vegetable oil much used in the manufacture of soap is obtained, and their fleshy flowers yield an intoxicating spirit when distilled. Three varieties of the

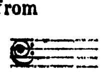
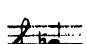
Indian butter-tree yield useful oils known as butters—*Bassia Parkii*, giving shea butter; *B. butyracea*, ghee butter; and *B. latifolia*, mahwa butter. These substances are used partly as medicines and food, partly for making candles and soap. From the bark, leaves, and oil of some species are extracted remedies for rheumatism and skin diseases. The timber is of excellent quality.

Bassompierre, FRANÇOIS DE (1579-1646), marshal of France and diplomatist, was born at Haroué in Lorraine. As colonel of the Swiss Guards, he served against the Turks in 1603, at the siege of Château Porcien in 1617, and took part in the sieges of Montpellier (1622) and La Rochelle (1628). He was sent on diplomatic missions to Spain (1621), Switzerland (1625), and England (1626). He incurred the suspicion of Richelieu, and was imprisoned in the Bastille from 1631 till the death of the minister in 1642. While there he wrote his *Journal de ma Vie* (1665; best ed. 1870-7), an interesting review of the years 1598-1631. See De Puymaigre's *Vie de Bassompierre* (1848).



Bassoon.

Bassoon, an important orchestral wood wind instrument, the successor of the bombard of the 16th century. It forms the bass of the whole family of wood wind instruments, among which it occupies a position similar to that of the 'cello among the strings. Like the oboe, it is played with a double reed, which is inserted and fixed in the S-shaped neck of the instrument. The compass extends from

 to 

though good solo players can bring out higher notes; and some bassoons have the low A, which Wagner has frequently used in his *Ring des Nibelungen.* Its upper notes have some affinity with those of the English horn and the 'cello, and sustained melodies in this part of the register are full of expressiveness. The lower notes are somewhat coarse. In general, the tone of the instrument is telling and peculiar. For the production of grotesque effects it is specially useful, having indeed been called 'the clown of the orchestra' (Prout). Haydn seems to have been the first to discover this quality of the bassoon. The most familiar example of the kind is, however, in the march in Mendelssohn's *Midsummer Night's Dream* music. In orchestral scores bassoon parts are written in the F and C clefs, and the instrument is generally designated by its Italian title, *fagotto*, a name applied to the bassoon from its resemblance to a fagot or bundle of sticks. See Prout's *The Orchestra* (1899).

Bassora. See BASRA.

Bass Rock, volcanic islet, mouth of the Firth of Forth, Haddingtonshire, Scotland, 3½ m. E.N.E. of North Berwick, opposite the Tantallon Castle of Scott's *Marmion.* Its area is 7 ac., and its culminating point, on N. side, is 350 ft. above sea-level. Favourite resort of solan geese; used in Covenanting times (1671-94) as a state prison. There is a lighthouse on the S. side of the rock. See Hugh Miller's *The Bass Rock: its History, Geology, etc.* (1848).

Bass Strait, running E. and W. between Tasmania and Victoria, Australia; named after Surgeon George Bass, of H.M.S. *Reliance*, who surveyed it in 1798. The breadth varies from 80 to 140 m., but navigation is interrupted by many islands and coral reefs.

Basswood, a name applied to the American lime tree, as the chief source of commercial bast.

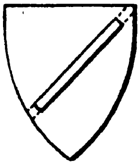
Bast, in botany, is a structural element in the stem of dicotyledons and gymnosperms. In most plants long, tough, elastic fibres form part of the bast, and it is on this account that it has economic value. The lime tree is specially rich in these fibres; and when the bark is removed the inner portion, or bast, is separated, and dried to form Russian bass or bast mats, which are used by gardeners. Strands of lime bast are also used for tying plants, but not so much as those of Cuban bast, which is derived from a tree of the mallow order. Flax, hemp, and jute are bast fibres of different plants. *Liber* is a term used for bast, but it is becoming obsolete. See Bevan and Cross's *Contributions to the Chemistry of Bast Fibres* (1880).

Basta, GEORG, BARON OF SULT (1550-1607), Austrian general, was born at Rocca, near Taranto, S. Italy, of an aristocratic Albanian family, and entered the Austrian army. After serving under Alexander Farnese in the Netherlands (1589-90), he was sent (1598) to occupy Transylvania. His harsh administration brought about insurrections in 1603 and in 1604, both of which he ruthlessly suppressed.

Bastar, native state, India, at the S. extremity of the Central Provinces; has an area of 13,062 sq. m., is covered with jungle, and more than half the inhabitants are a timid, harmless race of aborigines of Gond origin. Pop. (1901) 306,501.

Bastard. By English common law, a child born out of wedlock of parents domiciled in England is a bastard. By Scots law, a bastard may be rendered legitimate by the subsequent marriage of his parents. England refused this legitimization by the Provisions of Merton (1235). It is an exaggeration to say that a bastard is by law *filius nullius*, for both by Scots and English law he is capable of incest. But for purposes of succession it is true. If he dies intestate, without wife or child, his property passes to the crown; but it is the practice to waive this claim in favour of any one who can establish a moral or equitable claim to the property within twenty years. Such waiver is known as a 'gift of bastardy' (*cf.* Intestates' Estates Act, 1884, and 59 Geo. III. c. 94). Before 1836 a bastard in Scotland could not bequeath movables by will. A child born in wedlock is presumed to be legitimate, but evidence to the contrary may be given, though not by the parents. The Legitimacy Declaration Act, 1858, enables any British subject (under certain conditions) to present a petition to the English Divorce Court, or to commence an action of declarator before the Court of Session in Scotland, claiming a declaration that he is legitimate, or that his marriage is valid. The court may require any interested parties to be cited, and the declaration shall not prejudice any person who is not cited, except the heir-at-law or the next-of-kin of the petitioner. By the Registration Act, 1874, a bastard may not be registered in his father's name, except by his father's consent. See AFFILIATION, ALIMENT, DOMICILE, MARRIAGE.

Bastard Bar, in heraldry, an obsolete and somewhat misleading designation for the symbol of illegitimacy. The figure to which this term is applied is properly called the *baton.* As the *bar* proper is a horizontal and not a diagonal figure, it can be neither dexter nor sinister, so that a *bar sinister* is, in English heraldry, an impossibility. The size (*i.e.* width) of the baton is half that of the scarp, which in its turn is half that of the bend sinister.



Bastard Bar.

Bastard of Orleans. See DUNOIS, JEAN.

Basti, tn., N.W. Provinces (United Provs. of Agra and Oudh), India, 120 m. by rail E. of Lucknow. Pop. (1901) 14,761.

Bastia, dist. tn., Corsica, on the N.E. shore, 120 nautical m. from Nice, with a poor harbour, but a brisk trade in fish, fruit, oil, and marble. Here, during the siege of 1794, Nelson lost an eye. Pop. (1901) 25,425.

Bastian, ADOLPH (1826 1905), German ethnologist, was born at Bremen. In 1851 he went to Australia as a ship's surgeon, and during the next eight years travelled over a great part of the world. He was appointed keeper of the Ethnological Museum, Berlin, in 1868, and lecturer on ethnology in the university there in 1869. In conjunction with Virchow he founded the *Zeitschrift für Ethnologie*, the organ of the Berlin Anthropological Society. His greatest work is *Die Völker des östlichen Asien* (1866 71), a colossal collection of facts of religious, ethnological, and psychological interest. His other works, huge congeries of facts, without much attempt at order, include *Der Mensch in der Geschichte* (1860), *Die Kulturländer des alten Amerika* (1878 89), *Der Buddhismus in seiner Psychologie* (1882), *Religionsphilosophische Probleme* (1884), *Indonesien* (1884-94), *Kulturhistorische Studien* (1900), *Der Menschheitsgedanke durch Raum und Zeit* (1901), and some fifty other books.

Bastian, HENRY CHARLTON (1837), English physician, born at Truro; studied at University College, London, and was professor of pathological anatomy there from 1867-87, and professor of medicine from 1887-95. He is an authority on the pathology of the nervous system, and is also known as an advocate of the theory of the spontaneous generation of life among the lower organisms. His publications include *The Modes of Origin of Lowest Organisms* (1871); *The Beginnings of Life* (1872); *Evolution and the Origin of Life* (1874); *Clinical Lectures on the Common Forms of Paralysis from Brain Disease* (1875); *The Brain as an Organ of Mind* (1880); *Paralyses Cerebral, Bulbar, and Spinal* (1886); *A Treatise on Aphasia* (1898).

Bastiat, FRÉDÉRIC (1801 50), French political economist, born at Bayonne. He took a lively interest in the struggles of the English 'Anti-Corn Law League,' and in 1844 he published *De l'Influence des Tarifs Français et Anglais sur l'Avenir des Deux Peuples.* He visited England in 1846, and on his return founded at Bordeaux the first free-trade association in France. But health failing he retired to Italy, where he died. His best-known writings are *Cobden et la Ligue* (1845); *Sophismes Economiques* (1847; latest Eng. trans. 1888); *Propriété et Loi* (1848); *Justice et Fraternité* (1848); *Propriété et Spoliation* (1850): *L'Etat* (1849); *Protectionisme et Communisme* (1849); *Gratuité du Crédit* (1850). *Les Harmonies Economiques* (1850; 10th ed. 1893) was translated into English by Dr. P. J. Stirling. His works, which are full of wit and wisdom, and strongly antagonistic to all forms of protection and socialism, were collected and published by Paillottet (1881). See Bondurand's *F. Bastiat* (1879).

Bastide, JULES (1800 79), a French republican politician and author, who opposed the Orleans dynasty by sword and pen, was condemned to death in 1832, but escaped to England. After his pardon, in 1834, he returned to Paris, and again engaged in politics, advocating republicanism in the *National* and the *Revue Nationale*, which he had established. In 1848 he acted as foreign minister for six months. Among his works are *Histoire de l'Assemblée Législative* (1849); *Histoire des Guerres Religieuses en France* (1859).

Bastien-Lepage, JULES (1848-84), French realistic painter, studied at the Ecole des Beaux Arts, Paris, under Cabanel. He served during the war 1870-1 as a *franc-tireur* under the painter Castellani. He loved open-air nature, and painted the rustic life of his childhood. He was no student of sunshine, but preferred gray skies and quiet tones, and used a high horizon line. Among his chief works are: *La Petite Communiante* (1875); *Les Foins* (1878); a portrait of *Sarah Bernhardt* (1879). In 1879 he went to London to execute the portrait of the Prince of Wales (1879); and seizing the opportunity to study London street life, he painted the *London Bootblack*, a *London Flower-girl*, and later the *Thames at London* (1882). In 1881 he painted *The Beggar*, one of his best productions; *Love in the Village* in 1883, and *The Forge* in 1884. His influence on modern painting was far-reaching and beneficial. See André Theuriet's *Bastien-Lepage: l'Homme et l'Artiste* (1885; Eng. 1892); Brownell's *French Art* (1902); Julia Ady's (Cartwright) *Bastien-Lepage* (1895); and Fourcauld's *Bastien-Lepage: sa Vie et ses Œuvres* (1885).

Bastille, a term applied in the middle ages to a tower or bastion, and sometimes to the movable wooden tower otherwise called a *berfry.* In modern times the word has the general sense of a prison; but this signification is derived from the great and dreaded Bastille of Paris, in which, from the time of Richelieu onwards, persons obnoxious to those in high place were summarily incarcerated on the strength of a *lettre de cachet.* It fell before the fury of the mob in 1789. Although in its later days more definitely a prison, the Bastille of Paris was originally a fortress, built in the latter part of the 11th century as one of the fortifications of Paris. For the story of its downfall see Carlyle's *French Revolution* (ed. 1902) and Dickens's *A Tale of Two Cities* (ed. 1902). See also Bingham's *Bastille* (1888), Funck-Brentano's *Légendes et Archives de la Bastille* (new ed. 1900), Bournon's *La Bastille* (1893), and *Archives de la Bastille*, ed. Ravaisson (17 vols. 1866-92).

Bastion, a fortification so designed that a flanking fire could be directed along every rampart and ditch from other parts of the same fort. It was introduced in the 15th century to bring a cross-fire to bear on the attackers' artillery; but when the power of guns increased so that they could be withdrawn to a great distance, a cross-fire was no longer possible, and the main object of the bastion disappeared.

Basurhat, tn., dist. of Twenty-four Parganas, Bengal, India, 30 m. N.E. of Calcutta. Pop. (1901) 17,001.

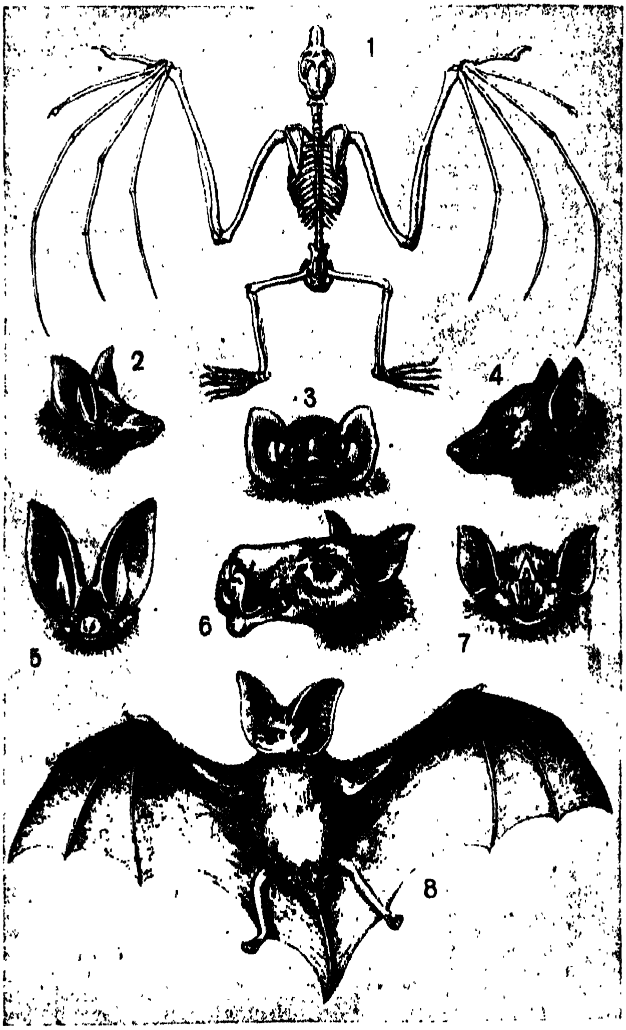
Basutoland, native territory on the N.E. of Cape Colony. Area, 10,293 sq. m., with a pop. of (1904) 349,000, of whom all were natives except 900. The whole district is mountainous, and the Maluti ranges, part of the Drakenberg, occupy most of the area. The Basutos are practically autonomous, living under their own chiefs and headmen. In 1868 they were taken under British protection by Sir P. Wodehouse, and then annexed to the Cape Colony in 1871 by Sir H. Barkly. In April 1880 an act was passed for their disarmament; but the Basutos, availing themselves of the natural ramparts of their country, such as Thaba Bossigo, defended themselves vigorously. In 1884 the imperial government took the Basutos over again. Cap. Maseru; pop. (1901) 960. The wealth of the Basutos lies in their corn, sheep, goats, oxen, and ponies, the latter a very hardy kind. See Widdicombe's *Fourteen Years in Basutoland* (1892); Mrs. Barkly's *Among Boers and Basutos* (4th ed. 1900); Lagden's 'Basutoland and the Basutos,' in *Colonial Institute Journal* (1901).

Basyle, in chemistry, the simple or compound which forms the electro-positive constituent of a salt.

Bat. Bats (*Chiroptera*) are mammals possessing the power of flight, but otherwise nearly related to insectivores. In structure the wing differs markedly from that of a bird, being formed by a membrane stretched over the greatly elongated fingers, and extending between the hind limbs, and even involving the tail in some cases. The thumb is short and clawed, and takes no part in the formation of the wing. As is only to be expected in a flying animal, the shoulder girdle is strongly developed, but the pelvis and hind limbs are weak, and owing to the way in which the latter are involved in the wing membrane, they are not adapted for terrestrial progression, bats being purely aerial forms. Though the brain is not highly developed, the senses are exceedingly acute, and specially sensitive outgrowths of skin are often present on the head, forming 'nose-leaves.' Bats are widely distributed over the surface of the globe, are nocturnal in habit, and are divided, according to their diet, into two sub-orders —(1) Megachiroptera, large fruit-eating bats, in which the tail, if present, is not involved in the membrane connecting the hind limbs: examples, the flying foxes (*Pteropus*). (2) Microchiroptera, small insect-eating bats, in which the tail, when present, is involved in the membrane connecting the hind limbs—*e.g.* the horse-shoe bats (*Rhinolophus*), the pipistrelle bats (*Vesperugo*), the common bats (*Vespertilio*), and the American vampire bat (*Desmodus rufus*). Of these, the Megachiroptera are confined to the warm regions of the eastern hemisphere, while the Microchiroptera are widely distributed in both hemispheres.

Bataan, or RINCONADA, prov., Luzon I., Philippines, lies W. of the Bay of Manila; has marble quarries, and produces rice, sugar, etc. The capital is Balanga, on the E. side (pop. 9,000). Pop. over 50,000.

Batak, or BATTA, people of Sumatra, E. Indies, belonging ethnologically to the Malay family, and probably one of its oldest divisions. They are taller and more muscular than the Malays generally, democratic in their institutions, and heathens in religion. On certain ceremonial occasions they are addicted to cannibalism; but they show a relatively high civilization, and have books of tree-bark. Their dialect of Malay shows close affinities with the language of the Hovas in Madagascar. They have maintained themselves in independence of the Dutch. At the present time they dwell for the most part on the plateau of Toba (2,560 ft.). Their total number is probably about 250,000. See the classic work of Junghuhn, *Die Battälander* (2 vols. 1847); A. C. van Ophuisen, in *Bijdragen tot Land-, Taal-, en Volkenkunde* (1886), with specimens of Batak poetry; J. B. Neumann, in *Tijdskrift* of the Amsterdam Geog. Soc. (1886); and J. von Brenner's *Besuch bei den Kannibalen Sumatras* (1894).



Bats.

1. Skeleton of fruit bat (*Pteropus jubatus*). 2. Mouse-coloured bat (*Vespertilio murinus*). 3. Noctule (*Vesperugo noctula*). 4. Kalong (*Pteropus edulis*). 5. Long-eared bat (*Plecotus auritus*). 6. Hammerheaded bat (*Hypsignathus monstrosus*). 7. Greater horse-shoe bat (*Rhinolophus ferrum-equinum*). 8. Geoffroy's nyctophile (*Nictophilus Geoffroyi*).

Batala, munic. tn., Gurdaspur dist., Punjab, India, 55 m. N.E. of Lahore. Cotton, silk, and leather goods. Pop. (1901) 27,365.

Batalha, tn., dist. Leiria, Portugal, 6 m. S.W. of Leiria; has a famous Dominican monastery, built to commemorate the victory of Aljubarrota (1385). In the church are the tombs of Kings John I. and II., Edward, and Alphonso V., and of Prince Henry the Navigator. Pop. (1900) 3,869.

Batan, port on N. coast of Panay I., Philippines. Pop. (1898) 12,908.

Batang. See Battam.

Batangas, prov. (1,153 sq. m.) in s.w. part of Luzon I., Philippines. The productions are cacao, coffee, and rice; the manufactures include cotton, silk, and abaca. Pop. over 210,000. The town of Batanga, in the s.w. of the above province, overlooks Batangas Bay, is well built, and has a pop. of nearly 40,000.

Batatas. See Sweet Potato.

Batavi, according to some a Celtic, but more probably a German tribe (Tacitus says they were an offshoot of the great German tribe of the Chatti), who originally inhabited the 'island of the Rhine'—*i.e.* the land between the Rhine, the Waal, and the Maas. Eventually they became merged with the Franks.

Bath—Remains of Roman bath (55 B.C.).

Batavia. (1.) Ancient name for Holland. (2.) Province, Java, near the W. extremity; has an area of 2,598 sq. m., and a pop. (1896) of 1,313,383, of whom 12,434 were Europeans, 1,215,013 natives, and 82,510 Chinese. (3.) Capital of Dutch East Indies, and chief tn. of Java, on the N. coast of this island, in 106° 48′ E. long. and 6° 8′ S. lat., near its W. end. It consists of an unhealthy old town built in the orthodox Dutch style, and a fairly healthy upper town (Weltevreden), in which are the chief buildings of interest—the governor-general's palace (1828), museum of the Batavian Society of Arts and Sciences, etc. Pop. 115,567 (1896), of whom 9,423 were Europeans, 76,751 Javanese and Sundanese, 26,433 Chinese, and 2,828 Arabs. Batavia is the principal trading centre of the Dutch possessions in the East. Its port is at Tanjong Priok, 6 m. to the N.E., where new harbour works were constructed in 1877-86. Batavia was founded by the Dutch in 1619, and from 1811 to 1816 was in the hands of the British. (4.) Capital of Genesee co., New York, U.S.A., on Tonawanda Creek, 37 m. N.E. of Buffalo, and 32 m. S.W. of Rochester; manufactures farm implements, and is the seat of the state Institute for the Blind. Pop. (1900) 9,180.

Batavian Republic, the name under which the Netherlands were known from 1795 to 1806, after the invasion by the French under Pichegru.

Batchian. See Batjan.

Bateman, Sir Frederic (1824-1904), English physician, a native of Norfolk, and a graduate (1850) of Aberdeen University. His chief contributions to medical science are *Aphasia, and the Localization of Speech* (1870); *Darwinism tested by Language* (1877); and *The Idiot: his Place in Creation.* He was knighted in 1892.

Bateman, John Frederic La Trobe- (1810-89), British civil engineer whose name is specially associated with the supply of water to large towns. Among the numerous schemes he carried through were reservoirs on the Bann R. in Ireland (1835); the Manchester water supply from Longdendale in the Pennines (1844), and afterwards from Lake Thirlmere (1879); and the Glasgow water supply from Loch Katrine (1856-60). Bateman also suggested a scheme and surveyed the route for a supply for London from the Severn valley (1865).

Bateman, Kate Josephine (1842), daughter of Sidney F. Bateman, after achieving considerable success on the American stage, came over to England in 1863. In her first venture as Leah in the German play *Deborah*, at the Adelphi, she attracted favourable notice. Later she impersonated Medea (1872), Lady Macbeth (with Henry Irving) in 1875, Queen Mary (1876).

Bateman, Sidney Frances (1823-81), actress, was born in New York; her father was an English actor who had settled in America. She was the author of several plays, and was, with her husband, the predecessor of Henry Irving in the management of the London Lyceum.

Bates, Harry (1850-99), English sculptor, born at Stevenage; studied at the Lambeth School of Art under Jules Dalou, and later at the Royal Academy schools, where, in 1883, his *Socrates teaching the People* won the gold medal and travelling studentship. This took him to Paris, where he worked under Rodin. His chief works are *Pandora* (Tate Gallery), and statues of Queen Victoria (Dundee) and Lord Roberts (Calcutta).

Bates, Henry Walter (1825-92), English naturalist, known especially as the author of *The Naturalist on the Amazons*, was born at Leicester. Trained for commerce, he early decided to devote his life to the study of natural science. From 1848 to 1859 he was in Brazil, part of the time with his friend Alfred Russel Wallace, exploring the Upper Amazon region, and making a vast and valuable collection of specimens, entomological and botanical, of which the greater number (8,000) were new discoveries. Charles Darwin was indebted to him for a wealth of illustration for his theory of natural selection. Bates's *Naturalist* appeared in 1863, and in the following year he was appointed assistant secretary of the Royal Geographical Society, an office which he held till his death. The 1892 edition of his *Naturalist* has a Memoir by Edward Clodd.

Batesar, tn., Agra dist., N.W. Provinces, India, 35 m. S.E. of Agra. A commercial fair held here attracts 150,000 persons.

Bath, a handsome city, co., munic. and parl. bor., and wat.-pl. in Somersetshire, England, beautifully situated on the river Avon, 11 m. S.E. of Bristol, on the G.W., Midland, and L. & S.W. Rys. The Avon and the Kennet canals connect it with the Thames. From very early times Bath was celebrated for its hot springs. The Romans, as shown by excavations since 1875, founded a city here, to which they gave the name of Aquæ Solis, and erected, in the reign of Claudius, magnificent baths. The Abbey Church, built in 1499, during the reign of Henry VII., stands on the site of a Roman temple dedicated to Minerva. The hot springs are chalybeate and saline,

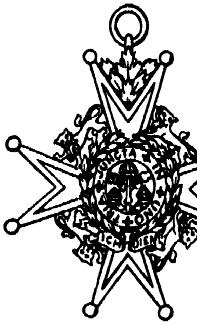
Roman Baths at Pompeii (restored).

1. The waiting-room. 2. The cold plunge. 3 The court. 4. The hot bath.

and the daily outflow is nearly 185,000 gallons. The pump-room attached to the 'king's bath' was built in 1797, at the suggestion of the celebrated Beau Nash. Bath, and its life in the 18th and early 19th centuries, are described in the books of Fielding, Smollett, Jane Austen, and Dickens. The title of Bishop of Bath and Wells was adopted by Gilbert in the 12th century, and the bishopric includes nearly the whole county of Somerset; the palace and cathedral, however, are at Wells. The borough returns two members to the House of Commons. Pop. (1901) 49,839.

Bath, city, Maine, U.S.A., county seat of Sagadahoc co., situated on the Kennebec R., 12 m. from its mouth. Its principal industry is shipbuilding, and some of the largest war vessels in the United States navy have been built here. Pop. (1900) 10,477.

Bath, ORDER OF THE. In 1725 the Most Honourable Order of the Bath was instituted (or revived) by George I. It consisted of a grand-master and 36 companions, and was purely military. In 1815 it was remodelled and made to consist of three classes. (1.) Knights Grand Commanders (G.C.B.). (2.) Knights Commanders (K.C.B.). (3.) Companions (C.B.). In 1847 it was extended by the admission of civil knights, commanders, and companions. At present the ordinary membership is limited to 55 military and 27 civil G.C.B., 145 military and 105 civil K.C.B., 705 military and 283 civil C.B. The badge (larger for Class 2, larger still for Class 1) represents, in gold and enamel, a rose, thistle, and shamrock issuing from a sceptre between three imperial crowns, with the motto of the order (*Tria juncta in uno*) in a red circle. The military badge is cross-shaped, the civil oval. The military G.C.B. badge has a laurel wreath also. The ribbon is red. See Selden's *Titles of Honour* (3rd ed. 1672), Nicolas's *British Orders of Knighthood* (1841-2), J. H. L. Archer's *Orders of Chivalry* (1871), C. N. Elvin's *Handbook of Orders of Chivalry* (1894).



Badge of the Order of the Bath.

Bathbrick, a material used for polishing or scouring metallic vessels, knives, etc.; made into friable bricks at Bridgwater, Somerset, from the fine siliceous sand found in the river Parret.

Bath Club, a social club, which has also swimming and gymnastics for its objects, with premises at 34 Dover Street, London, and at Berkeley Street for ladies. The club was established in 1894, and its membership is 1,750. The subscription is ten and eight guineas for gentlemen, and seven guineas for ladies. The entrance fees are fifteen and five guineas respectively.

Bathgate, par. and tn. in Linlithgowshire, Scotland, on N.B.R., 20 m. S.W. of Edinburgh, and 6 m. S.W. of Linlithgow. Coal mines and paraffin works employ most of the inhabitants. Pop. (1901) par. 14,004; tn. 7,549.

Bathometer. See OCEANOGRAPHY.

Bathori, name of an old aristocratic family of Transylvania, who gave to that province several princes, and to Poland one king. STEPHEN (1533-86), after ruling Transylvania for four years (1571-75), was elected king of Poland.—SIGISMUND (1573-1613) became prince on the death of his father, Stephen (1586). He was dominated by the Jesuits, and in 1596 yielded the throne of Transylvania to Rudolf II., emperor of Austria, in exchange for certain possessions in Silesia, the dignity of cardinal, and a life pension.—ELIZABETH (d. 1614), a niece of Stephen Bathori, king of Poland, was reputed to be a werewolf, and during the years before her imprisonment in the fortress of Csejte, in the co. of Nyitra, in 1610, was said to have caused many young girls to be murdered in her dungeons, that she might renew her youth by bathing in their blood. See Baring-Gould's *Book of Werewolves* (1865).

Bathos, a ridiculous descent from elevated language to commonplace or absurdity; or a ludicrous want of correspondence between a writer's thought and his expression of it. The finest specimens of bathos in English are to be found in the *British Album*, a collection of poems of the Della Cruscan group, compiled by Bell in 1790 from the columns of the *World* newspaper. One of these reads—

> 'Disordered, lost, from hill to plain I run,
> And with my mind's thick gloom obscure the sun.'

Dr. Brewer in his *Dictionary of Phrase and Fable* cites the following well-known lines:—

> 'And thou, Dalhousie, the great god of war,
> Lieutenant-general to the Earl of Mar.'

Alexander Pope wrote *A Treatise of the Bathos, or the Art of Sinking in Poetry;* and Swift and Arbuthnot collaborated on a work on the same subject.

Baths and Bathing. The Jews, Mohammedans, and Buddhists observe bathing as a rite; the bath, in religious ceremonial, has always been first inculcated in hot climates, where chiefly it is of sanitary value. The Pentateuch and the Koran are full of references to bathing. Both the *Iliad* and the *Odyssey* speak of the hot bath, and the Greeks are believed to have been the first people to use hot air for bathing purposes. From them the Romans adopted the hot bath, having previously used the swimming bath and cold bath only. The Roman baths were popular lounges; and those of Herculaneum and Pompeii, besides those built by Caracalla in Rome, are examples of the most enduring workmanship of those times. The last named provided accommodation for 2,000 bathers.

The very young and the very old cannot bear extremes of temperature, neither can those who suffer from heart disease or a tendency to apoplexy. The cold-water bath (temp. 65° F. and less) is suitable for regular use as a nerve tonic and stimulant for the average adult, but only for a few minutes at a time. Cold baths of longer duration are used, on account of their depressing effect, to lower high temperature. In the case of weakly persons the water should be warm (say 100° F.) at starting, and the temperature gradually lowered by adding cold water. Temperature continues to fall after the long-continued cold bath is ended, so that patients should always be removed when their temperature has dropped to 100° F. The cold bath cleanses no more than the skin surface. The hot-water bath (temp. above 100° F.) acts upon the skin and the cutaneous nerves, and thereby on deeper structures. The special liability to chill after a hot bath should be guarded against, either by finishing with a cold spray or plunge, to restore tone to the capillaries, or by taking the bath immediately before bedtime. Water that cannot be comfortably endured by the nurse's elbow is too hot for any infant. Hot baths are useful for children in convulsions, mustard being added in the proportion of two tablespoonfuls to the gallon, and cold water being poured over the head.

It is probable that the good effect attributed to many fashionable spas and watering-places is due, except in the case of skin diseases, not so much to the local action of salts dissolved in the waters, as to the internal use of the waters, to the change of air and scene, and to more rational diet and exercise, as well as to the temperature, pressure, and mechanical stimulus of the bath. The Nauheim baths have recently been recommended for acute heart disease.

In the preparation of artificial baths, salt and mustard are often added. Brine and Tidman's sea salt are used for their stimulating effect on the skin, and mustard is effective in dilating the skin capillaries in order to relieve internal congestion or to reduce fever. See Braun and Weber's *Curative Effects of Baths and Waters* (1875), Macpherson's *Baths and Wells of Europe* (1888).

Baths and Washhouses Acts, 1846 and 1878. These acts may be adopted in England by any borough governed by the Municipal Corporations Act, 1882, by any metropolitan borough (under the London Government Act, 1899), by the parish meeting of a rural parish (Local Government Act, 1894), and by any urban authority (Public Health Act, 1875). They authorize the erection or purchase of public baths, washhouses, drying-grounds, and open or covered swimming-baths, which may be turned into gymnasia in winter. Certain fees may be charged; and the number of baths for the labouring classes must be twice the number of any higher class of public bath. Rates may be levied. In Scotland, similar provisions may be made in burghs and towns, under the Burgh Police (Scotland) Act, 1892, and the Public Health (Scotland) Act, 1867; and in counties by district committees, under the Local Government (Scotland) Act, 1894.

Bathsheba ('daughter of the oath'), wife of Uriah the Hittite, afterwards of David, and mother of Solomon. Though the manner of her admission into the royal line was altogether shameful (2 Sam. 11), she rose to great power (1 Kings 1). Some suppose that she was a granddaughter of Ahithophel (*cf.* 2 Sam. 11:3 with 23:34), whose desertion of David would then be naturally explained as dictated by revenge for David's crime. See commentaries on 2 Samuel.

Bath-stone, a light yellowish limestone dug from quarries in the Lower Oolite, in Somerset and Wiltshire, England, and much used as building material. The stone is easily quarried and dressed, hardens on exposure to the atmosphere, but it is not of a durable nature.

Bathurst. (1.) Chief tn. of the W. district of New South Wales, Commonwealth of Australia, on S. bank of Macquarie R. (alt. 2,153 ft.), 145 m. by rail W. of Sydney. The industries include tanning and flour-milling. There are Anglican and Roman Catholic bishops. Pop. (1901) 9,227. (2.) Town of W. Africa, cap. of the British colony of Gambia; stands on W. side of the estuary of the Gambia. Not healthy during the rainy season, July to September. Pop. about 7,000. (3.) District and tn. in the E. of Cape Colony, lying on the coast between Bushman R. and Great Fish R.

Bathurst, ALLEN BATHURST, FIRST EARL (1684–1775), English politician. He disparaged Marlborough and opposed Walpole, but was a generous patron of literature—*i.e.* of Swift, Addison, Pope, Arbuthnot, Gay, Prior, Congreve, and others. In 1711 he was made Baron Bathurst, and Earl in 1772. HENRY, the second earl (1714–94), was Lord High Chancellor (1771–8). HENRY, the third earl (1762–1834), was Secretary for the Colonies (1812–28). To the same family belonged Henry (1744–1837), bishop of Norwich (1805).

Bathybius, a name given by Huxley to a supposed organism found in some preserved examples of deep-sea ooze obtained by Captain Dayman in 1857, while dredging in H.M.S. *Cyclops*, in connection with the laying of the Atlantic cable. Huxley's description was published in the *Quarterly Journal of Microscopical Science* in 1868, and greater publicity was given to the subject at the meeting of the British Association in the same year. Eventually it was shown by the *Challenger* that the substance in question was nothing but a precipitate of gelatinous calcium sulphate, thrown down by the addition of strong alcohol to deep-sea ooze, owing to the presence of sea water in the interstices of the ooze—the sea water, of course, containing calcium sulphate. The precipitate so formed bears considerable resemblance to protoplasm, and the fact that some organic substance is present in the ooze rendered the error the more easily made. Haeckel, on the other hand, still holds that organisms analogous to Huxley's bathybius occur in the ocean depths. In 1876, again, Dr. Bessels dredged up from the bottom of Smith Sound a similar substance, to which he gave the name of proto-bathybius.

Bathymetry, the measurement of depths. See OCEANOGRAPHY.

Baticaloa, or BATTICALOA, tn., E. prov. Ceylon, India, on E. coast, 70 m. S.E. of Trincomali. Good harbour. Pop. (1901) about 8,000.

Batignolles. See PARIS.

Batik, or BATTIK, a cotton stuff made in India and the E. Indies, on which patterns are impressed by waxing them over and dyeing the unwaxed parts. In Holland the same process is applied to silk, velvet, etc.

Batjan, BATCHIAN, or BATSHIAN, isl., Dutch E. Indies, one of the Moluccas, lies S.W. of Jilolo (Halmahera). Mountainous and well wooded. Gum-copal (damar) and coffee. Area, 1,050 sq. m. Pop. about 12,000.

Batley, par. and munic. bor., W. Riding, Yorkshire, 1½ m. N. of Dewsbury, and 8 m. S.W. of Leeds, on the L. & N.W.R. The town was created a municipal borough in 1868. There are numerous factories of shoddy and woollen cloth. The parish church, All Saints', was founded in 1482. Building-stone and coal are found in the neighbourhood. Acreage, 6,286. Pop. of par. (1901) 30,321.

Batman, a term used in the British army, originated in *bât*, a pack-saddle, but is now applied to a groom.

Batman, JOHN (1800–40), the founder of the colony of Victoria, was born at Paramatta, N.S.W., and first settled in Tasmania as a farmer. He was leader in the negotiations with the natives by which they made over, in 1835, the area on which Melbourne now stands. See Fox-Bourne's *Story of our Colonies* (1888).

Batna, vil., Algeria, 62 m. S.W. of Constantine, on the railway to Biskra, at the base of the Aures Mts. To the S.W. are the great Roman remains of Lambessa. Pop. (1901) 6,914.

Baton, the stick with which the conductor of a choir or orchestra beats the time. In early days the bandmaster beat time with his foot, and Lulli (1633–87) knocked on the floor with a six-foot stick. Spohr was the first to employ the baton in England, at a philharmonic concert in 1820. For a detailed history of the subject, see *Musical Times*, June 1896. Batons are generally made of maple for lightness, 21 or 22 in. long, and tapering from three-fourths to three-eighths of an inch in diameter. Field-marshals, drum-majors, and policemen also carry batons.

Baton, BATTON, BASTON, or BATTOON, in heraldry, the mark of illegitimacy, commonly called the bastard bar.

Baton Rouge, city, Louisiana, U.S.A., cap. of the state, situated on the Mississippi, 120 m. by river above New Orleans, on the Yazoo and Mississippi Valley Ry. It is the seat of the state university (1860). In 1779 Baton Rouge was taken from the British by the Spaniards; and here, in 1862, the Federals defeated the Confederates. Pop. (1900) 11,269.

Batoum. See BATUM.

Batrachia. See AMPHIBIA.

Batrachomyomachia (Gr. 'the battle of the frogs and mice'), a mock-heroic poem, in hexameters, has been erroneously ascribed to Homer, but is more probably the work of the Carian Pigres, brother of Queen Artemisia. The best editions are Baumeister's (1852), Brandt's (1888), Mitzsche's (1892).

Batshian. See BATJAN.

Batta. See BATAK.

Battalion is a body of infantry, and consists, in the British army, of 1,030 of all ranks, commanded by a lieutenant-colonel. Each battalion is, however, popularly known as a 'regiment,' a title to which it lost its official right in 1881, when the British infantry, from the 26th Foot upwards, was reorganized by consolidating two regiments into one, one becoming the 1st and the other the 2nd battalion of the new territorial regiment. More recently, certain regiments have been increased from two to four battalions of regulars. On the Continent the regiment usually consists of four battalions. A battalion of British mounted infantry consists of four companies and a regimental staff.

Battam, or BATANG, isl., Dutch E. Indies, in the Riouw Archipelago, S.E. of Singapore; is fertile and well wooded, and produces catechu. Area, 160 sq. m.

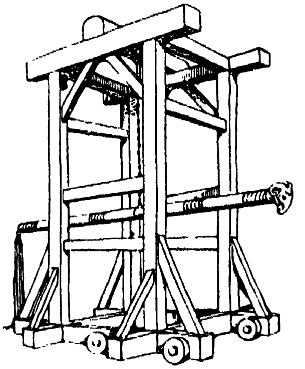
Battenberg, tn., prov. of Hesse-Nassau, dist. Wiesbaden, Prussia, 16 m. N.W. of Marburg; gives title to the Battenberg family. Pop. (1900) 951.

Battenberg, a title conferred in 1851 on Countess Hauke, daughter of a Polish general of artillery and morganatic wife of Prince Alexander of Hesse. Of her four children, Princes of Battenberg, LOUIS ALEXANDER (1854) is an officer in the British navy; HENRY (1858-96) married Princess Beatrice, youngest daughter of Queen Victoria, in 1885, and died at sea after a naval expedition to W. Africa; ALEXANDER JOSEPH (1857-93), born at Verona, was Prince of Bulgaria from April 1879 till September 1886, when he abdicated.

Battenberg, PRINCESS HENRY OF, PRINCESS BEATRICE (1857), the youngest daughter and constant companion of Queen Victoria, was married in 1885 to Prince Henry of Battenberg (d. 1896). On the death of her husband, who had formerly held the post, Princess Henry was appointed governor of the Isle of Wight by Queen Victoria. Her four children are Alexander Albert (1886), Victoria Eugénie (1887), Leopold Arthur (1889), and Maurice Victor (1891).

Batter, a backward slope in a wall, to make the batter-rule or plumb-line fall within the base. This is common in railway cuttings and similar erections.

Battering-ram, an ancient engine of war, used by the Greeks and Romans, also in use in mediæval times, for making breaches in the walls of cities and forts. It consisted of a beam of wood, sometimes 120 ft. long, with a ponderous mass of iron or bronze at the end. The ram was driven against the wall by the soldiers who carried it, or it was suspended horizontally by ropes, and struck the wall as it was oscillated backward and forward.



Battering-ram.

Battersea, met. and parl. bor. and civ. par., London, England, on the S. side of the Thames, noted for its park of 199 ac. The special feature of the park is the sub-tropical garden (about 4 ac.). There are many factories, engineering establishments, and foundries in Battersea; and the Shaftesbury Park estate (40 ac.) has been laid out to supply comfortable homes for working-men. In municipal matters it has been one of the most advanced democratic centres in London. It returns two members to the House of Commons. Area, 2,160 ac. Pop. of parl. bor. (1901) 223,230; of met. bor. and civ. par. 168,907.

Battersea, CYRIL FLOWER, FIRST BARON (1843), Junior Lord of the Treasury under Gladstone's last government (1892); educated at Harrow and at Trinity College, Cambridge; was called to the bar (1870); M.P. for Brecknock (1880-85), and for S. Bedfordshire (1885-92); made a peer in 1892. He is a fine-art collector, and was a friend of Tennyson, Arnold, and George Meredith.

Battery, in law. See ASSAULT.

Battery. (1.) A battery of artillery consists of 6 guns and a certain number of officers and men. War strengths of batteries: R.H.A., 5 officers, 174 men, 191 horses, 6 12-pounder guns, 6 ammunition and 5 other wagons; R.F.A., 5 officers, 166 men, 131 horses, 6 15-pounder guns, 6 ammunition and 5 other wagons; howitzer battery, R.F.A., 5 officers, 190 men, 156 horses, 6 5-in. howitzers, 9 ammunition and 3 other wagons; mountain battery, 5 officers, 179 men, 110 muleteers, 18 horses, and 208 mules. The guns used by mountain batteries are 7-pounder muzzle-loaders, made in two pieces, which are carried by two mules, and screwed together for action. (2.) Battery is also a term applied to a work of fortification executed for the protection of ordnance. There are three descriptions. (*a*) The batteries used in the attack and defence of fortresses are chiefly armed with howitzers, and so can be concealed from the enemy's view by the judicious selection of positions on the reverse slopes of hills. The chance of a direct hit is risked, and the howitzers are merely surrounded by light splinter-proof parapets. (*b*) The coast battery is generally constructed with thick parapets, and masonry revetments and casemates; but when howitzers are used, the principles mentioned in (*a*) are followed. (*c*) A battery armed with field guns is occasionally made by joining several gun-pits together with lengths of shelter-trench.

Battery, FLOATING. See FLOATING BATTERY.

Battery, ELECTRIC PRIMARY. See CELLS. SECONDARY (or storage). See ACCUMULATORS.

Batteux, CHARLES (1713-80), abbé, professor at the Collège de France (1749), and member of the French Academy (1761), is known by his treatise on the *Beaux Arts* (1746), his *Principes de la Littérature* (4 vols. 1750), his edition of *Les Quatres Poétiques d'Aristote, d'Horace, de Vida, de Despréaux* (2 vols. 1771), and his translation of Horace (1760). Batteux was one of the ablest of the French academic critics.

Batthyanyi, one of the oldest families in Hungary. COUNT CASIMIR BATTHYANYI (1807-54) was Minister of Foreign Affairs in Hungary in 1849. After the defeat at Vilagos he fled, and remained in Turkish territory till 1851.—COUNT LOUIS BATTHYANYI (1809-49) was appointed president of the Hungarian ministry in 1848. He was executed by the Austrians in 1849, under a sentence of martial law commonly regarded as unjust.—PRINCE BATTHYANYI (1803-83) won the Derby in 1876.

Battiadæ, a dynasty of eight kings, who reigned at Cyrene from about 630 to 450 B.C.

Battle, a hostile encounter between two or more armies on land or navies on sea. Among the greatest land battles in history were the following:—Marathon (490 B.C.), Syracuse (413), Arbela (331), Metaurus (207), Philippi (42), victory of Arminius over Varus (9 A.D.), Chalons (451), Tours (732), Hastings (1066), Orleans (1429), Lützen (1632), Blenheim (1704), Pultowa (1709), Saratoga (1777), Valmy (1792), Waterloo (1815), Königgrätz or Sadowa (1866), Sedan (1870). These include the battles which, according to Sir Edward Creasy (*The Fifteen Decisive Battles of the World*), 'claim our attention, independently of the moral worth of the combatants, on account of their enduring importance.' Of naval engagements the following are among the most important: — Salamis (480 B.C.), Actium (31 B.C.), Lepanto (1571), Spanish Armada (1588), Gibraltar (1607), English victory over the Dutch (1666), St. Vincent (1693), Carthagena (1702), Finisterre (1747), Gibraltar (1782), Ushant (1794), St. Vincent (1797), Camperdown (1797), Trafalgar (1805), Navarino (1827), Acre (1840), Alexandria (1882), Wei-hai-wei (1895), Santiago (Cuba, 1898).

Battle, par. and mrkt. tn., Sussex, England, 6 m. N.W. of Hastings. In 1067 William the Conqueror founded Battle Abbey, in honour of the victory of Hastings or Senlac. (See SENLAC.) The remains now belong to Lord Rosebery. Ac. 8,253. Pop. of par. (1901) 2,996.

Battle, TRIAL BY. This was in England a Norman innovation, by which some civil actions, and trials for felony at the private suit of the person wronged, might be decided by personal combat. In the case of Ashford *v.* Thornton, as recently as 1818, the accused in a trial for murder pleaded, 'Not guilty; and I am ready to defend the same by my body.' The plea was held good, and the accused set free, as the accuser would not fight; but trial by battle was abolished by statute in 1819. See Neilson's *Trial by Combat* (1890).

Battle-axe, weapon of warfare used from primitive times down to the era of gunpowder, consisting of a blade, diversely shaped, and a handle of varying length. When the latter is long and ends in a spear, pike, or hook, and has a blade like a pick on the side opposite to the blade of the axe, it is called a pole-axe or halberd. The earliest battle-axes had stone heads (celts), and these were succeeded by bronze instruments. Amongst the Greeks and Romans the battle-axe had either one broad cutting edge or was bipennate, the latter being pre-eminently the weapon of war. In later times the blade varied greatly in shape according to the period, but in the main it was a modification of the tools used by butchers, carpenters, and coopers. The French axe of the middle ages was bipennate with convex cutting edges; the Francisca and Danish axes had but one blade of this kind, sometimes extended behind into a spike.

Battle Creek, city, Calhoun co., Michigan, U.S.A., is situated in the S.W. of the state, 120 m. W. of Detroit, and is the seat of a well-known sanatorium. Manufactures farm implements. Pop. (1900) 18,563.

Battledore and Shuttlecock, child's game played with a small racquet and a piece of cork studded with feathers so as to keep it upright when struck into the air. A comedy of 1609 mentions it as a favourite game.

Battleford, tn., Saskatchewan dist. of N.W. Territories, Canada, situated at the junction of the Battle and N. Saskatchewan Rs. It was invested by Indians during the North-West rebellion in 1885, and was relieved by Colonel Otter. Pop. 513.

Battlement, a wall or rampart built round the top of a fortified building, with interstices or embrasures for the discharge of arrows or of guns. The rising parts of the wall are termed *cops* or *merlons*, and the embrasures are styled *crénelles*.

Battleship. See NAVY.

Battue is a way of killing game (chiefly pheasants and hares) by having the birds or animals driven forward to a point where sportsmen are stationed to shoot them down, the driving being accomplished by beating the bushes. The term (from Fr. *battre*, 'to beat') occurs early in the 19th century. See Badminton, *Shooting: Field and Covert* (1895).

Batu Khan (d. 1256), Mongol chief, grandson of Jenghiz Khan, led the Mongol hordes who devastated Russia, Poland, and Hungary in 1237–42.

Batum, or BATOUM, tn. and port in Transcaucasia, Kutais gov., Russia, in the S.E. corner of the Black Sea. An insignificant town before it came into the possession of Russia in 1878, it is now of importance for the export of oil from Transcaucasia, being the terminus of the railway from Baku and Tiflis (217 m.), through Poti, and of the pipe-line to Mikhailov. After petroleum, manganese ore is the chief export. Pop. (1897) 26,417; of the dist. 85,576.

Bauang, riv. and tn., prov. Union, S. of S. Fernando, on W. side of Luzon, Philippine Is. Pop. nearly 40,000.

Baucis. See PHILEMON.

Baud, tn., dep. Morbihan, France, 20 m. N.W. of Vannes, 27 m. by rail; flour mills, corn, hay. Chapel and statue of Venus de Quinipily, of pre-Christian origin. Pop. (1901) 4,730.

Baudelaire, CHARLES PIERRE (1821-67), French poet, born in Paris; began his literary career as an art critic; later, became editor of a short-lived conservative journal. He translated Poe's tales in three volumes (1856-8). Under the inspiration of De Quincey's *Confessions of an Opium Eater*, he published, in 1861, *Les Paradis Artificiels*, which describes the sensations of an eater of hashish. In 1857 he had published a volume of verse, *Les Fleurs du Mal*, which gained notoriety by being made the subject of a criminal prosecution for offence against public morals. Baudelaire is seen at his best in *Petits Poèmes en Prose*, and a collection of clever critical essays entitled *L'Art Romantique*. He also wrote *Théophile Gautier* (1859). *Richard Wagner et Tannhäuser à Paris* (1861), and *Souvenirs Correspondances*, etc., were published in 1872, after his death. He is still held in esteem by the naturalist and decadent schools of French authors. See his *Œuvres Complètes*, 4 vols. (1869); and Asselineau's *Charles Baudelaire: sa Vie et son Œuvre* (1869).

Baudin, CHARLES (1784-1854), French admiral, captured St. Jean d'Ulloa (1838), commanded in the Mediterranean (1848-9), and was made admiral in 1854.

Baudissin, WOLF HEINRICH, COUNT VON (1789-1878), German translator, was for some years in the diplomatic service of Denmark; settled in Dresden in 1827, and helped Tieck to translate Shakespeare; then he published German versions of Ben Jonson (1836) and other English dramatists, Molière (1865–7), Coppée (1874), and Gozzi and Goldoni (1877), besides modernized versions of poems by Hartmann von der Aue (1845) and Wirnt von Gravenberg (1848).

Baudrillart. (1.) JACQUES JOSEPH (1774-1832), French authority on forestry and arboriculture; author of *Dictionnaire de l'Aménagement des Forêts* (1821), and a *Traité général des Eaux et Forêts* (1821-34). (2.) HENRI JOSEPH LÉON (1821-94), son of Jacques, French political economist, taught at the Collège de France (1866) and the school of the Ponts et Chaussées (1881,) and was editor of the *Journal des Economistes* (1855) and of the *Constitutional* (1868). Among his numerous works are *Histoire du Luxe* (1878-80); *Manuel d'Economie Politique* (1857); *Rapports de la Morale et de l'Economie Politique* (1860).

Baudry, PAUL JACQUES AIMÉ (1828-86), French painter and pupil of Drölling. His imaginative mural decorations are to be seen in the Cour de Cassation (1881), Chantilly (1883), and in the *foyer* of the Grand Opera, Paris (1864-74). *La Perle et la Vague* (1863) is an exquisite piece of nude painting. His *Supplice d'une Vestale* (1857) is at Lille, and his *Fortune et la Jeune Enfant* (1853) in the Luxembourg. See *Modern French Masters*, by J. C. Van Dyck (1896).

Bauer, BRUNO (1809-82), German theological and political critic, was born at Eisenberg in Saxe-Altenburg. As professor at Bonn he published critical works on the Gospel of John (1840) and the Synoptic Gospels (1841-2), in which he stigmatized the evangelical sources as mere fabrications. In consequence of these views the Prussian government dismissed him from his chair, and thenceforth Bauer played the rôle of a theological Ishmaelite. In his *Kritik der paulinischen Briefe* (1850-2) he denies the authenticity of all the epistles of Paul. His theories regarding the Pauline epistles have been almost unanimously rejected. Two of his works possess special interest for Englishmen--*Einfluss des englischen Quäkertums auf die Deutsche Kultur u. auf das Englisch-Russische Projekt einer Weltkirche* (1878), and *Disraelis romantischer und Bismarcks sozialistischer Imperialismus* (1881). See Lichtenberger, *German Theol. in 19th Century* (1889), p. 374 *f.*

Bauer, CAROLINE (1807-78), a German actress who in 1829, in London, contracted a morganatic marriage with Prince Leopold of Coburg, afterwards king of the Belgians. A separation following in 1830, she returned to the stage, from which she finally retired in 1844, on her marriage with the Polish count Ladislas of Broël-Plater. In addition to two volumes of theatrical reminiscences, dealing largely with court life in Berlin (1825-35), a posthumous volume of her *Life* was issued in 1878 (English, 1884), denouncing King Leopold and his confidential adviser, Baron Stockmar.

Bauernfeld, EDUARD VON (1802-90), Austrian dramatist and poet, served in the Austrian civil service, but retired in 1848. He is best known as the author of light comedies of Viennese life, such as *Leichtsinn und Liebe* (1831), *Bekenntnisse* (1834), *Bürgerlich und Romantisch* (1835), *Grossjährig* (1846), *Der Kategorische Imperativ* (1851), *Aus der Gesellschaft* (1866), *Moderne Jugend* (1868); though he also wrote poems and novels. His *Gesammelte Schriften* were issued in 12 vols. in 1871-2. There is a *Life* by Horner (1900); and his *Tagebücher, 1819-79*, were published in 1895-6.

Baugé, dist. tn., dep. Maine-et-Loire, France, 22 m. N.E. of Angers. The town is built on a plateau overlooking a narrow valley. Woollen weaving, canvas, clogs, oil, and horn utensils; commerce of fruit, oil, pork, and wood. Castle of the 15th century built by René d'Anjou. The English, under the Duke of Clarence, were defeated here by the French in 1421. Pop. (1901) 3,325.

Bauhin, KASPAR (1550-1624), Swiss botanist, the first to adopt orderly methods of diagnosing the characters of plants. He was careful to distinguish genus and species, anticipated the binary nomenclature of Linnæus, and was, in fact, the Linnæus of the 16th century. His great work of forty years was the *Pinax*, in which he recorded all species of plants known to him, and their synonyms as given by his predecessors. The Bauhinia genus of plants was named after Bauhin and his brother John. See Sachs's *Hist. of Botany* (1890).

Bauhinia (named after the Swiss botanists Kaspar and John Bauhin), a genus of about one hundred and fifty species of tropical plants of the order Leguminosæ, many of which are lianas with flattened, twisted wooden stems which reach the tops of the highest trees. Ropes are made from the fibres of some Indian species.

Baumann, OSKAR (1864-99), Austrian geographer and traveller, born at Vienna. He accompanied, in 1885, Oskar Lenz in his exploration of the Congo as far as the Stanley Falls. In 1886 he explored the island of Fernando Po, in the Gulf of Guinea; in 1890, Usambara and the adjoining territories on the mainland; and in 1893-5, the Victoria Nyanza. After 1896 he was Austrian consul at Zanzibar. He published *Fernando Póo und die Bube* (1888), *Usambara und seine Nachbargebiete* (1891), *Durch Massailand zur Nilquelle* (1894), and *Der Sansibar-Archipel* (1896-9). After his death appeared *Afrikanische Skizzen* (1900).

Baumbach, RUDOLF (1840), German minor poet, who has written the epic *Zlatarog* (1877), *Lieder eines fahrenden Gesellen* (1878-80), *Spielmannslieder* (1881), and various *Märchen* (1881 to 1896).

Baumgarten, ALEXANDER GOTTLIEB (1714-62), German philosopher, was born at Berlin; studied at Halle, and was appointed professor of philosophy at Frankfort-on-the-Oder in 1740. His *Aesthetik* is an elaboration of the system of Wolff as modified by Leibniz. His principal works are *Metaphysica* (1739; 7th ed. 1779); *Ethica Philosophica* (1740); *Æsthetica* (1750-8); *Jus Naturæ* (1765); *Philosophia Generalis* (1770).

Baumgarten-Crusius, LUDWIG FRIEDRICH OTTO (1788-1843), German theologian, was born at Merseburg; studied theology and philosophy at Leipzig, and in 1817 was appointed professor of theology at Jena. He shows himself a learned historian of dogma in his *Kompendium der Christlichen Dogmengeschichte* (1840-6). Amongst his other works are *Philosophia Generalis* (1870), *Ethica* (1740), and *Jus Naturæ* (1765).

Baumgärtner, ANDREAS FREIHERR VON (1793-1865), Austrian natural philosopher, born at Friedberg, Bohemia. Professor of physics (1817-33), then director of factories (1833-46), he was (1847) head director of railway construction, afterwards minister of public works (1848) and of finance (1851). The *Zeitschrift für Physik* was founded by him (1826-37). Other works are *Mechanik in ihrer Anwendung auf Künste u. Gewerbe* (1824) and *Naturlehre* (1823; 8th ed. 1845).

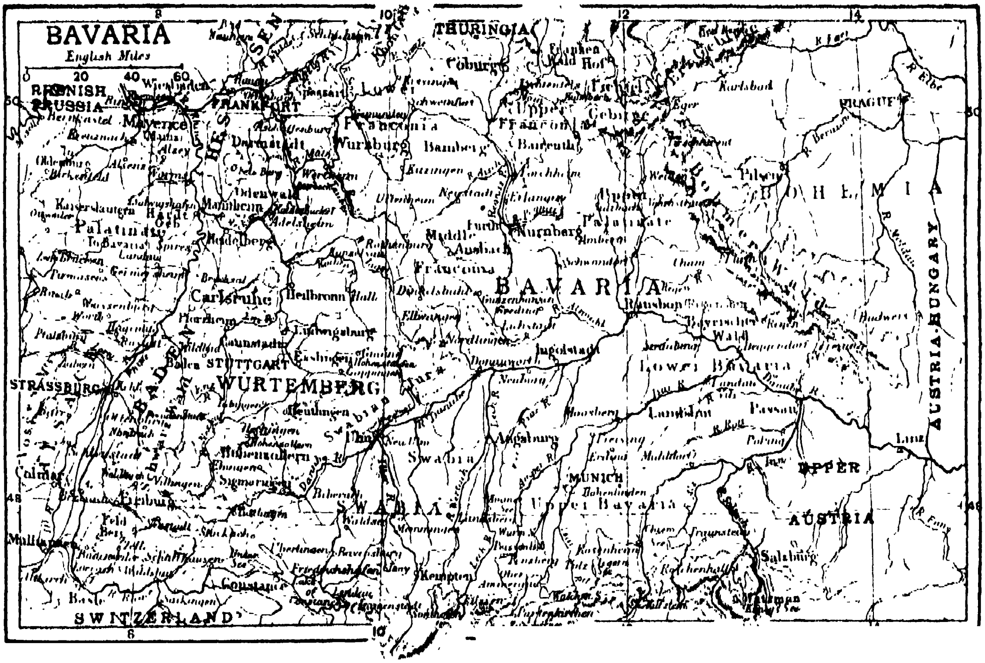
Baumgärtner, GALLUS JACOB (1797-1869), Swiss politician, born at Altstätten. He took a prominent part in the revision (1831) of the constitution of the cantons. His works include *Die Schweiz von 1830-50* (1853-66) and *Geschichte . . . St. Gallens* (1868-90).

Baumgärtner, KARL HEINRICH (1798-1886), German physician, born at Pforzheim; clinical professor in Freiburg (1824-62). His studies in embryology and physiology, which were important contributions to the modern cell theory, are developed in *Nähere Begründung der Lehre von der Embryoanlage durch Keimspaltungen* (1854), *Anfänge zu einer physiologischen Schöpfungsgeschichte* (1855), *Schöpfungsgedanken* (1856-9), and other works.

Baur, FERDINAND CHRISTIAN (1792-1860), German theologian, was born near Stuttgart. From Blaubeuren, where he was appointed (1817) one of the professors in the theological seminary. Influenced by Schleiermacher's writings, he wrote *Symbolics and Mythology* (3 vols. 1824-5), in which the principles of modern religious philosophy are made to elucidate the history of ancient religions. This work led to his appointment as professor of historical theology in Tübingen (1826), where he laboured most assiduously till his death. The rest of his writings, on the New Testament and early church history, were dominated by the postulates of Hegel's philosophy. Of Paul's epistles he accepted as genuine only Romans, Galatians, and those to the Corinthians, pronouncing the canonical gospels to be late productions. Among his works are *Paul the Apostle* (1873), *Hist. of the Church in the First Three Centuries* (1873), *Die christliche Lehre von der Versöhnung* (1838), and *Die christliche Lehre von der Dreieinigkeit* (1841-3). His followers became known as the 'Tübingen School.' See Mackay's *The Tübingen School and its Antecedents* (1863); Lichtenberger's *Hist. of German Theology* (1889); Pfleiderer's *Theological Development in Germany* (1890); Christlieb on *Modern Doubt* (1865); A. B. Bruce, *Present-Day Tracts* (No. 38, 1883).

Bautain, Louis Eugène Marie (1796–1867), French theologian, born at Paris. Professor of philosophy at Strassburg (1816), he took orders (1828). Appointed (1838) dean of the faculty of letters in Strassburg, he became (1849) vicar-general, and (1854) professor of moral theology in Paris. His many works include *Psychologie Expérimentale* (1839), *Philosophie Morale* (1842), and *La Morale de l'Evangile* (1855).

Bautzen, tn. in the kingdom of Saxony, stands on an eminence above the Spree, 37 m. by rail E. of Dresden, and is the chief tn. in the Wendish dist. of Upper Lusatia (Lausitz). Bautzen manufactures hosiery, gloves, cloth, and machinery. Here, on May 20 and 21, 1813, Napoleon defeated the allied Prussians and Russians. Pop. (1900) 26,024.



Bauxite, an earthy mineral, white to red in colour, and composed of impure aluminium hydroxide. It is found at Baux, near Arles, in France, in Ireland, and in the United States (Arkansas, Georgia, and Alabama), and is a valuable source of alum and aluminium. In February 1905 a patent was issued to an Arkansas inventor for making refractory brick out of this ore.

Bavaria, or Bayern, a kingdom of the German empire, consisting of two detached portions—the smaller being on the W. of the Rhine, between Alsace-Lorraine, Rhineland, and Hesse-Darmstadt; the larger E. of the Rhine, between Bohemia, Austria, Switzerland, Würtemberg, Baden, Hesse-Darmstadt, Hesse-Nassau, and various Thuringian states. Area, 29,286 sq. m. Pop. (1900) 6,176,057.

South of the Danube, Bavaria consists of a plateau backed by the N. foothills of the Alps. Among these is the Zugspitze, the highest elevation (9,725 ft.) in Germany. On the N. side there are two plateau regions, with the Bavarian Forest, the Bohemian Forest, and Fichtelgebirge to the E., the Franconian and Thuringian Forests to the N., the Rhön Mts., Spessart, and Odenwald to the N.W., and in the S. the Swabian Jura. The Main is the chief river in the N. region, and is connected with the Danube (the chief waterway of the south and centre) by the Ludwig Canal. In the Palatinate the most prominent orographical feature is the Haardt Mts., and the most prominent hydrographical the Rhine.

Upper Bavaria, which is drained by the Iller, Lech, Isar, and Inn, furnishes good pasturage, and many of the moors are being reclaimed. Of the entire area 60½ per cent. is arable land. Barley and hops are important because of the vast brewing industry of Bavaria. Wine is extensively produced in the vicinity of Würzburg and in the Palatinate, over 60,000 acres yielding nearly 12,000,000 galls. in 1900. Fruit is a valuable crop in various districts, and cattle-breeding is of great importance. Forests cover 32½ per cent. of the surface. The minerals include coal, iron, and salt (Reichenhall, Berchtesgaden, Traunstein, and Rosenheim); graphite, lithographic stones (Solnhofen), lead, and copper are also extracted. Kissingen, Berchtesgaden, and Reichenhall have mineral springs. The chief industries are the manufacture of iron and steel, machinery, musical instruments, gold and silver wares, glass, porcelain, cottons, linens, silks, chemicals and dyes, pencils, and toys. Brewing is of great importance, the busiest centres being Munich, Erlangen, Kulmbach, and Nuremberg.

Seventy and a half per cent. of the population are Roman Catholics, and 28¼ per cent. Protestants. There are two Roman Catholic archbishoprics and six bishoprics.

Bavaria has three universities—Munich, Würzburg, and Erlangen; also one technical high school at Munich. The chief towns are Munich (the capital), Augsburg, Nuremberg, Würzburg, Ludwigshafen, Fürth, Kaiserslautern, Ratisbon, Bamberg, Hof, Pirmasens, Bayreuth, and Erlangen. Bavaria forms a hereditary constitutional monarchy, the legislative power being invested in the king and two legislative chambers. The kingdom has six votes in the federal council, and sends forty-eight members to the Imperial Diet. The army, of three army corps since 1900, forms part of the Imperial army, but is numbered separately and administered independently. Its peace footing stands at about 60,000 men.

History. Baiern, or Boiaria, land of the Boii, overrun by Rome of the early empire, was divided into three provinces — Rhætia (Tyrol), Vindelicia (between Iller and Inn), and Noricum, west of these — Augsburg and Salzburg being chief towns, and Regensburg and Passau frontier forts. On the break-up of the Roman power, the country, occupied by the Teutonic tribe of Baguwarians (Bavarians) at the close of the 5th century, was ruled by dukes, first elective, then hereditary. After a struggle of two hundred years, Bavaria, absorbed by the Franks, was ruled by Charlemagne, who left his descendants as margraves (788-900) to hold the marches against Hun and Bohemian.

The title of duke was restored (920) for services rendered to the empire, and Bavaria helped the Emperor Otto I. to defeat the Huns at Augsburg. In the middle ages there were constant quarrels between duke and emperor; and the towns, which were either imperial or free (Augsburg, Nuremberg), ecclesiastical (Bamberg) or ruled by princes (Baireuth), rose into importance through the transit of Italian trade northwards, and again declined owing to the development of sea-borne commerce. During the same period the boundaries of Bavaria underwent constant change.

In 1180 Frederic Barbarossa conferred the duchy on Otto, Count of Wittelsbach, founder of the present royal house. Maximilian I. (1598-1623) was made elector, and received the northern half of Bavaria, owing to Tilly's victory over the Elector Palatine. The French defeat of Blenheim (1704) was shared by Bavaria, but after the treaty of Utrecht (1713) the elector was reinstated in his dominions. Thereafter Bavaria oscillated between the French and German alliance, being invaded (1796) by Moreau, who occupied Munich; siding with Napoleon I., who created Maximilian Joseph I. a king (1805-6); and subsequently, secured in her new dignity by the allies, helping to overthrow her benefactor (1813). Four kings have reigned since then — Louis I. (1825-48), Maximilian II. (1848-64), Louis II. (1864-86), and Otto Wilhelm Luitpold (1886).

In 1818 (May 26) Maximilian I. granted his country a constitution, abolished serfdom, and established religious liberty. Louis I. restored the cathedrals of Bamberg and Regensburg, built a national Walhalla, adorned Munich with palaces and art galleries, obtained the crown of the Hellenes for his son Otho, and resigned (1848), having further enlarged the constitution. To Maximilian II., patron of arts and commerce, succeeded Louis II., who shared Austria's defeat by Prussia (1866), but in 1870 helped the latter against France. He was Wagner's patron. He died by his own hand.

On the extinction of the elder branch of the house of Wittelsberg the junior acceded (1777), thus reuniting the Rhenish Palatinate to Bavaria. It is here that the liberal party is strongest; while old Bavaria is the home of Catholic conservatism, and of a romantic and artistic race, probably of Celtic-Italic origin—characteristic Bavarians, as opposed to Teutons proper. See Seguin's *The Country of the Passion Play* (1890); Götz's *Geographisch-historisches Handbuch von Bayern* (2 vols. 1894-8); Faber's *Zur Hydrographie des Maingebiets* (1895); Bronner's *Bayrisches Land und Volk* (1898); and C. Gruber's '*Das Münchener Becken: ein Beitrag zur physikalischen Geographie Südbayerns*,' in vol. i. of Kirchhoff's *Forschungen zur Deutschen Landes- und Volks-Kunde*.

Bavaria, STATUE OF, a colossal statue in bronze at Munich, personifying Bavaria, raised (1850) by Ludwig I.; designed by Schwanthaler.

Bavarian Alps. See TYROL.

Baviad, THE, a satire (1794) by William Gifford, which, along with the *Mæviad* (1795), attacked the insipid and nonsensical poetry of the Della Cruscans; so called from the two inferior poets, Bavius and Mævius, mentioned by Virgil in his Third Eclogue (v. 90).

Bawian, or BAWEAN, populous isl. of Dutch East Indies, N. of Madura, in Java Sea, produces rice, etc. Cap. Sengka Pura, on S. side. Pop. of isl. 33,000.

Bax, ERNEST BELFORT (1854), English journalist and author, lived some time in Germany, and has identified himself prominently with the literary treatment of socialism, as in his *Jean Paul Marat* (1878; new ed. 1901), *Religion of Socialism* (1886), *Ethics of Socialism* (1889), *Outspoken Essays on Social Subjects* (1897), etc. In 1885 he joined the poet William Morris in founding the Socialist League, and later was an active member of the Social Democratic Federation. In history he has written *German Society at the Close of the Middle Ages* (1894), and *The Peasants' War in Germany* (1899).

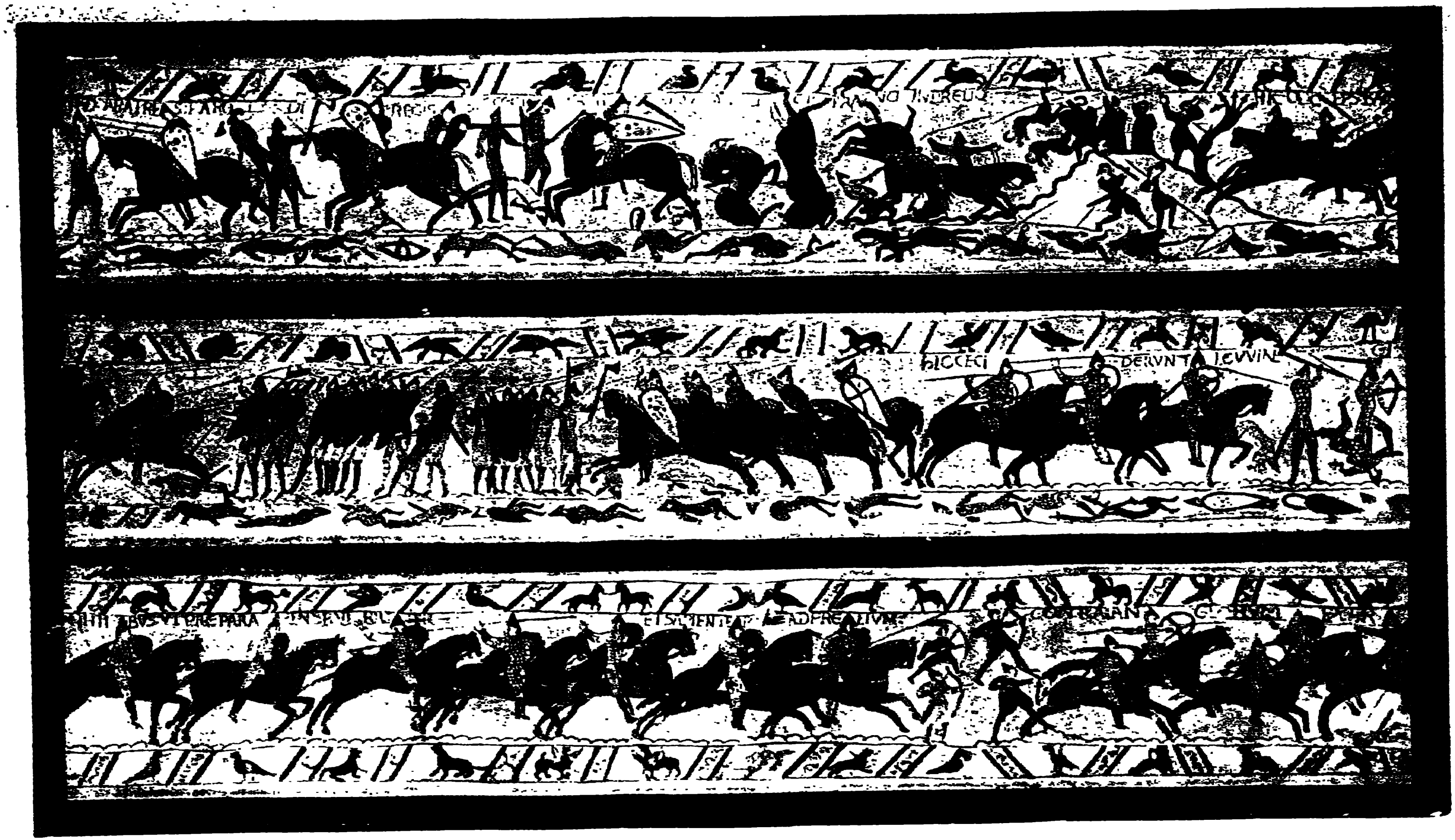
Baxar, or BUXAR, munic. tn. situated on the r. bk. of the Ganges, in Shahabad dist., Bengal, India, 65 m. N.E. of Benares; scene of the defeat, in 1764, of the nawab of Murshidabad—a victory which secured Lower Bengal for the British. It is also a sacred place. Pop. (1901) 46,170.

Baxter, SIR DAVID (1793-1872), a linen manufacturer in Dundee, was a native of that town. In 1826 he became partner in the manufacturing firm of Baxter Brothers, the success of which has contributed much in advancing Dundee's high commercial position. He was created a baronet in 1863. See W. Norrie's *Dundee Celebrities of the 19th Century* (1873).

Baxter, RICHARD (1615-91), English nonconformist divine, was a native of Shropshire, and chiefly self-taught. Entering the church in 1637, he acted, on the outbreak of the civil war, as chaplain to one of the Parliamentary regiments. When in ill health, and 'in continual expectation of death,' he wrote the first part of his famous work, *The Saints' Everlasting Rest*, which was published in 1650. Recovering his health, he laboured with great effect for fourteen years in Kidderminster. On the restoration, Baxter, although he had greatly modified his views in the direction of Presbyterianism, was appointed one of Charles II.'s chaplains, and took a prominent part in the Savoy Conference. He declined the bishopric of Hereford; was driven out of the church by the Act of Uniformity of 1662; and settled at Acton, in Middlesex, until the Act of Indulgence in 1672 left him free to go to London. In 1685 he was tried for alleged sedition by the brutal Judge Jeffreys, who sentenced him to fine and imprisonment. After eighteen months spent in prison he was released. Baxter was an able, earnest, and eloquent writer and preacher. Among his writings may be mentioned *The Reformed Pastor* (1656), *Call to the Unconverted* (1657), and *Now or Never* (1663). The main authority for Baxter's life is his autobiography, entitled *Reliquiæ Baxterianæ* (1696). See also Bishop Hall's *Life*, Calamy's *Life* (1702), Orme's *Life and Times of Richard Baxter* (1830), and *Lives* by G. D. Boyle (1883) and J. H. Davies (1887).

Baxterians, a name applied to the followers of Richard Baxter, the nonconformist divine, prominent among whom were Isaac Watts and Philip Doddridge.

Bay (Fr. *bais*, 'berry'), first applied to the fruit of certain plants, and then to the plants themselves. The sweet bay tree (*Laurus nobilis*) of cottage gardens is the true laurel of the Romans, the Daphne of the Greeks, the victor's laurel and poet's laurel of romance. The plant was introduced into England from S. Europe in the 16th century. The long, pointed, lance-shaped leaves have many culinary uses, on account of their aromatic properties; but as they contain prussic acid, they must be



The Bayeux Tapestry, showing Scenes from the Battle of Hastings.

used with care. The bay tree bears inconspicuous yellow flowers in spring, and these are followed by purple berries in autumn, when fertilization has occurred. Propagation may be effected by means of seeds or cuttings. In order to obtain good bushes, the leading shoots of the young plants should be shortened in spring during the first few years. Red bay is a laurel of the southern parts of the United States; white bay and poison bay are two species of the magnolia order in the same region. The cherry laurel is wrongly named bay laurel; it belongs to the plum and almond genus. Its leaves are larger and of a lighter green than those of sweet bay.

Sweet Bay or Laurel.

Leaves, flowers (male and female), and fruit

Bayaderes, a class of women in India who follow the profession of dancers or pantomimic artistes. They are divided into two great classes—the *devádasi*, themselves of two divisions, who are more or less closely associated with the worship of the Hindu deities; and the *nautchis*, the 'dancing girls' of Anglo-Indian literature, who are not attached to a temple, but travel about the country, in bands, for hire. The first rank of the former are exclusively of the Vaisya caste; the latter are recruited from the low-caste natives, or are slave-girls.

Bayamo, or San Salvador, tn., prov. Santiago, Cuba, 69 m. N.W. of Santiago de Cuba; one of the oldest cities in Cuba; near it is a celebrated cave. Pop. (1899) 3,022.

Bayard, common name for several famous horses of legend and story—*e.g.* in the story of the *Four Sons of Aymon*; the horse of Fitzjames, in Scott's *Lady of the Lake*; and under the Italian form of Bayardo, in Tasso's *Rinaldo*. It is also the name of a horse in a legend current in many parts of England, the horse being famous for a prodigious leap.

Bayard, Pierre du Terrail, Chevalier de (1476-1524), 'the knight without fear and without reproach,' was the most chivalrous hero of the middle ages—strong yet tender, fearless and true, simple, humane, and magnanimous. He first won distinction at the battle of Fornuovo in 1495, when he received his knighthood. He next fought successively against the Spaniards (1503), winning great fame at the bridge of Garigliano and at Venosa; against the Genoese (1507); and against the Venetians, especially at Agnadello (1509) and Brescia (1509). In the war with Henry VIII. of England he was taken prisoner, but was released. On the accession of Francis I., in 1515, he was created governor of Dauphiny. In one expedition he made Prosper Colonna a prisoner; and at Marignano (1515), fighting against the Milanese, he gained such a victory for Francis that the young king himself asked for and received the honour of knighthood at the hands of Bayard. In 1521, when Charles V. besieged Mézières with a large army, Bayard defended the place against all assaults, and compelled the enemy to retire. While defending the passage of the Sesia, April 30, 1524, in another contest between France and Milan, Bayard was mortally wounded. His *Life* was written by his secretary, Joffrey, in 1527, and by Terrebasse (5th ed. 1871). Of the former work there are translations in English, by Sara Coleridge (1825), Kindersley (1848), and L. Larchey (1883).

Bayard, Thomas Francis (1828-98), an American Democrat, statesman, and orator, who acted as United States minister to the court of St. James from 1893 to 1897, when he gained great popularity in Britain. He was twice proposed for the presidency (1880 and 1884), and acted as secretary of state (1885-9).

Bayazid, or Bayazet, fort. tn., Armenia, Asia Minor, near Persian frontier, 150 m. S.E. of Erzerum, on the caravan road between Erzerum and Tabriz. Pop. 2,000; of dist. 52,500. See also Bajazet.

Baybay, tn. on W. side of Leyte I., Philippines, 35 m. S.W. of Tacloban. Pop. (1898) 17,367.

Bayberry (*Pimenta acris*), a plant belonging to the myrtle order. In the W. Indies it is the source of bay rum, an aromatic liquid obtained by distilling rum with the leaves of this plant, or by mixing various oils, as the oil of myrica, of orange peel, or of pimenta, with alcohol. It is used as a cosmetic and perfume.

Bay City, city, Michigan, U.S.A., co. seat of Bay co., situated in the E. part of the Lower Peninsula, on the Saginaw R., near its mouth. Its principal trade is in lumber, fish, and salt, and its manufactures are of considerable importance. Pop. (1900) 27,628.

Bayer, Johann (1572-1625), German astronomer, a native of Bavaria. He was ennobled by the emperor, and distinguished as the *Os Protestantium*. He introduced the Greek and Roman letters into astronomic nomenclature. His *Uranometria* (1603) in 51 sheets, was at that date the most complete chart of the heavens.

Bayern. See Bavaria.

Bayeux (anc. *Bajocasses*), dist. tn. and seat of a bishop, dep. Calvados, France, 7 m. from the sea, 18 m. W.N.W. of Caen. The cathedral of Bayeux, with parts dating from the 11th century, is one of the most beautiful buildings of Normandy. The small museum contains the celebrated tapestry of Bayeux (see below). There are industries of lace, china, earthenware, etc. The town was burned by Normans, English, or French in 1106, 1356, 1450, 1563. Pop. (1901) 7,806.

Bayeux Tapestry. This unique piece of handiwork, described in 1743 (*Palæographica Britannica*) as 'the noblest monument of English antiquity abroad,' represents scenes connected with the conquest of England by William of Normandy, culminating in the battle of Hastings. It is embroidered on a piece of linen 207 ft. long and 20 in. wide, the part occupied by the historical scenes having a breadth of about 13 in., with a narrow ornamented margin on each side. The scenes number in all seventy-two, and over each is a short description in Latin. The first historical mention of the tapestry is in 1369, in an inventory of the goods belonging to the cathedral of Bayeux. Although annually exhibited in the church for eight days at the feast of St. John, it was practically unknown beyond the town till 1724, when a description, based on a drawing of a part of the work, was presented to the Académie des Inscriptions by M. Lancelot. The discovery of the tapestry itself was due to Bernard de Montfaucon, who published representations of it in his *Monumens de la Monarchie Française* (1729-33). See F. R. Fowke, *The Bayeux Tapestry* (1898); Rev. J.

C. Bruce, *The Bayeux Tapestry Elucidated* (1885); Jules Comte, *La Tapisserie de Bayeux*, with photogravures (1879); *Vetusta Monumenta* (1819), vol. vi. (contains beautifully coloured drawings by C. Stothard); *Archæologia*, vols. xvii.-xix.

Bay Islands, a group in the B. of Honduras, to the N. of Honduras, ceded by Great Britain to Honduras in 1859. The trade is principally in bananas and cocoanuts with New Orleans and New York. Pop. 5,000.

Bayle, PIERRE (1647-1706), French philosopher and critic, the son of a Calvinistic preacher, was born at Carlat, Languedoc; he withdrew to Geneva to escape threatened prosecution by the Catholics. In 1675 he was appointed to the chair of philosophy at the University of Sedan, and in 1681 to the chair of philosophy and history at Rotterdam. Here he published (1682) his famous *Pensées Diverses sur la Comète*, and in 1684 his *Critique Générale de l'Histoire du Calvinisme de M. Maimbourg;* the latter was severely criticised by his colleague Jurieu. In 1684 he began the publication of the *Nouvelles de la République des Lettres*, a journal of literary criticism, successfully carried on until 1698, and continued after his death to 1720. On the revocation of the Edict of Nantes, Bayle wrote his *Commentaire Philosophique sur ces Paroles de Jésus-Christ: 'Contrains-les d'entrer,'* also attacked by Jurieu as unorthodox; and, after a prolonged controversy, Bayle was deposed (1693) from his professorship. He then applied himself to the completion of the *Dictionnaire Historique et Critique* (1696), his masterpiece, which shows to perfection his extensive information, fluency of style, and sceptical spirit. This work, condemned by his adversaries and censured by the Rotterdam consistory, met with widespread success, and exercised considerable influence upon the narrow dogmatism of the Reformed Churches. His *Œuvres Diverses* were published at the Hague (1725-31). See *Lives* by Desmaizeaux (1730) and Feuerbach (2nd ed. 1848), and Damiron's *Philosophie en France au XVII*^{e} *Siècle* (1846).

Bayliss, SIR WYKE (1835), English painter and author, born at Madeley, Salop, and studied at the Royal Academy. In 1853 he entered an architect's office, and from that time his artistic bent was towards ecclesiastical art, of which he is a distinguished interpreter. He was elected president of the Royal Society of British Artists in 1888, and was knighted in 1897. His paintings of great European cathedrals include *La Sainte Chapelle* (1865); *St. Mark's, Venice* (1880); *Vespers in St. Peter's, Rome* (1888); *The Golden Duomo* and *Pisa* (1892). He has written *The Witness of Art* (1876), *The Higher Life in Art* (1879), *The Enchanted Island* (1888), and *Rex Regum: a Painter's Study of the Likeness of Christ* (1898).

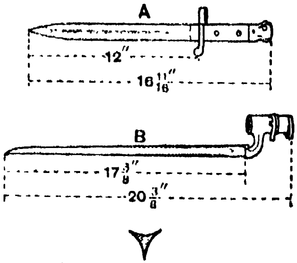
Baylor University, at Waco, Texas, is under the auspices of the Baptist body. It received its charter in 1845, and from that year until 1882 was established at Independence, Texas. In 1901 its students numbered 747.

Bayly, THOMAS HAYNES (1797-1839), English lyrical poet and miscellaneous writer, a native of Bath; wrote a number of pieces for the stage (notably *Perfection*, in which Madame Vestris appeared) and several novels; but his fame rests entirely on his songs, some of which, such as *The Soldier's Tear*, *We met—'twas in a Crowd*, and *She wore a Wreath of Roses*, are still popular. A Memoir by his widow is prefixed to his *Ballads and other Poems* (1844).

Baynes, THOMAS SPENCER (1823-87), English man of letters, born at Wellington, Somerset became a pupil, at Edinburgh University, of Sir William Hamilton, whose class assistant he was from 1851 to 1855. He was one of the literary editors of the short-lived *Edinburgh Guardian*. In 1857 he went to London, where he became assistant-editor of the *Daily News*, and (1857-63) examiner in logic and mental philosophy in London University. From 1864 till his death he filled the chair of logic, rhetoric, and metaphysics in St. Andrews University. In 1873 he was appointed editor of the ninth edition of the *Encyclopædia Britannica*, to which he contributed a notable article on *Shakespeare*, reprinted in his volume, *Shakespeare Studies* (1894). But from about 1882 the chief burden of the editorial work was borne by Professor Robertson Smith. Baynes translated the *Port Royal Logic* (1851), and wrote an essay on *The New Analytic of Logical Forms* (1852).

Bay of Islands, a deep harbour, 11 m. across, sheltered by numerous islands, on the N.E. coast of the N. Island of New Zealand, 128 m. from Auckland.

Bayonet. The modern bayonet is a short sword, the blade of which is twelve inches long, which fits on to the muzzle of the rifle, and which is given to the foot soldier as a weapon for use in hand-to-hand fighting. The old bayonet was considerably longer, was triangular in section, and tapered very much towards the point. The bayonet is very useful in enabling infantry to resist the attack of cavalry, when rushing the enemy's position in the final stages of the assault, and in night fighting. When not fixed on the rifle, it is carried in a scabbard attached to the left side of the soldier's belt.



Section of blade of B.

Bayonets.

A, modern pattern, B, former pattern.

Bayonne. (1.) Fortified tn. and episc. see, dep. Basses-Pyrénées, on the Adour, 3 m. from the Bay of Biscay, 125 m. by rail S.S.W. of Bordeaux, with interesting buildings, such as the 13th century cathedral, the 15th century church of St. Esprit, and the old castle. There are shipbuilding, leather-dressing, and distilling industries, and manufactures of pottery and chocolate; large trade in hams. Vessels of 2,500 tons can enter the Adour, and there is a depth of 15 to 19 ft. at the entrance to the harbour at high water. Bayonne is the ancient *Lapurdum*. From 1152 to 1451 it was in the possession of the English. Its citadel, which dominated the city, is a masterpiece of Vauban. In May 5, 1808, Charles IV. signed here his renunciation of the throne of Spain in favour of Napoleon, who proclaimed, also here, on July 6, 1808, a new Spanish constitution. Laffitte was born here (1767-1844). Pop. (1901) 27,601. (2.) City of Hudson co., New Jersey, U.S.A., situated at the end of the peninsula between Newark Bay and New York Harbour. Oil refining is the principal industry. Pop. (1900) 32,722.

Bayou, a name for a stream or a canal connecting other streams or rivers in the southern United States. It is not fed by natural springs. The state of Mississippi is known as the 'Bayou State,' from the large number of bayous it contains.

Bay Psalm Book, the earliest version of the Psalms printed and published in the New England States (1640), and the first book printed in N. America, was produced by Richard Mather, Thomas Welde, and John Eliot.

Bayreuth, or BAIREUTH, tn., Bavaria, dist. Upper Franconia, on the Red Main, 58 m. by rail N.E. of Nuremberg; famous for Richard Wagner's theatre (1876), and for the festivals in which his operas are produced. Jean Paul Richter lived at Bayreuth, and Franz Liszt was buried there. There are also the palace of Duke Alexander of Würtemberg, the opera-house, and the dwelling-houses of Wagner (Villa Wahnfried) and Jean Paul. The suburb of St. George is the seat of cotton, linen, and thread manufactures. Bayreuth dates from the 12th century. Pop. (1900) 29,384. See Meyer's *Das Stadtbuch von Baireuth* (1896); Jones's 'Bayreuth and the Wagner Festival' in *Cassell's Mag.* vol. xxvii. (1899); also works cited under WAGNER.

Bay Rum. See BAYBERRY.

Bay State, a popular name for the state of Massachusetts, U.S.A., originally known as the Massachusetts Bay Colony.

Bayswater, a district of London and a chapelry in Paddington par., Middlesex. It adjoins Hyde Park, Kensington Gardens, and the G.W.R., 3½ m. W. of St. Paul's. It was originally called Baynard's Water.

Bayuda Steppe, a vast desert in the Egyptian Sudan, in the bend of the Nile N. of Khartum.

Bay Window, a term used for a window which projects beyond the line of the front of a house, generally constructed in the form either of a semi-hexagon or a semi-octagon. Strictly speaking, a *bay* window rises from the ground or basement of a house, an *oriel* window is supported by means of a bracket or corbel, and a *bow* window is invariably a segment of an arch; but the three words and their use are now practically synonymous.

Baza, tn., prov. Granada, Spain, 55 m. from Granada, on railway to Murcia. An ancient city, originally founded by the Goths, it contains many picturesque old buildings, Moorish, Gothic, and mediæval. There are many mineral springs in the neighbourhood, and mines of quicksilver, lead, etc., which are little worked. Pop. (1900) 12,770.

Bazaar, a Persian word designating in the East a market-place, where people also gather together to hear the news and discuss politics; in general a street, or series of streets, occupied with dusky shops. There are special bazaars of the respective trades, and a general bazaar. The most noted are those of Ispahan, Tabriz, and Constantinople. The modern bazaar is a sale of miscellaneous articles contributed gratuitously, and sold for the benefit of some charitable, religious, or public institution. The hall in which the bazaar is held is usually fancifully decorated, and the goods are set out on stalls presided over by ladies. Raffling, though illegal, is commonly practised at bazaars.

Bazaine, FRANÇOIS ACHILLE (1811-88), marshal of France, saw service in Algeria, Spain, Morocco, and the Crimea. In the Italian war of 1859 he commanded a division, and in 1863 he succeeded Forey in the supreme command of the Mexican expedition. In 1870 Bazaine was entrusted with the 3rd Army Corps, lying near Metz. After the battles of Wörth and Spichern he commanded the main French armies, and on Aug. 14, 1870, began a retreat from Metz. Defeated at Vionville, Mars-la-Tour, and Gravelotte, he threw his army into Metz, and was at once besieged by Prince Frederick Charles. Foiled in his efforts to break the lines of investment, he capitulated (October 27), and laid down his arms, 3 marshals and over 6,000 officers and 170,000 men becoming prisoners of war. Denounced as a traitor by the voice of the nation, a court-martial in 1873 degraded him and sentenced him to death; but the sentence was commuted to twenty years' imprisonment. In August 1874 Bazaine managed to escape from his prison on the Ile Sainte-Marguérite, and reached Madrid, where he died fourteen years later. Though a dilatory general, and enmeshed in politics, he was undeniably brave, and has not lacked apologists. His own defence will be found in his *Rapport Sommaire* and his *Episodes* (1883). For another vindication, see *La Légende de Metz* (1888).

Bazalgette, SIR JOSEPH WILLIAM (1819-91), English civil engineer, of French extraction; was appointed (1855-89) engineer to the newly-constituted Metropolitan Board of Works; and under his guidance were carried through two public undertakings of great utility—(1) a general sewage scheme for London (1858-88), in which 90 m. of sewers were constructed, at a cost of £8,000,000; and (2) the Victoria, Albert, and Chelsea sections of the Thames Embankment (1862-74). He was knighted in 1874.

Bazard, ST. AMAND (1791-1832), French revolutionary and socialist, took part in the defence of Paris in 1815. He was the founder of a secret society (Amis de la Verité) on the model of the Carbonari societies of Italy, but its premature and unsuccessful outbreak at Belfort forced him to go into hiding. In 1825 he became a convert to the teachings of Saint-Simon, and soon shared with Enfantin the leadership of the movement. In 1828 he delivered a series of lectures, afterwards published as the first volume of *L'Exposition de la Doctrine de St. Simon* (1828-30), the second volume being written by Enfantin. Their objects were defined in the little work *Religion Saint-Simonienne* (1830). In 1831 the two leaders quarrelled over the question of the relation of the sexes, and Bazard withdrew from the society.

Bazardjik, or DOBRIC, tn., Bulgaria, 28 m. N.W. of Varna, on trib. of Danube. Pop. about 10,000.

Bazeilles, vil., Ardennes, France, near R. Meuse, 2½ m. S.E. of Sedan. Here a battle between the Prussians and the French was fought on Sept. 1, 1870, previous to the surrender at Sedan. Pop. (1901) 1,406.

Bazigars, tribe scattered over India, and variously known as Bazigars, Kunjra, Panchpiri, and Nats. Most of them are nomadic and exclusive Mohammedans. Skilful in gymnastic feats, the men make good jugglers, and the women dancers. In customs, features, and language they resemble the gypsies, who may be of a common origin.

Bdellium, a name given to several myrrhlike gum-resins of various origin, still used, though not so much as formerly, in pharmaceutical practice. This term occurs twice in the Old Testament (Gen. 2:12 and Num. 11:7; rendered in Greek *anthrax* in the former, and *crystallos* in the latter), and denotes probably a gem.

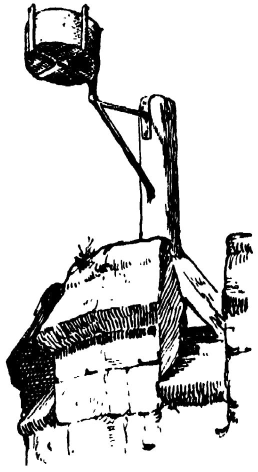
Beach, SIR MICHAEL EDWARD HICKS-, M.P. See HICKS-BEACH.

Beach, THOMAS MILLER. See LE CARON, MAJOR.

Beaches, RAISED. A raised beach is usually a horizontal terrace of varying width, some distance above the present seashore. It may consist of naked rock, but is more frequently covered with sand and gravel; and when overgrown with grass or trees, it may form so slight a feature of the scenery as to escape the casual observer. Such old, grass-grown raised beaches can be traced for miles along the shores of Scotland, in places narrow and almost destroyed, but here and there expanding into broad level terraces on which are built many coast towns—*e.g.* Nairn, Fortrose, Cromarty, Bridge of Allan. In favourable situations, three or even more of these terraces may be found one below the other; and geologists recognize three raised beaches in Scotland, indicating three successive shore-levels, as the land was gradually elevated during Pleistocene times. Sometimes at the inner margin of the beach-terrace a rocky cliff is found, in which caves may still testify to the former action of the breakers (Crail, Kintyre, Buckhaven, and Fortrose). Shells are occasionally found in the lower beach deposits, though usually they have been dissolved by percolating water. There is often much drifted wood mixed with the gravel, sand, and mud, especially near the mouths of the rivers. Similar beaches are known in the north of England. The raised beaches of Norway have long been famous; some of them are 600 ft. above the sea. In Jamaica, Chile, New Zealand, and many other places there are raised beaches. Surveys of the great lakes of N. America have demonstrated the existence of raised beaches there. Apparently the entire basin of the great lakes is being elevated in the north-east, and depressed in the south-west. See Chambers's *Ancient Sea Margins* (1848); Darwin's *Voyage of the 'Beagle'* (new ed. 1901); Lyell's *Principles of Geology* (12th ed. 1875); Suess's *Das Antlitz der Erde* (1883-8).

Beachy Head, cape on S. coast of Sussex, England, 3 m. W. of Eastbourne, the E. extremity of the S. Downs, the chalk cliffs here rising to a perpendicular height of 564 ft. On the W. cliff—Belle Toute—a lighthouse visible for 23 m. was erected in 1831. The BATTLE OF BEACHY HEAD was fought, June 30, 1690, between an Anglo-Dutch fleet of 56 sail of the line, under Admiral Arthur, Earl of Torrington, and Cornelis Evertsen the youngest, and a French fleet of 68 ships of the line, under Comte de Tourville. The allied van, composed of the Dutch, and the rear, under Vice-Admiral Sir Ralph Delavall, fought on the 29th June very closely and gallantly; the allied centre engaged less warmly. The tide then carried the French out of gunshot of the allies. At that time only one ship, a Dutch one, had been lost. During Torrington's subsequent retreat up channel before the French, he lost or sacrificed eight or nine more, and then took ignominious refuge in the Thames. The action is known by the French as the battle of Béveziers. For a discussion of Torrington's action, see *Quart. Rev.*, Oct. 1893, and Clowes's *The Royal Navy*, vol. ii. (1897).

Beacon, anything designed to act as a signal or indicator. In the 10th-century Anglo-Saxon poem of *Beowulf*, 'beacon' is used with the meaning of 'ensign' or 'standard;' and this particular signification was current in English as late as the end of the 15th century. Long before that time, however, the word had begun to develop its more special meaning of '*fire-signal*;' for an Act of Edward III. (*c.* 1340) ordains that beacons 'should be high standards *with their pitch-pots*.' By this is indicated the cresset or fire-basket, which was not only carried by soldiers, watchmen, and servants at the top of poles, but was very frequently fixed on the ramparts of mediæval castles (as may yet be seen at Edinburgh Castle); and it was also fastened to the inner walls of baronial halls, or suspended from the vaulted roof, for ordinary purposes of illumination. It was also fixed at the outer end of a harbour wall, to guide incoming boats at night. At the present day, however, the word 'beacon' is chiefly held to denote a fire-signal, such as the beacons erected in a long chain from Cornwall to the Cheviots, whose successive flare announced to the whole of England the advent of the Spanish Armada, or the beacons scattered all over the British Isles in the early part of the 19th century, as a precaution against the threatened French invasion. Beacon fires were lighted on the occasion of the diamond jubilee of Queen Victoria (1897), and at the coronation of King Edward VII. (1902). In some cases the name 'beacon' has become attached to a hill itself. Dunkery Beacon on Exmoor is an example of this; also the Airly Beacon of Kingsley's song. For beacons in the modern sense of marks for navigation on coasts, in rivers, and in estuaries, see BUOY.



Ancient Beacon.

Beaconsfield. (1.) Market town and par. in Buckinghamshire, England, 2½ m. N.E of Loudwater stn., on the Maidenhead and High Wycombe Ry., and 23 m. W.N.W. of London. The town gave the title of earl to Benjamin Disraeli. Pop. (1901) 1,570. (2.) A suburb of Kimberley, Cape Colony, with which it is connected by tramway. Diamond mines. Pop. (1890) 21,619, mostly natives.

Beaconsfield, BENJAMIN DISRAELI, EARL OF (1804-81), prime minister of England, politician, and novelist, was the second of the four children of Isaac Disraeli. Benjamin was born in London, and was received into the Jewish Church, but was baptized when his father and mother became members of the Church of England in 1817. Privately educated, he learned most in his father's library. At his father's table he met Croker, Rogers, and other writers of the day; and though he was constrained at seventeen to enter a solicitor's office with a view to the bar, literature claimed him. When he was twenty-one (1826) he published his first (semi-autobiographical) novel, *Vivian Grey*, which was the book of the season. Then his health broke down, and the second part of *Vivian* (1827) and *The Young Duke* (1831) were disappointing. But he presently produced three brilliant satires—*Ixion in Heaven*, *The Infernal Marriage*, and *Popanilla* (all 1828), the latter a skit on the British constitution. In 1830 and 1831 he travelled—saw Spain, the Mediterranean, Greece, Turkey, and the Holy Land. A second autobiographical novel, *Contarini Fleming*, followed in 1832, *Alroy* in 1833, and *The Rise of Iskander* in 1834. *The Revolutionary Epic*, published in 1834, proved to him that he was not a poet, and he decided that politics was to be his rôle. Affecting extreme foppery in dress—he was determined to be distinguished somehow—he started as a Radical; wooed in 1832 the electors of High Wycombe in a laced shirt and pink-lined coat, and was rejected. But he succeeded in making himself notorious, and by the time the Radicals had sickened of the Reform Parliament he was done with them, and joined Peel. As a Tory candidate for Taunton he came into collision with O'Connell, and more notoriety was the result. The *Times* published his *Letters of Runnymede*, attacking the Whig leaders in the style of Junius; and to the 1837 Parliament he was easily returned for Maidstone, as the colleague of his friend Mr. Wyndham Lewis, whose widow he married in the following year. His first speech was shouted down by the other side; but the House heard him say, 'I will sit down now, but the time will come when you will hear me.' He took Shiel's advice to be commonplace for a session, and was listened to. Marriage saved him from financial shipwreck. In 1841 he took his seat for Shrewsbury, which in 1847 he exchanged for Buckinghamshire. He hit hard in the House, and made himself respected, if not feared. Associating himself with some of the younger Tories—Young England—he wrote more novels, embodying their views on the salvation of England by the aristocracy. *Henrietta Temple* and *Venetia*, love stories, which appeared in 1837, were followed by the political *Coningsby* (1844), *Sybil* (1845), and *Tancred* (1847). The writer of these works had no part in the tendency that was sweeping Peel towards free trade; and when Peel abandoned protection in 1846, Disraeli, by a series of fierce attacks on his old chief, made himself the leader of the Tories, with a nominal chief in Lord George Bentinck, whose *Life* he wrote in 1852. For a quarter of a century he led the Conservatives in the House of Commons, 'educating,' in his own phrase, the men who slowly and reluctantly submitted to his indispensable dominance. He was three times Chancellor of the Exchequer (in 1852, 1858-9, and 1866), and prime minister in 1868 and 1874-80. Disraeli educated the party to the pitch of passing the Reform Act of 1867. When he got real power in 1874, he showed that imperialism and a spirited foreign policy had taken the place in his heart of the earlier enthusiasm for social reform. But though he had in 1872 protested against the Liberals' neglect of the colonies, he did nothing to bind the empire together. In 1876 he made Queen Victoria Empress of India, bought the Suez Canal shares, and became Earl of Beaconsfield; and in 1878 he loosened the grasp of Russia on the throat of Turkey, and brought back 'peace with honour' from the Berlin Congress. His greatest novel, *Lothair*, was published in 1870; his last, *Endymion*, in 1880. He was buried at Hughenden, leaving directions that his *Life* should be written by Lord Rowton. Disraeli was one of the greatest of British parliamentarians, but the time has not come for an appreciation of him as a politician. His novels are unique. No one has portrayed with such fidelity the English aristocracy at its best, or the inner life of politics. *An Unfinished Novel*, by him, commenced serial issue in the *Times* on Jan. 20, 1905. See Sir T. Martin's *Life of the Prince Consort* (1880), and *Life of Lord Lyndhurst* (1883); *Greville Memoirs* (1875); *Croker Papers* (2nd ed. 1885); T. P. O'Connor's *Lord Beaconsfield* (6th ed. 1884); *Sketch* by Georg Brandes (Eng. ed. 1880); and *Biographies* by T. E. Kebbel (1888), J. A. Froude (1890), Harold Gorst (1897), Sir W. Fraser (1891), Wilfrid Meynell (1903), and Walter Sichel (1904).

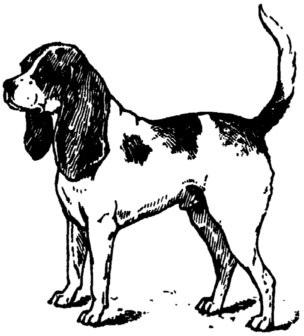
Benjamin Disraeli, Earl of Beaconsfield.

(Photo by W. & D. Downey.)

Beadle, a functionary, bearing a mace or a wand of office, who precedes civic or ecclesiastical dignitaries. The English parish beadle, however, is practically a constable. In ancient Egypt the church beadles or temple police (*sāsh*) preceded the procession of priests, as portrayed at Abydos and Bubastis. At the latter place they were of dwarf race.

Beads. Beads were among the earliest ornaments: they have been found in Egyptian tombs; glass beads, used by the Phœnicians for trade, are still treasured by African chiefs; and at the present day beads are a common medium of exchange with uncivilized tribes. Birmingham is the centre of the industry in England, but Venetian beads are the most noted for their variety and beauty. In making glass beads, a mass of glass is blown into a bulb, and this is drawn out into a long tube. This tube is cut into pieces about one foot long, and these, after being annealed, are cut into beads. The beads are then placed in a rotating drum, with charcoal and plaster, and heated over a furnace. By the rubbing together in the drum the pieces of soft glass receive a round shape, the charcoal and plaster preventing them from sticking together.

Beagle, in appearance a miniature foxhound, is the smallest dog used for hunting purposes. It would appear to be of ancient origin, for a pair are mentioned at the time of Queen Elizabeth. The present-day beagle varies in height from 10 to 16 in. It possesses an extraordinarily keen scent, acute intelligence, and admirable perseverance. A pack in full cry runs so closely that it might sometimes be covered with a sheet, and the dogs give a sonorous music quite amazing for such small beasts. There are forty-four packs of beagles in the United Kingdom, and for hare-hunting in a mountainous country they afford excellent sport. The points are: skull fairly long and wide, and slightly domed; stop well defined; muzzle short and rather tapering; nose large, with nostrils well open; ears long, thin, and hanging in folds; eyes rather full, and very soft; neck fairly long and muscular, and free from dewlap; shoulders strong and sloping, and set rather wide apart; chest very deep in proportion to size; ribs deep and round; body well ribbed up; loin very muscular; hind quarters wide and strong; hocks well bent; fore legs straight, and with good bone; feet round and catlike; stern gay and lashing; coat close, dense, and flat, and of any hound colour. The rough variety differs from the smooth only in texture of coat.



Beagle.

Beagle, the British sloop on which Charles Darwin, as naturalist, made his famous voyage (1831-6).

Beak, in birds. See Bill.

Beaked, in heraldry, a term applied to birds (not being birds of prey) which have the beak of a colour different from that of the body. When the legs and talons are similarly coloured, the term 'membered' or 'armed' is used.

Beaker, a thin cylindrical or conical vessel made of glass, used in chemical operations to heat liquids, collect precipitates, etc.

Beal, Samuel (1825-89), Oriental scholar, studied at Cambridge, went through the China war as a navy chaplain, and ultimately became professor of Chinese at University College, London. Among his works, in which he brought to light much valuable information on the history of early Buddhism, are: *The Catena of Buddhist Scriptures from the Chinese* (1872), *The Romantic Legend of Buddha* (1876), *Texts from the Buddhist Canon, Dhammapada* (1878), a *Life of Buddha*, and a *Life of Hienen-Tsiang* (1888).

Beale, Dorothea (1831), principal of the Cheltenham Ladies' College since 1858; LL.D. Edin. She is probably the best known of English headmistresses, and is the author of several text-books and articles in the magazines on literary and educational subjects.

Beale, Lionel Smith (1828), English physiologist, was born in London; studied at King's College, where he became professor successively of anatomy and physiology (1853), pathology, and medicine, retiring in 1896. Among his works are: *The Microscope in its Application to Practical Medicine* (4th ed. 1878); *How to work with the Microscope* (ill. ed. 1861); *Protoplasm, or Life, Force, and Matter* (1870); *The Mystery of Life* (1871); *Vitality and Natural Religion* (1900); and *Vitality and Natural Science* (1900).

Beale, Robert (1541-1601), English diplomatist and antiquary, was engaged by Elizabeth in negotiations with continental princes, and with the Queen of Scots (1581-4) at Sheffield. He was present at the massacre of St. Bartholomew, and carried (1586) to Fotheringay the warrant for the execution of Mary. He has left an account of both events. He was M.P. for Totnes (1572), Dorchester (1585-6, 1588), and Lostwithiel (1592), and served under Leicester in the attempt to relieve Sluys (1587). See Strype's *Annals*, iii. (1709); his *Whitgift* (1718), and *Parker* (1711).

Beam, White (*Pyrus aria*), a tree about 30 ft. high, belonging to the pear genus of Rosaceæ; is found in Europe and Asia, and grows in mountainous woods in Britain. The leaves are simple, elliptical, with serrate edges, and either whole or cut into lobes; the under surface is white with downy hairs. The flowers resemble those of the rowan; the fruit is like an enlarged haw or miniature apple, and is slightly acid and astringent. It is sometimes mistaken for the service tree. The wood is yellowish white, hard, close-grained, and takes on a high polish; it is very suitable for turning.

Beam. See Shipbuilding; Building.

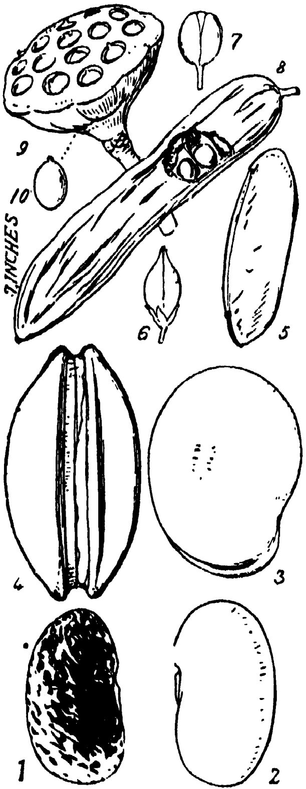
Beamish, North Ludlow (1797-1872), military writer and antiquary; served at the viceregal court of Hanover; published *Instructions for the Field Service of Cavalry, from the German of Count von Bismarck* (1825); *History of the King's German Legion* (1834-7); *On the Uses and Application of Cavalry in War* (1855); *Discovery of America by the Northmen* (1841).

Bean, a name applied to certain seeds, chiefly of the order Leguminosæ. (**1.**) Seeds of Leguminosæ.—The *Vicia Faba* of Linnæus includes broad beans and their garden varieties, and field beans, which are used for feeding horses. Other varieties are scarlet-runner beans, haricot kidney beans, French or haricot beans, and the scimitar-podded kidney or sugar beans, also known as Lima haricot beans. Three species of *Phaseolus* are natives of India—the moth or aconite-leaved kidney bean, the three-lobed kidney bean, and the green gram or mung. Calabar bean is the ordeal bean of Calabar. (**2.**) Plants of other orders.—Bean-capers are the flower-buds of a plant in the guaiacum order, and are used as substitutes for true capers. Bog-bean, or buck-bean, is a British species of the gentian order. Water-bean, or sacred bean, is the name of the fruit which is supposed to be the sacred lotus of Egypt.

The beans commonly grown in English gardens are the broad bean (*Vicia Faba*, or *Faba vulgaris*), the climbing scarlet runner (*Phaseolus multiflorus*), and the dwarf French, haricot, or kidney bean (*P. vulgaris*). The broad bean is the species referred to by Greek and Roman authors, and is the bean which the ancient Egyptians held to be evil and unclean. The Romans made use of it as an instrument of the ballot in their municipal elections, and they also prepared it in various ways for human food. The broad bean was early introduced into Britain, and is referred to by Chaucer as a well-known vegetable. The kidney bean, on the other hand, was only introduced at the beginning of the 16th century, and the scarlet runner nearly a century later. Kidney beans are mentioned by Beaumont and Fletcher.

Beans are highly nitrogenous; dried haricots contain 23 per cent. of legumin and other proteids. They also contain over half their weight of starch.

Beans, like most other vegetables, rejoice in a light, warm, deeply-dug soil, well enriched with manure. For the earliest supply of broad beans, a sowing of Mazagan may be made in November, followed by a sowing of early Lepod in February. Others may be sown in March, and for late crops a sowing of old broad Windsor may be made towards the end of April. Sow in drills three inches deep, allowing eighteen inches between the rows, and nine inches between the plants in the row. French beans and scarlet runners are much more tender, and susceptible to frost. The earliest sowing of French beans in the open may be made about the beginning of April, ne-plus-ultra being a good variety. About the beginning of May, a sowing of triumph or progress may follow; about the end of May, Canadian wonder may be sown. The distance between the plants should be the same as advised above for broad beans. Scarlet runners are sown in the same way, but six or more feet must be left between the rows, the intervening space being utilized for dwarf crops. The first sowing should be made early in May. Good varieties are champion runner, best-of-all, and Chelsea giant. The newer climbing French beans should be treated in a similar way, but being a little hardier may be sown a fortnight earlier. See Wythe's *Book of Vegetables* (1901); Vilmorin's *The Vegetable Garden* (1885); De Candolle's *Origin of Cultivated Plants* (1884). See also Locust Bean, Tonka Bean.



Beans.

1. Scarlet-runner. 2. Haricot bean. 3. Broad bean. 4. Calabar bean. 5. Tonquin bean. 6. Bog bean. 7. Bean caper. 8. Locust bean. 9. Sacred bean or lotus (Egypt). 10. Seed of the lotus.

Bean Feast, a social festival observed in some European countries on the eve of Twelfth Day, as in the Netherlands, where Jordaens and Steen have painted the revels. The mock king of the feast was he who got the piece of the 'twelfth-cake' which was found to contain a bean that had been baked in it; hence the name. This pagan festival, which not improbably reaches back to the Roman Saturnalia, has sometimes been confused with Epiphany, which occurs on the same date. The name 'bean feast' is now generally applied to a festival given by employers, especially in and near London, to their work-people.

Bean Tree, a name given to various trees because of the similarity of their fruit to a bean. In Australia, the Moreton Bay chestnut, *Castanospermum australe*, is so called; and in the United States and W. Indies there are four or five species so named, of which the best known are the *Catalpa bignonioides* and the Jamaican *Erythrina corallodendron*. The wood of the Catalpa is a hard, useful timber, the bark has tonic and antiseptic properties, but the honey made from the handsome 'trumpet flowers' is poisonous.

Bear, riv. of Idaho and Utah, U.S.A., trib. of Great Salt Lake; rises on the northern slope of the Uinta Mts.

Bear. Bears are a well-defined group of mammals which, together with some smaller animals—such as otter, stoat, skunk, and others—constitute a section (*Arctoidea*) of the order Carnivora. Bears differ from the more typical carnivores, such as cat and dog, in the nature of the teeth, which are such as to render a mixed diet possible; in the broad feet, which are plantigrade – *i.e.* the whole sole is applied to the ground in walking (contrast cats and dogs); and in certain minor points, such as that the skull is long, the body large and massive, the movements relatively slow, as compared with those of cats and dogs. The fur is generally long and soft. The common brown bear (*Ursus arctos*) is, or was, widely distributed in Europe and Asia, and feeds on roots, fruits, honey, insects, and, at times, small mammals. Of the Arctic region the characteristic species is the polar bear (*Ursus maritimus*), while the American forms are the well-known grizzly bear (*U. horribilis*), believed to be closely related to the brown bear, and the black bear (*U. americana*), together with the spectacled bear (*U. ornatus*) of the slopes of the Andes. Africa south of the Atlas Mts. has no bear—a somewhat remarkable fact—while India and the Malay Peninsula contain several peculiar species.

Most bears are adepts at climbing, and owing to the mobile plantigrade hind limbs, which are longer than the fore limbs, are capable of standing upright and using the fore limbs as weapons. In the more familiar forms these fore limbs are used in the deadly 'hug,' which is one of the bear's favourite modes of attack. Though all bears live, at least partially, on vegetable food, all are, to some extent, predatory animals. In the case of the brown bear, for example, the animal is fiercely carnivorous in the early spring.

Bear (Constellation). See Ursa.

Bear-baiting. The baiting of bears with dogs was a favourite sport of the Romans, who imported bears from Britain, Syria, and elsewhere for the purpose; and until recent times it was common all over Europe. It existed in England as early as the 12th century, and was, in the reign of Elizabeth, a popular and fashionable amusement. A noted centre in London was Paris Gardens, on the Bankside in Southwark. In the 17th century it was repressed by the Puritans, and was finally prohibited by law in 1835.

Bearberry (*Arctostaphylos*), a genus of the heath order (Ericaceæ), found chiefly in America. Two species occur in the British Isles on mountain slopes. *A. alpina*, with deciduous leaves and black berries, is very rare, and is found only in the Highlands of Scotland. *A. uva-ursi* is more common: its small, leathery, dark green, obovate leaves are evergreen; the plant has a low, dense, trailing habit; the flowers are pink, and appear soon after the snow melts from the hills; the fruit is red. In both species the fruit is about as large as a cranberry. In continental regions it is eaten by bears, and in Britain by grouse and other birds.

Bearberry (Arctostaphylos uva-ursi).

Stamen, section of ovary, and cluster of fruit.

Beard. See Hair.

Beard, George Miller (1839-83), American physician, born in Connecticut. Assistant surgeon (1863-4) in the navy during the civil war, on its conclusion he began (1866) practice in New York, and devoted himself especially to nervous diseases, on which (1868) he was appointed university lecturer. His works treat of *American Nervousness* (1881), *The Study of Trance* (1882), and *Nervous Exhaustion, Neurasthenia* (1880).

Beard, John (1717-91), English actor and tenor singer, made his first appearance in Handel's representation of *Acis and Galatea, Alexander's Feast,* and *Atalanta.* He afterwards appeared at Drury Lane and Covent Garden, becoming manager of the latter in 1761. For him Handel composed the great tenor parts in *Israel in Egypt, Messiah, Samson, Judas Maccabæus,* and *Jephthah.* See *Gent. Mag.* for 1791.

Beard, Thomas (d. 1632), Puritan divine, and headmaster of Huntingdon grammar school, where he had Oliver Cromwell for a pupil. Beard's work, *The Theatre of God's Judgments* (1597), contains the earliest account of the death of Marlowe.

Beard Grass, a name applied to two rare species of grass (*Polypogon*) found near the sea from Norfolk to Hants, in England.

Beard Moss, a lichen (*Usnea barbata*) which hangs like tangled tresses of hair from the branches of trees in Britain and other countries of the temperate regions.

Beardsley, Aubrey Vincent, a notable and original black-and-white artist, was born in 1872 at Brighton. His drawings in black and white for the *Pall Mall Magazine* and the *Pall Mall Budget,* began to attract public attention. His illustrations in Messrs. Dent's edition of *La Morte d'Arthur,* published 1893, may be said to have given him a definite reputation. When the *Yellow Book* was started in 1894, he was appointed art editor, and was next associated with Mr. Arthur Symons in the production of the short-lived *Savoy.* Illustrations, or decorative designs, for Oscar Wilde's *Salome,* for *The Rape of the Lock,* for *Mademoiselle de Maupin,* and for *Pierrot of the Minute,* followed; and when Beardsley died from consumption, at Mentone, in 1898, he had just completed a series of initials for an edition of *Volpone.* His work was admirable and highly accomplished in a technical sense, the line was marked by precision and style, and the black-and-white masses were used very adroitly and with wonderful decorative effect; but he was not free from affectation, he was over-fond of the grotesque and even the unsavoury.

Bearer Company, in the British army a mixed unit of the Army Service and Royal Army Medical Corps, which is attached to each brigade of cavalry and infantry in war time. The former corps furnishes 1 warrant-officer and 1 sergeant—both mounted—34 rank and file for drivers and batmen, and 50 draught-horses. The R.A.M.C. provides 3 officers, 1 warrant-officer—all mounted—57 non-commissioned officers and men, 10 four-horsed ambulance wagons, 1 two-horsed water-cart, and 4 two-horsed carts for provisions, etc. Total, 97 officers and men, 56 horses. In action the bearer company is divided into four parts—*viz.* ambulance men, collecting station, ambulance wagons, and dressing station.

Bears.

1. Polar bear. 2. Grizzly bear. 3. Black bear. 4. Malayan be

Bearing. To builders the bearing of a piece of timber means the unsupported part between two fixed extremities or supports, which are likewise called bearings. The term is also applied to the distance or length of the beam beyond the line or face of support, or extent of the beam surface which actually lies on, or is supported by, the wall, which latter becomes then the 'bearing wall' or 'partition.' The supported wall, if built in the same direction, is said to have a 'solid bearing;' if built in a transverse direction, as in the case of sills, a 'false bearing,' or as many false bearings as there are intervals below the wall or partition. Timbers or lintels let into a wall have usually a bearing of 9 in. at each end; stone steps should also have a bearing of 9 in. The bearing of joists or other beams supported at both ends is regulated by the resistance of the material to crushing. A bearing of 4½ in. on the sleepers or wall plates is generally considered sufficient in ordinary dwelling-houses. In applied mechanics a bearing is the support of a moving part of a machine. Bearings have a double part to play: they not only furnish a support, but permit the part of the machine supported to perform the motion or motions required of it. Such motions are either turning or sliding. To reduce frictional losses, and to prevent the destruction of the moving surfaces, special forms of bearings have been designed. (See FRICTION; BALL BEARINGS.) The bearing of a vehicle is one of the pieces supporting the framework and resting on the axle. In railroad engineering, a bearing is the element that holds up the framework of a railway carriage or truck, and rests on the journal of the axle outside the wheel. In nautical language, bearing connotes the position of any object with regard to the observer's ship as determined by compass.

Bear Lake, GREAT, lake, N.W. Territories, Canada; length, 175 m.; breadth, 25 to 45 m.; area, 11,200 sq. m. It discharges into the Mackenzie R. by the Great Bear R. Its waters abound with fish, and are frozen over nine months in the year. Fort Confidence, at the N.E. end, and Fort Franklin, at the W. end, are the two chief trading stations.

Béarn, an old prov. of France, forming part of the deps. of Basses-Pyrénées and the Landes, and inhabited by Gascons of Basque origin. Cap. Pau. In 1620 Louis XIII. formally made Béarn a part of France.

Bear's Breech. See ACANTHUS.

Bear's Foot. See HELLEBORE.

Beas (the *Hyphasis* of the Greeks; Sans. *Vipasa*), one of the five rivers of the Punjab, rises in the Himalaya Mts., and after a course of 290 m. joins the Sutlej, 35 m. S.E. of Amritsar.

Beat, in music. (**1.**) A name formerly given to certain graces or ornaments. (**2.**) The wavy effect produced when two notes, which are nearly but not quite in unison, are sounded simultaneously.

Beatenberg, St. See ST. BEATENBERG.

Beath (Gael. 'birch tree'), par. of S.W. Fifeshire, Scotland, 5 m. E.N.E. of Dunfermline; contains the mining villages of Hill of Beath (one of the first in Scotland to adopt the Gothenburg public-house system), Cowdenbeath, Kelty (part of), Oakfield, and Lassodie. Area of par. 6,343 ac. Loch Fitty lies within the S.W. boundary. Coal is extensively worked. Pop. (1901) 15,812.

Beaton, DAVID, CARDINAL (1494-1546), primate of Scotland. At the University of Paris he became intimate with the Scottish regent, the Duke of Albany, who in 1519 appointed him resident for Scotland at the French court. In 1525 Beaton became abbot of Arbroath; in 1528, lord privy seal; in 1538 he was created a cardinal; and in 1539 he succeeded his uncle, James Beaton, as archbishop of St. Andrews. On the death of James V., in 1542, he sought to seize the infant queen of Scots, and to obtain the regency by means of a forged will; but the scheme failed, and he was arrested and imprisoned. After his release, he became, in 1543, chancellor of Scotland. He now persecuted the Protestants with great cruelty and rigour. Among his victims was the famous preacher George Wishart. His rule became intolerable, a conspiracy was formed against him, and he was assassinated at St. Andrews on May 29, 1546. See Burton's *Hist. of Scot.*; Knox's *Hist.*; the *Iconographia Scotica*; G. Cook's *Hist. of the Reformation in Scot.* (2nd ed. 1819); Tytler's *Original Letters* (1839); and *Cardinal Beaton, Priest and Politician*, by John Herkless (1891).

Beaton, or BETHUNE, JAMES (d. 1539), uncle of the preceding, archbishop of Glasgow (1509) and St. Andrews (1522), was one of the commission of regency during the minority of James V.; and, by securing the marriage of James with Magdalen of France, successfully thwarted Wolsey's plan of an alliance between England and Scotland. His rigorous policy against the reformation led to the burning of Patrick Hamilton (1528) and three other reformers. Beaton founded the new divinity college at St. Andrews. See Keith's *Hist. of Scot., Civil and Ecclesiastical* (1886); Spottiswoode's *Hist.* (1677).

Beaton, or BETHUNE, JAMES (1517-1603), last R.C. archbishop of Glasgow (1552), nephew of the cardinal, retired to Paris after the death (1560) of the queen regent. Beaton was one of Queen Mary's most active correspondents. See Cosmo Innes's *Sketches of Early Scot. Hist.* (1861).

Beatrice, the angelic woman who was the heroine of Dante's *Vita Nuova*, of his *Divina Commedia*, and of his whole life. It has been supposed by some that she was a purely symbolic figure; but it is now certain that the object of his adoration was an actual Beatrice, a Florentine lady, daughter of one Folco Portinari, who became the wife of a certain Simone de' Bardi. After her untimely death in 1290, Dante married (1291) Gemma de' Donati.

Beatrice, PRINCESS. See BATTENBERG, PRINCESS HENRY OF.

Beattie, JAMES (1735-1803), Scottish poet and miscellaneous writer, born at Laurencekirk, Kincardine; died at Aberdeen, where he was (1760) professor of moral philosophy in Marischal College. He published a volume of miscellaneous poems in 1761, and in 1765 a poem, *The Judgment of Paris.* His once celebrated *Essay on Truth* (1770), for which he received a pension of £200 a year from George III., was a refutation of Hume's scepticism; but its main contents had been anticipated by Reid's *Inquiry* (1764). In 1771 he published the first book of *The Minstrel, or the Progress of Genius*, the work on which his fame rests; the second book appeared in 1774. Written in the Spenserian stanza, it abounds in beautiful descriptive passages, and is notable for the harmony of its versification. Among his other works were a *Dissertation on Poetry and Music* (1776), *Evidences of the Christian Religion* (1786), and *Elements of Moral Science* (1790-93). See his *Life* by Sir W. Forbes (1806), and the ed. of his poems by Alex. Dyce for the Aldine Ser. (1866).

Beattie, WILLIAM (1793-1875), Scottish physician and author, studied medicine at Edinburgh (1812), and practised in Edinburgh (1820), subsequently in Cumberland (1821), and afterwards with great success in London (1827-45). He was a friend of Thomas Campbell the poet, whose life he wrote (1849). A series of descriptive and historical works on Switzerland, the Danube, the castles and abbeys of England, etc., appeared in 1835-6, illustrated by W. H. Bartlett.

Beaucaire, tn., dep. Gard, France, on r. bk. of Rhone, at the head of the Canal de Beaucaire, 14 m. E. of Nîmes, with manufactures of silk, cloth, wool, leather, etc. The annual fair (July 21-28), established in 1217, and once the rendezvous of thousands of traders, is now insignificant. Pop. (1901) 9,143.

Beauce, dist., France, round Chartres, part of the deps. Eure-et-Loir and Loir-et-Cher; a large and very fertile calcareous plateau especially suited for wheat.

Beauchamp, Alphonse de (1767–1832), French historian, was born at Monaco, and died in Paris. At seventeen years of age he took service with the king of Sardinia; but in 1792 he refused to fight against France, and after a short imprisonment proceeded to Paris, where he obtained employment in the office of the Committee of Public Safety, and a little later in that of the minister of police. The publication of his *Histoire de la Vendée et des Chouans* in 1806 cost him his office and banishment to Rheims, from which he was recalled five years later. He also compiled numerous biographical sketches (*e.g. Moreau* in 1814, and *Louis XVIII.* in 1824).

Beauchamp, William Martin (1830), American clergyman and ethnologist, has held charges at Northville, New York (1863–5), Baldwinsville, New York (1865–1900), and in 1886 became examining chaplain for Central New York. In 1889 he surveyed the Iroquois territory in New York and Canada, and has made an extensive study of the Iroquois tribes. Among his works are *The Iroquois Trail* (1892), *Indian Names in New York* (1893), *Aboriginal Chipped Stone Implements of New York* (1897), and *Aboriginal Occupation of New York* (1900).

Beauclerk, Topham (1739–80), great-grandson of Charles II. and Nell Gwynne. Bennet Langton introduced him to Johnson, and so began the friendship by which Beauclerk is chiefly remembered. See Boswell's *Life of Johnson*, and Birkbeck Hill's *Dr. Johnson: his Friends and his Critics* (1878).

Beaufort. (1.) Town and summer resort, N. Carolina, U.S.A., co. seat of Carteret co., situated on the S.E. coast, at the mouth of Newport R. It has a fine harbour, and is of considerable commercial importance. Pop. (1900) 2,195. (2.) Town, S. Carolina, U.S.A., the co. seat of Beaufort co., situated in the S.E. part of the state, on the coast, near the mouth of the Beaufort R., and on the Charleston and West Carolina Ry. Its principal industry is exporting cotton and rice. Pop. (1900) 4,110.

Beaufort, Sir Francis (1774–1857), British rear-admiral. Entering the navy (1787), he was present (1794) in the *Aquilon* at Lord Howe's action of June 1. In 1800 he was severely wounded in cutting out a Spanish ship. In the same year he was promoted to be commander, and in 1810 became a captain. Hydrographer to the Admiralty (1832–55).

Beaufort, Henry, Cardinal (1377–1447), was the natural son (afterwards legitimized) of John of Gaunt and Catherine Swynford. Educated at Oxford and Aix-la-Chapelle, he was in 1398 appointed bishop of Lincoln, and translated to Winchester in 1405. Three times (1403–4, 1413, 1424–6) he held the Great Seal of England. In 1426 he was created a cardinal by Pope Martin V. He opposed the war tax on the clergy proposed by Henry V., but lent the king large sums out of his private purse. The failure of his crusade against the Hussites in Germany, and the diversion to other objects of moneys granted by Rome for specific purposes, brought him under papal displeasure. In 1444 he succeeded in making a truce between England and France. Beaufort died at Winchester in 1447, shortly after his great rival, the Duke of Gloucester, in whose death it was falsely said he had been implicated. Though ambitious and haughty, and not without avarice, he was a far-sighted and patriotic statesman, who desired to uphold the crown by the advice and support of the estates of the realm. The course of after events is the best testimony to his political wisdom and constitutional zeal. See Creighton's *Hist. of the Papacy* (new ed. 1897), Stubbs's *Const. Hist.* (1866), and the *Chronicles* of Monstrelet (1810).

Beaufort-en-Vallée, tn., dep. Maine-et-Loire, France, 20 m. E. of Angers, with a trade in fruit, corn, linen, oil, cattle. The castle belonging to the Duke of Lancaster gave the family name of Beaufort to his natural children by Catherine Swynford. Pop. (1901) 4,222.

Beaufort Testimonial, a prize, in the form of an instrument or technical books, awarded annually to the naval officer who, qualifying for the rank of lieutenant, passes at the Royal Naval College the best examination in navigation. It was founded in 1860 to commemorate the services of Sir Francis Beaufort.

Beaufort West, tn. and dist. on the Great Karroo, Cape Colony. The district has large sheep runs, and the town, which is on the railway from Cape Town to Kimberley, is the largest in that part of the Karroo. It is supplied with water from a skilfully-constructed dam. Pop. of dist., about 10,000; of town, about 3,000.

Beaugency, tn., dep. Loiret, France, on r. bk. of the Loire, 17 m. S.W. of Orleans; has manufactures of wool, and a trade in wheat, vinegar, flour, etc. Built on the site of a Roman station, the town was strongly fortified during the middle ages, and was held by the English (1359–1428), when it fell before Joan of Arc. The Germans, under the Grand-duke of Mecklenburg, here defeated the French under Chanzy (Dec. 7–10, 1870). Pop. (1901) 3,761.

Beauharnais, Alexandre, Vicomte de (1760–94), French general, son of the Marquis Beauharnais; born at Martinique; married, in 1779, Josephine Tascher de la Pagerie, afterwards wife of Napoleon I. After serving in the American war, he came to France, embraced republican principles, and was one of the first nobles to join the Third Estate. Beauharnais became secretary to the Assembly, and afterwards to the military committee; and was president of the Assembly when Louis XVI. fled from the capital (June 21, 1791). In May 1793 he succeeded Custine as general-in-chief of the army of the Rhine. The decree for the exclusion of the nobility from military employment led to his retirement; and shortly afterwards he was accused before the revolutionary tribunal of having contributed to the loss of Mayence, and was condemned and executed on the same day.

Beauharnais, Eugène, Marquis de (1781–1824), better known as Prince Eugène, the son of Alexandre Beauharnais and Josephine, afterwards consort of Napoleon, was born at Paris. Entering the army, he accompanied Napoleon to Egypt, and became general of brigade in 1804, and in the following year received the title of prince, and was appointed viceroy of Italy. On Jan. 16, 1806, he married the Princess Royal of Bavaria, and immediately after was formally adopted by Bonaparte as his son. During the war with Austria, in 1809 he was commander-in-chief of the army of Italy, and shared in the honours of Wagram. In the later wars of Napoleon he took a very active share, especially in the campaigns of 1812–13. Disappointed of the crown of Italy, he retired, after the downfall of Napoleon, to Bavaria, and died at Munich. See Baron Darnay, *Notices Historiques sur...... le Prince Eugène* (1830); Du Casse, *Mémoires et Correspondance du Prince Eugène* (10 vols. 1858–60); Weil, *Prince Eugène et Murat* (1902).

Beaujeu, tn., dep. Rhône, France, 28 m. N.W. of Lyons; chief town of the former prov. Beaujolais. Pop. (1901) 3,373.

Beaujolais, part of the former prov. of Lyonnais, France, now in depts. of Rhône and Loire, is famous for its vineyards, producing the Burgundy known as Beaujolais.

Beaulieu, par., Hampshire, England, at the head of the estuary of Beaulieu R., 4 m. S.S.W. of Southampton. Its abbey, now in ruins, was founded by King John, and became the asylum of Margaret of Anjou after the battle of Barnet. It also sheltered Perkin Warbeck. Pop. (1901) 833.

Beauly, vil. in Kilmorack par., Inverness-shire, Scotland, on Highland Ry., 10 m. W. of Inverness. Pop. (1901) 855.

Beaumarchais, PIERRE AUGUSTIN CARON DE (1732–99), French dramatist and politician, was born in Paris. Marrying the widow of a court dignitary, he obtained before long his patent of nobility (1761), and assumed the name of De Beaumarchais. An acquaintance with the financier Duverney was the foundation of a large fortune, which his talent for business enabled him to amass. He was employed by the king on behalf of Madame du Barry, against whom a party was actively carrying on a pamphleteering warfare from England. Shortly after this he wrote the two comedies, *Le Barbier de Seville* and *Le Mariage de Figaro*, on which his fame mainly rests. The former was produced in 1775, the latter in 1784, and their life has been further prolonged by their adaptation as the libretti of operas by Rossini and Mozart. Beaumarchais had, earlier in his career, written two sentimental plays, *Eugénie* (1768) and *Les Deux Amis* (1770), and subsequently wrote two other comedies, *Tarare* (1787) and *La Mère Coupable* (1792). During the revolution, which his satirical writings had helped to bring about, his wealth and position made him the mark of much attack; and an accusation of treason to the republic caused him for some time to seek an asylum abroad. He wrote his experiences of this period under the title of *Mes Six Époques* (1793). See his *Collected Works* (7 vols. 1809), and *Beaumarchais et son Temps* by Loménie (Eng. tr. by H. Edwards, 1856).

Beaumaris ('fair marsh'), a munic. bor. and spt., chief tn. of Anglesey, 6¼ m. by road from Bangor, on Beaumaris Bay. The town grew up around the castle founded here by Edward I. about 1295. The parish church of St. Mary dates in part from the 13th century. The town is a quiet sea-bathing resort, with golf links. Pop. (1901) 2,310.

Beaumont, city, Texas, U.S.A., the co. seat of Jefferson co., situated in the E. part of the state, on Neches R., near its mouth. The lumber industry was of considerable importance here, but the recent (1900) discovery of an enormously rich oil field in the neighbourhood has driven all other industries into the background. Pop. estimated (1902) at 20,000.

Beaumont, FRANCIS (1584–1616), English dramatist, was son of Francis Beaumont, a judge, and younger brother of Sir John Beaumont. From Broadgates Hall (now Pembroke College), Oxford, he went (1600) to the Inner Temple. He first appeared as a poet in 1602, although it is not clear that the ascription to him of the Ovidian narrative poem, *Salmacis and Hermaphrodite*, which appeared in that year, is correct. His close literary and personal relation with John Fletcher began about 1607, and he probably had a share, often a large one, in about half a dozen of the plays generally included in editions of Beaumont and Fletcher. In 1613 he wrote the masque produced jointly by the Inner Temple and Gray's Inn, on the marriage of the Princess Elizabeth with the Elector Palatine. About the same time he married Ursula Isley, and apparently gave up writing for the stage. On his death, in 1616, he was buried in Westminster Abbey. See his *Poems* (1640, 1653), including much that is not his; G. C. Macaulay's *Francis Beaumont* (1883); and A. W. Ward's *English Dramatic Literature*, vol. ii. (1875).

Beaumont, SIR GEORGE HOWLAND (1753–1827), connoisseur, patron of art and landscape painter, encouraged and befriended many of the poets and artists of his time, including Coleridge, Haydon, Jackson, Wilkie, Landseer, and the sculptor Gibson. The formation of a national gallery is largely owing to his efforts, and in 1826 he presented sixteen pictures from his own collection to the nation.

Beaumont, JEAN BAPTISTE ELIE DE (1798–1874), French geologist, born at Canon (Calvados), professor at the Ecole des Mines (1829), and at the Collège de France (1832), and perpetual secretary of the Académie des Sciences, Paris, in 1856. With Pierre Dufrénoy he published the great *Carte Géologique de France* (1840; 2nd ed. 1855), begun in 1825.

Beaumont, SIR JOHN (1583–1627), English poet, was son of Francis Beaumont, a judge, and brother of Francis Beaumont the dramatist. He was born at Grace Dieu, Leicestershire, and after leaving Oxford, entered the Inner Temple, but gave up the law on succeeding to the family estates. The best of his poetry is serious and even religious in temper. See his *Collected Works* (ed. A. B. Grosart, 1869).

Beaumont, JOSEPH (1616–99), English poet. His principal work is an allegorical epic entitled *Psyche* (1648), written in a six-line heroic stanza, and describing the progress of the soul through the temptations of life into eternal happiness. He was canon of Ely (1636); master of Jesus College, Cambridge (1662); and master of Peterhouse (1663). See Grosart's ed., privately printed, with memoir (1880).

Beaumontague, putty used by carpenters and joiners for filling up cracks in bad joinery. The word is derived from Jean de Beaumont.

Beaune, tn., dep. Côte d'Or, France, 23 m. S. of Dijon; is celebrated for the wines of the district, and gives its name to a well-known Burgundy. The town also trades in vinegar, corn, and cattle. Pop. (1901) 13,887.

Beauregard, PIERRE GUSTAVE TOUTANT (1818–93), Confederate general, was born in New Orleans. He graduated at West Point in 1838, served in the Engineer corps during the Mexican war (1846–8), and at its close was charged with the supervision of fortifications and harbours on the Gulf coast. On the secession of the Southern States in 1861, he offered his services to the Confederates, and was entrusted with the defence of Charleston. He received the surrender of Fort Sumter, and took part in the battles of Bull Run and Shiloh, and in other engagements. Beauregard (now general) was again placed in command at Charleston in 1863. He gained a victory at Drury's Bluff, and in 1865 joined General J. Johnston, and with him surrendered to General Sherman. He was the author of *Principles and Maxims of the Art of War* (1863), and *Report of the Defence of Charleston* (1864). See Roman's *Military Operations of General Beauregard* (1884).

Beau Seant, the banner of the Knights Templars. It was half white, half black.

Beausobre, ISAAC DE (1659–1738), French Huguenot pastor and writer, born at Niort. After the revocation of the Edict of Nantes he took refuge in Rotterdam. Chaplain (1686) to the Princess of Anhalt-Dessau, he repaired on the death of the prince (1693) to Berlin, where he was appointed pastor of the French church, king's chaplain, and councillor of the upper consistory. Frederick II. calls him a 'man of honour, probity, and learning.' His *Histoire Critique du Manichéism* (1734–9) is notable.

Beauvais, cap. of dep. Oise, France, on R. Thérain, 55 m. by rail N.W. of Paris, on the route from Paris to Calais. It is specially noted for its cathedral and its tapestry factory. The lofty cathedral, of Gothic architecture, begun in 1247, consists only of choir and transept. The tapestry factory, founded in 1664, belongs to the state. Cloths, rugs, and carpets, gold and silver lace, buttons, and brushes are also manufactured. It resisted the English and Burgundians in 1472. In Roman times it was the capital of the Bellovaci. Pop. (1901) 20,300.

Beaver (*Castor fiber*), the name applied to a social rodent, formerly widely distributed over Europe and N. America. Now very sparsely represented on the former continent, it is said to be also in imminent danger of extermination in the latter, where it has hitherto been abundantly represented. Among the structural peculiarities should be noticed the strongly-webbed hind feet, which are used in swimming; the scaly, horizontally flattened tail, used as a rudder in swimming; the small ears, which can be laid back to close the auditory passage; and the short, thick fur, which has considerable commercial value. Near the anus lie two glands which secrete a fatty substance known as castoreum, used in medicine. The body varies in length from two and a half to three feet.

The great interest of the beavers lies in the ingenuity which they manifest in the construction of their houses or 'lodges,' and in the building of dams where the water in the vicinity of their dwellings tends to become so shallow as to impede their movements. These structures are, in America, produced by the joint activity of the members of a colony; but in Europe the few remaining beavers are mostly solitary, and do not build to the same extent as their transatlantic allies. The diet consists of the leaves and bark of trees, especially willow and poplar, and it is these trees which are by preference used in building. In felling trees, the incisor teeth are the instruments used, and the beavers have been known to bite through trees two feet in diameter. The dwelling is excavated in the banks of streams, and often has an entrance passage made of interlacing brushwood. In addition, Canadian beavers construct 'lodges' in the middle of expanses of shallow water, consisting of tree trunks, turf, and other materials, and containing food reserves in addition to dwelling chambers. See Martin's *Castorologia* (1892).

Beaver Dam, tn., Wisconsin, U.S.A., at outlet of Beaver Lake, 63 m. N.W. of Milwaukee; has numerous factories for woollen and cotton goods, and is the seat of Wayland Academy. Pop. (1900) 5,128.

Beaver Falls, bor. in Beaver co., Pennsylvania, U.S.A., situated in the W. part of the state, on the Beaver R., near its junction with the Ohio, 31 m. from Pittsburg. It is the seat of Geneva College (1848). Pop. (1900) 10,054.

Beaver Rat, the Australian name for a family of rodents, Muridæ, of the genus Hydromys; similar in appearance and habits to the water-vole of Europe and the musk-rat of America.

Beaver Tree, or SWAMP SASSAFRAS, growing in peaty or swampy soil, is the *Magnolia glauca* of N. America. Its bark has medicinal properties like those of cinchona.

Beawar, munic. tn., Ajmere, Rajputana, India, 35 m. S.E. of Ajmere.

Beazley, CHARLES RAYMOND (1868), English student of geographical and historical subjects, is a fellow of Merton College, Oxford. His chief publications are *James of Aragon* (1890), *Henry the Navigator* (1895), *Dawn of Modern Geog.* (2 vols. 1897 and 1901), *John and Sebastian Cabot* (1898), *Azurara's Chronicle of the Discovery of New Guinea* (trans. 2 vols. 1896 and 1899). He has contributed numerous geographical articles to this work.

Bebeeru, BEBERINE. See GREENHEART.

Bebek, bay and tn. on Bosporus, 6 m. N.E. of Constantinople, Turkey; contains one of the Sultan's palaces. The bay is one of the loveliest in Europe.

Beavers constructing a Dam.

Bebel, FERDINAND AUGUST (1840), German social democrat, born at Cologne. A turner by trade, he early adopted socialistic principles, and presided over the labour congress of 1868, shortly afterwards launching, with Liebknecht, the *Demokratisches Wochenblatt.* Elected (1867) to the N. German Diet, and (1871) to the

Imperial Reichstag, he was (1872) condemned, on a charge of high treason, to two years' imprisonment. His repeated imprisonments since have increased his influence among his party, which in 1881 returned him also to the Saxon Diet. A ready speaker, he has written *Unsere Ziele* (10th ed. 1893), *Der Deutsche Bauernkrieg* (1876), *Die Frau u. der Sozialismus* (33rd ed. 1902), *Die Sonntagsarbeit* (1888), *Charles Fourier* (1888), etc. At the first public congress of the German Social Democracy, Oct. 12-18, 1890, Bebel was an outstanding figure. In 1891 he joined the staff of the *Vorwärts*. At the general election of 1903 the Social Democrats returned eighty-two members to the Reichstag, under his leadership.

Bec Abbey, in dep. Eure, Normandy, 13 m. N.E. of Bernay; Benedictine; founded by Hellouin in 1034. Lanfranc and Anselm were both priors here during the 11th century, and made it one of the most noted seats of learning in the west of Europe.

Beccafico, the name given to a small bird found in considerable abundance in S. Europe. Though in its specific meaning it is applied to the garden warbler, which is a summer visitor to England, the name is also used to denote the several species of warblers (Sylviidæ) common in the region named. Its favourite food is the fig, from which characteristic its name is derived. It forms a favourite delicacy.

Beccaria, CESARE BONESANA, MARQUIS DE (1735-93), Italian jurist and economist, was born at Milan, and spent practically the whole of his life in his native city. His first published work was an essay on the coinage of Milan, in 1762; but the work on which his fame rests is the *Treatise on Crimes and Punishments*, which appeared in 1764. It is a protest against the nameless barbarities which disgraced the criminal codes of the day, and an advocacy of reasoned and merciful treatment of offenders. It undoubtedly had a great influence on Bentham, and through him on the world; though its influence was also direct. The cavillings of his enemies were silenced by his appointment in 1768 as professor of political economy at the Academy in Milan.

Beccles, par., munic. bor., and mrkt. tn., Suffolk, England, on riv. Waveney, 8 m. W. of Lowestoft, on G.E.R. The most interesting buildings are the church of St. Michael, with a detached tower; and a grammar school, founded in 1712. There are large printing works, maltings, and brick and earthenware factories. Ac. of par. 18,467. Pop. of bor. (1901) 6,898.

Becerra, GASPAR (1520-70), Spanish sculptor, who studied in Italy, and was also architect, painter, and author. Philip II. employed him in the Alcazar and Pardo Palaces, Madrid. The high altar of Astorga cathedral is by him. He also drew the illustrations for I. de Valverde's *Book of Anatomy* (1556). See Leader Scott's *Sculpture: Renaissance and Modern* (1886).

Bêche de Mer (Port.), or TREPANG (Malay), a holothurian or sea slug, much used, when dried, as an article of food in China. The animals, of which there are several varieties, are obtained off the coasts of N. Australia and the E. Indies. Boiled and split open, they are dried by smoking or by the sun. The shape somewhat resembles that of a cucumber, and the body is from 6 in. to 2 ft. long. About 2,500 tons, valued at £250,000, are exported annually.

Bêche de Mer.

Becher, JOHANN JOACHIM (1635-82), German chemist, born at Spires. Professor at Mainz (1666), he established a large laboratory at Munich. He afterwards worked at Würzburg, Haarlem, and London. His work showed a remarkable anticipation of later discoveries with regard to the relation of chemistry to physics.

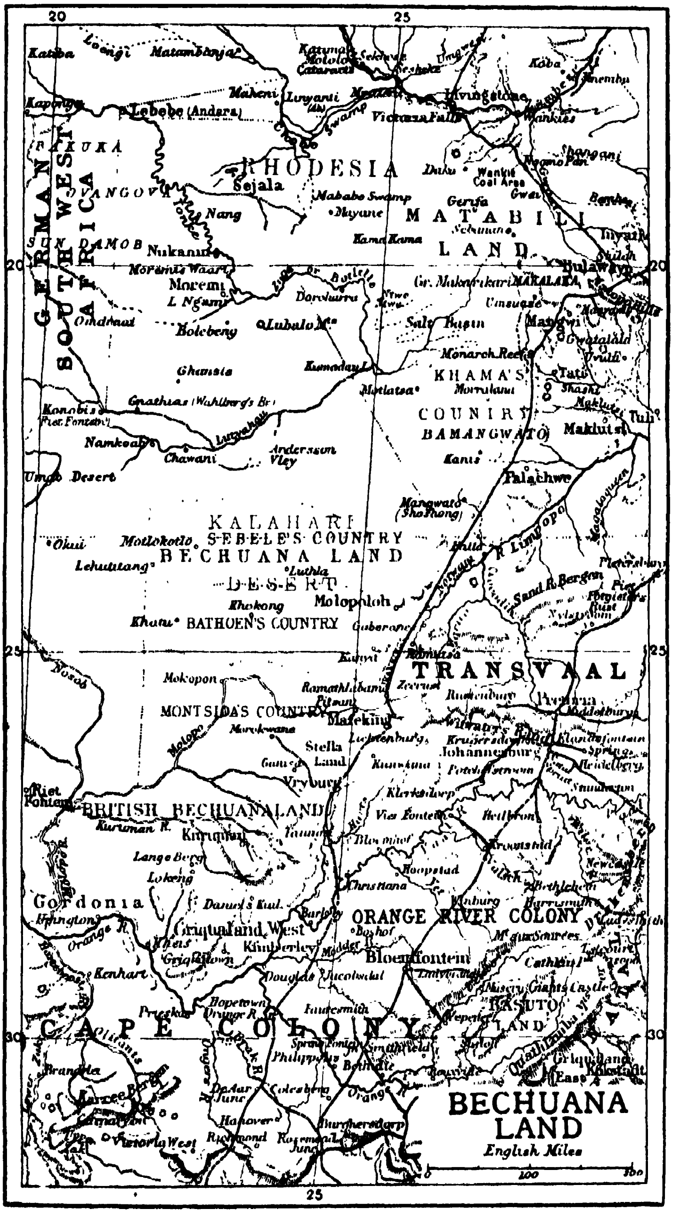
Bechstein, KARL (1826-1900), German pianoforte-maker, born in Gotha; founded at Berlin, in 1856, the firm which still bears his name. The instruments are of singularly full and powerful tone.

Bechuanaland, the land of the Bechuanas, on the N. of Cape Colony, divided into British Bechuanaland and the Bechuanaland Protectorate. BRITISH BECHUANALAND has an area of 51,500 sq. m., and lies on the high plateaus, about 4,000 ft. above the level of the sea. It is bounded on the N. by the Molopo R. It was annexed by Britain in 1885, and in 1895 was transferred to Cape Colony. Pop. (1904) 84,210, of whom 9,276 are whites. The chief towns are Mafeking (2,712), noted for its siege in the Boer war, Vryburg (2,984), Kuruman, and Taungs.

BECHUANALAND PROTECTORATE is the vast stretch of territory N. of British Bechuanaland, consisting of monotonous plateaus. It reaches up to the Zambezi R.; its boundaries are Matabeleland and the Transvaal on the E., and German S.W. Africa on the W. Area, 380,000 sq. m. The most important tribes inhabiting the country are those of the Bakhatla, under Leachwe; the Bakwena, under Sepele; the Bangwaketse, under Bathoen; the Bamaliti, under Ikaneng; and the Bamangwato, under the Christian and enlightened chief Khama, whose capital is in the Choping Hills, at Palapye, or Palachwe, the chief architectural feature of which is the church. These chiefs rule under the tribal system, and are superintended by a resident commissioner. A hut-tax is collected, and no licences for the sale of spirits are allowed. There is a mounted police force. The natives are peaceful cattle-breeders and farmers. Total pop. estimated at about 200,000. Here were formed the two short-lived Boer republics of Stellaland and Goshen (1882-84). Kolobeng was the residence, at one time, of David Livingstone. The character of the land appears best in such a work as Anderson's *Lake Ngami* (1855), or the journal of the Trek Boers (*Cape Monthly Magazine*). The KALAHARI DESERT, a vast and undefined waste, with occasional salt-pans and 'vleis,' lies partially within Bechuanaland. See J. D. Hepburn, *Twenty Years in Khama's Country* (1895); E. Lloyd, *Three African Chiefs* (1895); and Mackenzie, *Bechuanaland* (1887).

Beck Case, a case of mistaken identity which aroused considerable excitement in 1904. The salient facts of the case are as follows:—In 1877 John Smith was sentenced to five years' penal servitude for robbing women. Nineteen years later a series of similar crimes was committed, and Adolf Beck, a Swede, was arrested and tried. The constable who arrested Smith in 1877 swore positively that Beck was Smith, and the common serjeant ruled that the question whether the prisoner was or was not the man convicted in 1877 was inadmissible. Beck received seven years' penal servitude, and his prison clothing bore marks indicating the previous conviction in 1877. While in jail Beck discovered that Smith was a Jew. This fact was known to the prison authorities in 1879, and by them communicated to the Home Office. The public prosecutor and the police, however, were ignorant of it until 1904. On examination it appeared that Beck was not a Jew. The Home Office then ordered the removal of the marks from Beck's clothing; but he served his time, and was released in 1901. In April 1904 the crimes occurred once more, and again Beck was arrested, tried, and convicted, but sentence was reserved. Before it was passed Smith had been arrested *in flagrante delicto.*

Investigation revealed Beck's innocence both in 1896 and in 1904, and he received a 'free pardon' and an offer of monetary compensation. This he refused, and demanded an inquiry, which took place. The committee criticised the Home Office for the lack of co-ordination between the office of the public prosecutor and the police. It advised the strengthening of the legal element in the Home Office, and recommended that when reference was made to the judge who tried a particular case, it should also extend to all officially connected with it. The anomaly of pardoning an innocent man should be abolished; the conviction should be quashed, and a record of acquittal entered on the rolls. Further, the ruling of the common serjeant could not be supported, and judges should be compelled to state a case on good cause shown. A new court of appeal was unnecessary, the Court of Crown Cases Reserved being sufficient if the recommendations of the committee were carried out. In February 1905 a bill (Crown Cases Act, 1905), backed by the Lord Chancellor, was introduced in the House of Lords as the result of these recommendations. It provides that where a judge refuses to reserve any question of law, an appeal may be made to the King's Bench, whose decision shall be final. The King's Bench may order the re-trial of the case, and may also, if it is of opinion that the question of a point of law has not resulted in a miscarriage of justice, declare that the judgment shall stand. In the event of the re-trial of a quarter sessions case being ordered, the court may direct the case to be tried again at the next assizes.



John Bartholomew & Co.

Becke, GEORGE LOUIS (1848), novelist, native of New South Wales; gained, while trading in the South Seas (1870-93), the experience which he has turned to good account in his stories of adventure: *By Reef and Palm* (1893); *The Ebbing of the Tide* (1896); *Pacific Tales* (1897); *The South Sea Pearler* (1900); *By Rock and Pool* (1901); *Breachley Black Sheep* (1902), etc. He has occasionally worked in collaboration with Walter Jeffery.

Beckenham, par. and tn., W. Kent, England, 7 m. S.E. of London; ac. 3,856; pop. (1901) 26,330.

Becker, KARL FERDINAND (1775-1849), philologist, born in the old electorate of Treves. From 1823 head of an educational institute at Offenbach, his views on language enjoyed much vogue till superseded by J. Grimm's epoch-making works. His *German Grammar* reached its 11th edition in 1876.

Becker, WILHELM ADOLF (1796-1846), German classical scholar, was born at Dresden, and became professor of archæology (1837) at Leipzig. His *Gallus* (1838; new ed. 1880-82) and *Charicles* (1840; new ed. 1888) are brilliant imaginative studies of the social life of ancient Rome and Greece respectively. These, and his *Handbuch der Römischen Alterthümer* (1843-46), a forerunner of Mommsen's *Römisches Staatsrecht*, were his chief productions.

Beckerath, HERMANN VON (1801-70), German politician. Having founded (1838) a successful bank, he was returned (1848) to the national assembly, where he strenuously supported the cause of Prussia's hegemony. To the Prussian policy of German unity he was also a zealous adherent. From 1849 a member of the Prussian second chamber, he did his best to save constitutional liberty against reaction. His last public act was his successful defence at Munich of Prussia's commercial policy. See Kopstadt, *H. v. Beckerath* (1874).

Becket, or À BECKET, THOMAS (1118-70), archbishop of Canterbury, canonized (1173) as a saint. After receiving a varied training in law and theology, he entered (about 1142) the service of Theobald, archbishop of Canterbury, and took minor orders. He early showed zeal on behalf of Henry of Anjou, who in 1155 appointed Becket his chancellor. In this position he lived sumptuously, and maintained an establishment which outshone that of the king. In 1162 Henry II. took the momentous step of having Becket created Archbishop of Canterbury. He was now as ascetic as he had formerly been luxurious; and he, the former devoted servant of the king, became the champion of the rights of the church. Becket retired for a time to France, but maintained his indomitable antagonism to the king, going so far as to threaten to excommunicate the English bishops who had submitted. He returned (1170) to England, to find himself the idol of the people, and continued to champion popular rights and ecclesiastical privileges until his assassination by four of Henry's knights while at the altar, Dec. 29, 1170. In 1220 Becket's bones were enshrined in a chapel of the cathedral, where they long formed a favourite object of pilgrimage, as described in Chaucer's *Canterbury Tales* (1383). See the *Lives of Becket* by Canon Morris and Canon Robertson; Hook's *Lives of the Archbishops*; Freeman's *Historical Essays*; Froude's *Essays*; and Lord Tennyson's play, *Becket*, in which Sir Henry Irving filled the title rôle.

Beckford, WILLIAM (1709-70), twice lord mayor of London, was born in Jamaica; became a successful merchant in London, and in 1762 was elected lord mayor. During the following year he was closely associated with Wilkes, editor of the *North Briton*; and during his second term of office, in 1770, twice, accompanied by the aldermen and councillors, presented a strongly-worded petition and remonstrance to the king. On the second occasion, the king having again refused with marked displeasure, Beckford replied in the speech which is inscribed on his monument at the Guildhall. He died in London, and was buried at Fonthill, Wiltshire. See Woodcock's *Illustrious Lord Mayors* (1846).

Beckford, WILLIAM (1759-1844), author of *Vathek*, was born at Fonthill, Wiltshire. After a private education, he made the 'grand tour' on the Continent. His letters relating to his travels were published anonymously in 1783, as *Dreams, Waking Thoughts, and Incidents*. His famous Oriental romance *Vathek* was published in French in 1782, and an English version surreptitiously in London (in 1784) by Beckford's friend, Rev. S. Henley. The story, fostered by Beckford, that *Vathek* was written at a single sitting of three days and two nights, has been shown by Dr. Garnett (in his 1893 edition of *Vathek*) to be fabulous. He sat as M.P. for Wells (1784-90), and for Hindon (1806-20). In 1796 he retired to Fonthill, where he squandered his fortune on extravagant building operations. Eventually, in 1822, he was compelled to sell the Fonthill estate and remove to Bath, where he died. His other works are: *Memoirs of Extraordinary Painters* (1777); *Modern Novel Writing* (under pseudonym 'Lady Harriet Marlow,' 1796); *Azemia* (under pseudonym 'Jacquetta Agneta Mariana Jenks,' 1798); *Italy* (1834); *Recollections of an Excursion* (1835). His *Life*, by Cyrus Redding (1859), is inaccurate.

Beckmann, JOHANN (1739-1811), German naturalist and economist, for nearly forty years (from 1770) professor of rural economy and commercial science at Göttingen. Chiefly known for his *History of Inventions* (5 vols. Leipzig, 1780-1805; London, 1814). See Exner's *J. Beckmann* (1878).

Beckwith, JOHN CHARLES (1789-1862), missionary to the Waldenses; born at Halifax, Nova

campaign, and lost a leg at Waterloo. Retiring from active service in 1820, he devoted himself (from 1834) to ameliorating the condition of the Waldensian people. He settled among them in 1841, founded over 120 schools, married Caroline Valle, a Waldensian, and died at La Torre, among the people of his adoption. See Worsfold's *The Valley of Light* (1899).

Becque, HENRI FRANÇOIS (1837-99), French dramatist, was a Parisian by birth. His earliest dramatic effort was an operatic libretto, *Sardanapale*, in 1867. During the next year his first play, *L'Enfant Prodigue*, was produced, and met with some success, owing to the vigour of its dialogue. He followed this with *Michel Pauper* in 1870, *L'Enlèvement* in 1871; in 1878, with *La Navette*; by *Les Honnêtes Femmes* in 1880, and *Les Corbeaux* in 1882. The latter play met with a stormy reception, and was severely criticised for its uncompromising realism. The author's bitter and forcible style gained him the name of founder of '*le théâtre cruel*;' and was again exemplified in *La Parisienne* (1885). He also wrote *Querelles Littéraires* (1886) and *Souvenirs d'un Auteur Dramatique* (1895). His *Théâtre Complet* appeared in 1898.

Becquer, GUSTAVO ADOLFO (1836-70), Spanish man of letters, was a wayward genius of the romantic period greatly influenced by Heine and Byron. His picturesque prose legends, though morbid, are very fine, and his verse is in many instances exquisite in its peculiar way. See his *Obras*, ed. Correa (5th ed. 1898); Garcia Blanco's *Lit. Española en el Siglo XIX* (1891-4); Hubbard's *Hist. de la Lit. Contemp. en Espagne* (1874).

Becquerel, ANTOINE CÉSAR (1788-1878), French physicist, was born at Châtillon-sur-Loing. An officer of Engineers (1808-14), he became inspector of the Ecole Polytechnique, and, working along with Ampère, Biot, and other eminent scientists, made many important discoveries in the electric conductivity of metals, in magnetism, and in electro-chemistry. In 1829 he was admitted a member of the Académie des Sciences. His principal works are *Traité de l'Electricité et du Magnétisme* (1834-40; new ed. 1855), *Eléments de Physique Terrestre et de Météorologie* (1847), and *Des Forces Physico-chimiques et de leur Intervention dans la Production des Phénomènes naturels* (1875).—His son, ALEXANDRE EDMOND (1820-91), worked in collaboration with his father. In 1851 he received the cross of the Legion of Honour, and in 1852 was appointed professor of physics. His principal work, dealing with the theory of light, is *La Lumière: ses Causes et ses Effets* (1867-8).

Becquerel Rays. See RADIO-ACTIVITY.

Becse, O-. See OBECSE.

Becskerek, NAGY, tn., co. Torontal, Hungary, on l. bk. of Bega, and connected by Bega Canal with Temesvar, 45 m. N.E. Trades in corn and cattle. Pop. (1900) 25,953.

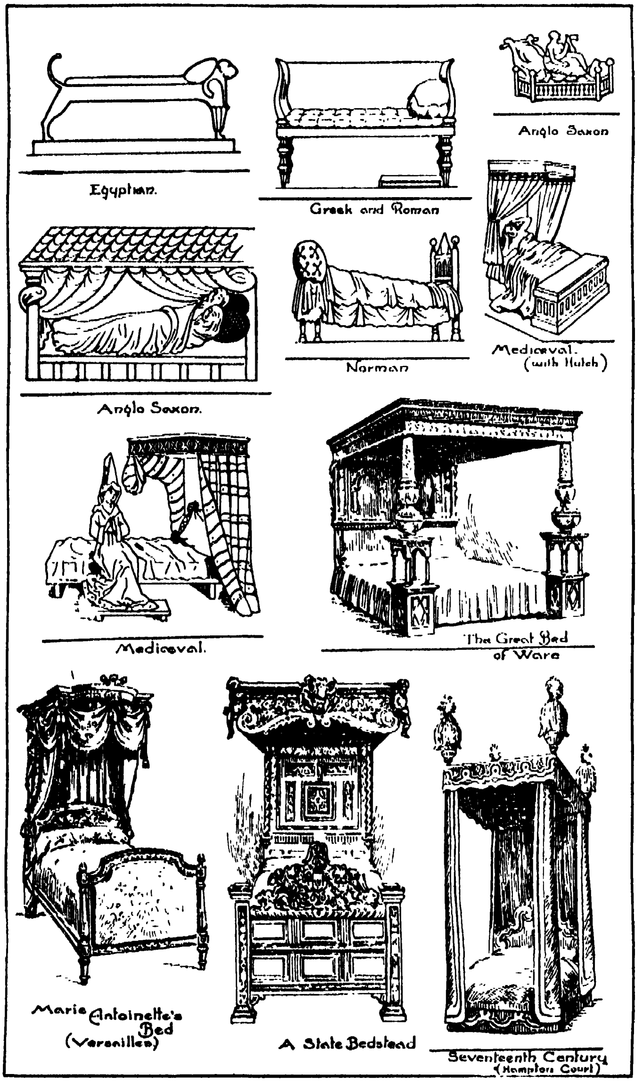
Bective Abbey. See TRIM.

Bed. Originally a bed was the skin of an animal laid on the floor, and afterwards it consisted of bags filled with rushes, leaves, or straw, like the modern palliasse, but not upholstered or squared with modern neatness. We have very full information relative to the beds and bedding in use by the Romans. In the earlier times of the republic they had beds of the same kind as those used by the Greeks. They borrowed from Asia those larger carved bedsteads, gilt and plated with ivory, whereon were piled cushions of wool and feathers, with counterpanes of furs and other rich materials. The Roman customs were handed down to the Gauls and to the Franks. With the irruptions of the Saxons and Danes into Britain, there was a relapse into the semi-barbarism of the earlier times previous to

Death of Becket.

(After the Painting by Cross in Canterbury Cathedral.)

the Roman invasion. Illuminated MSS. preserve specimens of Anglo-Saxon beds, some of which had testers and footboards; some had posts, with a canopy resembling the roof of a house; while some had solid cornices all round, and large, thick hanging curtains attached to big rings. A bed of this sort is represented on the frieze of Edward the Confessor's chapel at Westminster. The illustrations of beds and bedding in the time of the Normans and afterwards do not differ essentially from those of the later Anglo-Saxon times. In the reign of Henry III. we find a bed of rather modern appearance, with a tester and curtains. In the 15th century large square-post bedsteads came into fashion in England. Another common bed of the period was the truckle or trundle bed. 'This was a double bed, a smaller bed running underneath the larger one, which was drawn out for use at night. In the English universities the master of arts had his pupil to sleep in his truckle bed, and at an earlier period it was the place of the *valet de chambre*. Paul Hentzner, in his visit to Windsor Castle in 1598, noticed particularly the beds belonging to former princes as measuring eleven feet square, covered with quilts shining with gold and silver. Queen Elizabeth's bed, however, he says, was not so large as the others. The Great Bed of Ware, referred to by Shakespeare, and now in Rye House, is a bed twelve feet square, and capable of accommodating a dozen sleepers. It is assigned by tradition to Warwick the Kingmaker. Of the beds and their furniture in the 17th and 18th centuries there are choice specimens in different parts of the country. In Naworth Castle, Cumberland, there is the bed of Belted Will, the famous warden of the marches; and Cawdor Castle, Haddon and Hardwicke Halls, Blickling, and Cothill contain some choice illustrations of the beds of our ancestors. Bedsteads of iron and brass have now largely taken the place of these.



Ancient Types of Bed.

Among Eastern nations the bed is often nothing but a carpet, the bedclothes consisting of a rug or plaid. Even in very cold countries, such as Russia, the beds are closely allied to the Eastern carpet, the houses being kept so warm by stoves that much bed covering is no more required in winter than during the heats of summer.

As the traveller proceeds further northwards, the size of the beds seems to decrease, dwindling down to the smallest possible size in the northern parts of Europe. In parts of N. Italy there are still in use enormous beds nearly as large as the Bed of Ware, one at Lugano measuring ten feet across.

Bed, GEOLOGICAL. See STRATUM.

Bédarieux, tn., dep. Hérault, France, 35 m. W. of Montpellier; manufactures fine cloth, hats, and wool, and has tanneries and distilleries. Pop. (1901) 6,106.

Bedchamber, LORDS AND LADIES OF THE. See HOUSEHOLD, KING'S or QUEEN'S.

Bedchamber Question. See HOUSEHOLD, ROYAL.

Bedda Nuts. See MYROBALANS.

Beddard, FRANK EVERS (b. 1858), English zoologist and biologist, naturalist to the *Challenger* expedition (1882-4); prosector to the Zoological Society (1884), and sometime lecturer on biology at Guy's Hospital, London. Chief works: *Animal Coloration* (1892); *Text-book of Zoogeography* (1895); *Structure and Classification of Birds* (1898).

Beddgelert ('the grave of Gelert'), par. and vil. on the borders of Carnarvonshire and Merionethshire, Wales, near pass of Aberglaslyn, 13 m. S.E. of Carnarvon. Here is shown the stone variously said to mark the grave of Llewellyn's hound, or of a British saint. The place is a great tourist resort, and a starting-place for the ascent of Snowdon. It is the scene of Southey's *Madoc*. There are slate quarries and copper mines in the vicinity. Ac. 26,716. Pop. (1901) 1,230.

Beddoe, JOHN (1826), English physician and anthropologist, served on the civil medical staff during the Crimean war, and afterwards practised (1857-91) at Clifton. Among his works are *Essay on the Origin of the English Nation* (1868); *The Races of Britain* (1885); *Anthropological Hist. of Europe* (Rhind Lectures, 1893).

Beddoes, THOMAS LOVELL (1803-49), English poet, first attracted attention by the publication of *The Bride's Tragedy* (1822), a play directly inspired by the influence of Webster and Tourneur, the only work published by himself. He studied and practised medicine on the Continent; but his violent democratic sympathies led to frequent changes of residence. His principal work, *Death's Jest-Book, or the Fool's Tragedy,* was published (1850) by his friend T. F. Kelsall, followed next year by a volume of *Poems by the late Thomas Lovell Beddoes,* with Memoir. See also Memoir prefixed to E. Gosse' ed. of Beddoes's *Poetical Works* (1890), and Beddoes's *Correspondence* (ed. Gosse, 1894).

Bede, or BEDA, THE VENERABLE (c. 673-735), 'a servant of God, and priest of the monastery of the blessed apostles Peter and Paul, which is at Wearmouth and Jarrow.' Although the most learned man of his age, he never left Jarrow, but had correspondents all over England and in several parts of the Continent. The extent of Bede's learning was surpassed only by the nobility of his character; he was also open-minded and liberal to a quite extraordinary degree. His genius was encyclopædic rather than original. In some forty-five works he gathered together all the world then knew of physics, music, philosophy, grammar, rhetoric, arithmetic, medicine. They may be classified as (*a*) grammatical; (*b*) scientific—he was the first historian to arrange his material by the years from the Incarnation; (*c*) historical and biographical; (*d*) theological—chiefly commentaries, made up largely of allegorical exegesis. His great work is the *Historia Ecclesiastica Gentis Anglorum.* For Bede's complete works, see Dr. Giles's edition in 12 vols. (1843-4), and the indispensable Migne (*Patrologiæ Cursus Completus,* xc.-xcv., 1844). The West Saxon vernacular of *Historia Ecclesiastica,* containing the beautiful story of Caedmon, has been edited by Miller for the Early English Text Society. The standard edition of the Latin text is Plummer's (1896). For life and criticism, see Morley's *Eng. Writers,* vol. ii., and Stopford Brooke's *Eng. Lit. to the Norman Conquest* (1898).

Bedegar, or BEDEGUAR, the reddish mossy growth that appears as a gall on sweet brier and other wild roses. It is caused by the punctures of insects—notably the *Cynips rosæ*—which deposit their eggs, and thus cause irritation. See GALLS.

Bedel, or BEDELL, another form of beadle (A.S. *béodan,* 'announce,' 'command,' 'bid'), title of certain officers in Oxford and other mediæval universities. They are attached to certain faculties (in Oxford, law, medicine, arts, and divinity), to apportion the schools, announce the days and hours of lectures, publish and carry out decrees, and carry the mace before certain dignitaries. They are of two classes—esquire bedel and yeoman bedel.

Bedell, WILLIAM (1571-1642), bishop of Kilmore and Ardagh, was chaplain to the British embassy at Venice (1607-11), where he was intimate with Fra Paolo Sarpi, then defying the papacy. Appointed provost of Trinity College, Dublin (1627), and bishop (1629), Bedell devoted himself to the redress of ecclesiastical abuses. The translation of the Bible into Irish was completed under his supervision. See *Life and Death of Bishop Bedell,* by his son, ed. for the Camden Society (1872) by Jones.

Bedesman, or BEADSMAN, one who is authorized to pray ('to tell his beads') for others. In Scotland, the king's bedesmen were licensed beggars, by royal favour. See Scott's *Antiquary.*

Bedford, parl. and munic. bor. and mrkt. tn., Bedfordshire, England, on the Ouse, 48 m. (Midland Ry.) from London. The town extends on both sides of the Ouse, a fine promenade and new park being on the N. bank. The principal buildings are the Bunyan Meeting-house (1850), on the site of the chapel in which John Bunyan preached; the Howard Chapel, named after the philanthropist; new law courts, town hall, corn exchange, and county jail, which replaces that in which Bunyan was confined. There are bronze statues to Bunyan and Howard. The Harpur Trust (Sir William Harpur, 1556) administers the grammar school and a group of other schools at an annual cost of about £14,000. Straw-plaiting is an important industry, and engine and agricultural implement works, notably the Britannia Iron Works, give employment to many of the people. The town has also a large trade in grain. It returns one member to the House of Commons. The town is the burial-place of Offa, king of Mercia. Pop. (1901) 35,144. ELSTOW ('Helen's Stowe'), vil., 1 m. S. of Bedford, is notable as the birthplace of Bunyan (1628).

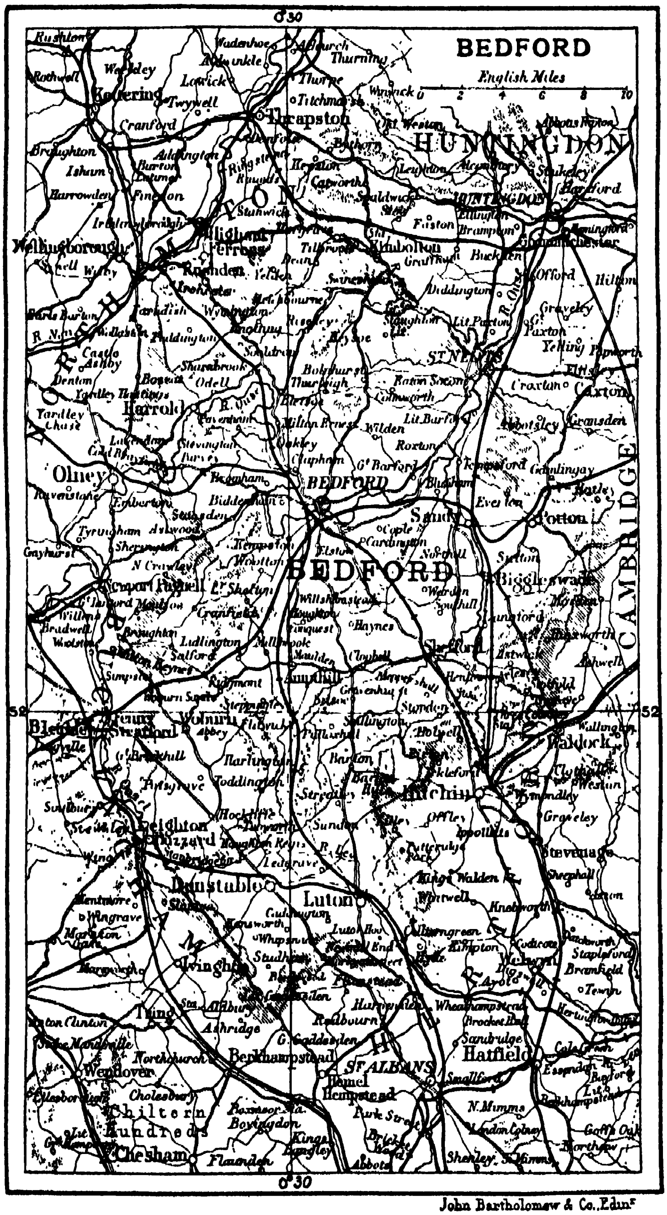
Bedford, a British first-class cruiser (9,800 tons) laid down in 1899. The ship-name has figured in the navy since 1702, and is associated with Rooke's victory at Vigo (1702), the action off Cape Spartel (1703), Rooke's victory off Malaga (1704), the capture of Louisbourg (1758), Rodney's action off St. Vincent (1780), Rodney's action with De Grasse (1782), Toulon (1793), Hotham's action off Genoa (1795), the capture of the *Censeur* (1795), and the battle of Camperdown (1797).

Bedford, HERBRAND ARTHUR RUSSELL, K.G., ELEVENTH DUKE OF (1858). He succeeded to the title in 1893, served in the Egyptian campaign, and was aide-de-camp to Lord Dufferin when Viceroy of India (1884-88). He is chairman of the Bedfordshire County Council. At his residence (Woburn Abbey) there is a noteworthy gallery of pictures and statuary, and in the park a fine zoological collection.

Bedford, JOHN OF LANCASTER, DUKE OF (1389-1435), third son of Henry IV. by his first wife, Mary of Bohun. He was created Duke of Bedford (1414) by his brother, Henry V. After Henry's death, in 1422, he became regent of England; and in the struggle for the French crown which followed the death of Charles VI., he commanded the English army in France, proclaimed Henry VI., a child of nine months, at Paris, and defeated the French at Verneuil (Aug. 17, 1424). His success was checked by the rise of Joan of Arc, and the desertions of the dukes of Brittany and Burgundy. He died at Rouen. (See *The Wars of the English in France,* and Blondel's *De Reductione Normanniæ,* 1449-50, both published by the Master of the Rolls; Stubbs's *Const. Hist.,* vol. iii., 1866.) The title was also conferred by Henry VII. on his uncle, Jasper Tudor, Earl of Pembroke (?1431-95), in October 1485. On the fall of the Lancastrians in 1470 he fled with his young nephew to Brittany, and returned with him to London in 1485, when Henry was crowned.

Bedford Level, a tract of land known as the Great Level of the Fens, and afterwards as the Bedford Level, consisting of 95,000 ac., and situated in the counties of Lincoln, Norfolk, Suffolk, Huntingdon, Northampton, and Cambridge. It was granted to the Earl of Bedford and his co-adventurers in 1634, as a recompense for draining it. The Bedford Level is now managed under the Bedford Level Act, 1663, by a governor, twenty conservators, and six bailiffs, who have power to levy taxes for keeping up the drains.

Bedfordshire, inland co., S. Midlands, England, 36 m. in length by 21 m. broad. The surface nowhere reaches any great elevation; highest point, 799 ft., in Dunstable Downs, a continuation of the Chiltern Hills of Buckinghamshire. The county is drained chiefly by the Great Ouse, with its tributary the Ivel. Limestone, coprolites (for phosphate), fuller's earth, and brick clay are the principal minerals. Market-gardening is important. Manufactures are limited: straw-plaiting in the S.; pillow lace, a domestic industry; bricks and coarse earthenware are made, and also rush mats. The county returns two members to Parliament (Biggleswade and Luton divisions), and the borough of Bedford one. Railway communication is provided by the Midland, G.N., and L. & N.W. Rys. The chief towns are Bedford, Biggleswade, Leighton Buzzard, Dunstable, and Luton. Area, 466 sq. m. Pop. (1901) 171,249. See Thos. Fisher's *Collections, Historical, etc.* (1812-16-40); G. A. Cooke's *Topographical and Statistical Description* (1836); Parry's *Select Illustrations of Bedfordshire* (1827), and *Illustrations of Bedfordshire* (1895).

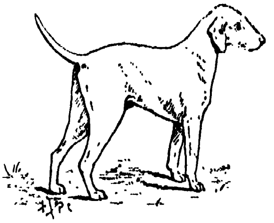


John Bartholomew & Co. Edinr

Bedivere, Sir, the earliest knight of Arthur's Round Table, survived the great battle with Mordred, and nursed the king until he was borne away to Avilon. See Malory's *Morte d'Arthur* (ed. 1886) and Tennyson's *Idylls of the King* (1869).

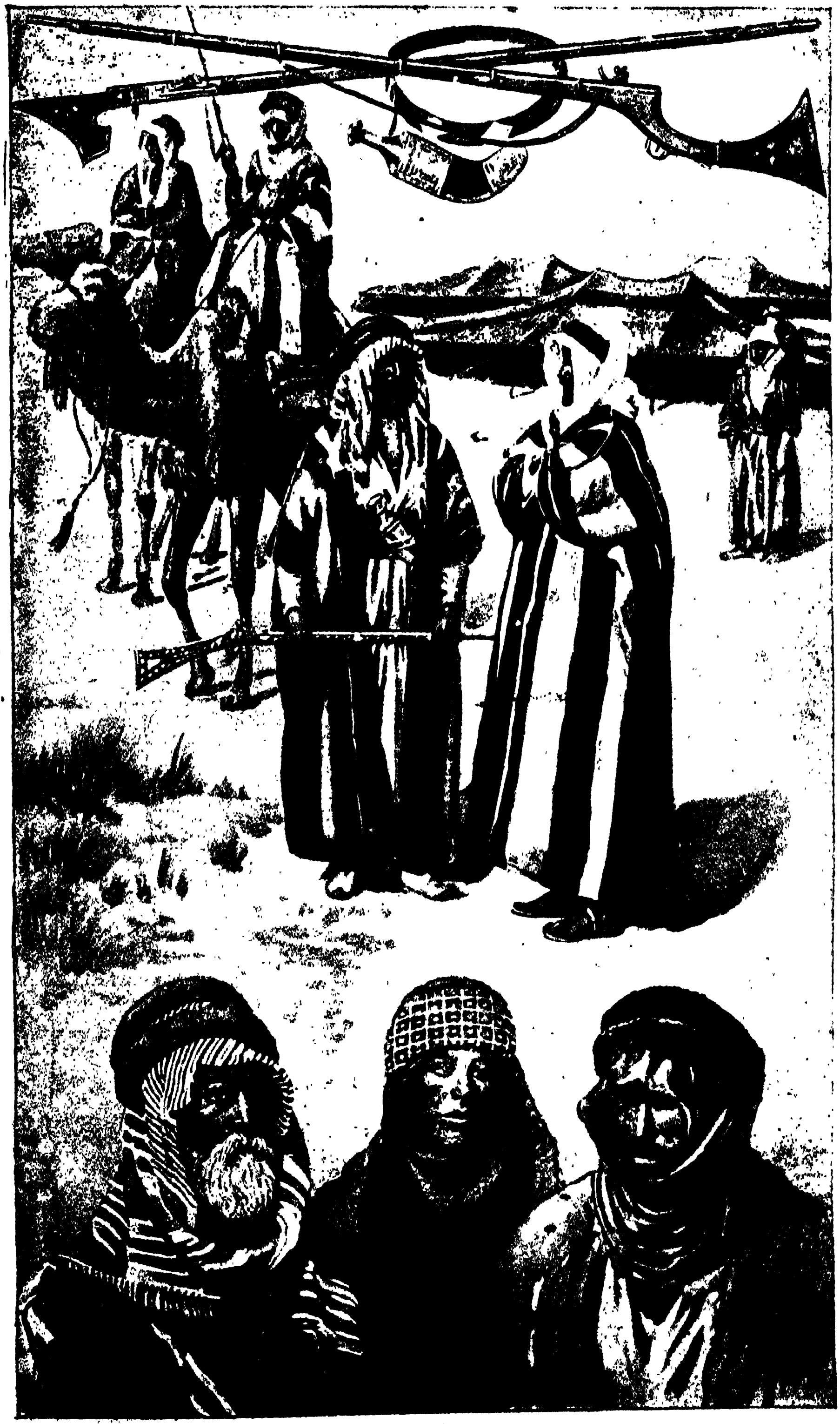
Bedlam (corruption of 'Bethlehem'), Hospital of St. Mary's of Bethlehem at Bishopsgate Without, London, was originally founded in 1247 as a priory, but afterwards used as a lunatic asylum. It was transferred to Moorfields in 1676, and it is to this place that Hogarth's picture refers. Since 1815 it has been situated at St. George's Fields, Lambeth.

Bedlington Terrier, a Northumberland dog, which derives its name from the village of Bedlington. It is a thoroughly game dog, and very active and plucky. It is probably derived from a cross with the Dandie Dinmont terrier. Points: skull narrow and domed, and adorned with a silky top-knot; jaws extremely punishing; lips tight; nose large, and either black or flesh-coloured according to the shade of the coat; eyes small, and rather deeply sunk, their colour following that of the body; ears filbert-shaped, fine, tipped with soft hair, and carried flat to the sides of the head; neck long, and shoulders sloping; body rather narrow at the chest, but deep at this point; ribs flat; slightly arched at the loins, which should be powerful; legs straight; feet of fair size; hind-quarters graceful-looking, and not too heavy; tail tapering neatly from the root, and scimitar-shaped; coat hard, and close below; colour blue, liver, or sandy, or any of them mixed with tan; weight, 18 lbs. to 25 lbs.



Bedlington Terrier.

Bedloe's Island, in harbour of New York, U.S.A., 1½ m. S.W. of battery. On it is erected the famous Bartholdi statue of Liberty, presented (1886) by France to the United States.



Bedouins.

1. Bedouin arms. 2. Encampment. 3. Bedouin sheik. 4. Woman. 5. Shepherd.

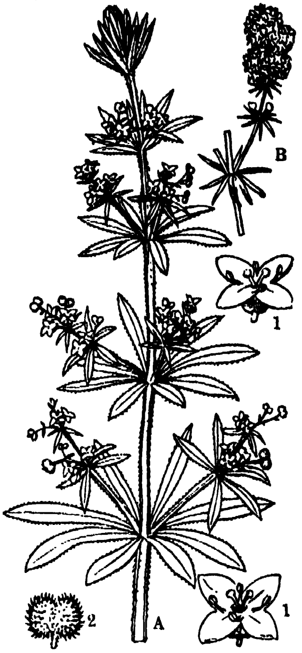
Bedmar, Alfonso de Cueva, Marquis de (1572-1655), Spanish diplomatist, was sent in 1607 as Spanish ambassador to Venice, where he originated a conspiracy for the subjugation of the republic. The plot (1618), however, was discovered, and Bedmar was at once recalled. He was made a cardinal in 1622, and later became bishop of Oviedo. His conspiracy forms the subject of Otway's play, *Venice Preserved* (1682).

Bed of Justice (Fr. *lit de justice*), properly the cushioned throne on which the French king in parliament sat to enforce the registration of his edicts. The king was assumed to wield an authority transcending the delegated authority of parliament, and the registration was enacted without discussion. 'Why a bed of justice?' 'Because,' says Fontenelle, 'justice there went to sleep.' The last was held by Louis XVI. (Nov. 19, 1787) at Versailles.

Bedouins (properly *Bedáwi*, pl. *Bedáwin*; from Ar. *badw*, 'desert;' hence 'dwellers in the desert'), nomadic Arabs; at first nomads of the Arabian deserts, in contradistinction to the settlers in towns. With the spread of Arabian Bedouins over the Syrian and Egyptian deserts, into Mesopotamia, etc., and finally, following the Mohammedan conquest of the 7th century, into Africa, the name of 'Bedouin' underwent commensurate extension. Their utmost range reaches to Persia, Turkestan, the mountains of Kurdistan on the one side, and the Atlantic and the negro states of the Sudan on the other. Many nomads in Africa, really Hamitic, but Mohammedans, and in part speaking Arabic, are usually comprehended under the name of 'Bedouins.' Haunting deserts, they have preserved the character, given to them over three thousand years ago, of a wild people dwelling in tents, their hands against every man, and every man's hands against them. In Arabia they are reckoned at one-seventh of the population. The notorious Anese in Arabia alone number over 300,000. Altogether the Bedouins are calculated at less than 500,000. Each tribe dwells by itself; each village under a sheik; forty to fifty villages under a kādi. Their weapons are the long lance, firearms, and the yataghan. Expert horsemen, living in the open, they despise townspeople. Below middle stature, they are lean, wiry, hardy, with 'long, narrow heads, and short, straight noses;' of brown complexion; they are disposed to contemplation, and delight in extravagant tales. Their tribes are commonwealths, and if any of a tribe lose cattle in a foray, the loss is made up by a general contribution. Hospitality is with them a religion. See Burckhardt's *Notes on Bedouins and Wahabys* (1830); Blunt's *Bedouin Tribes of the Euphrates* (1879); Hill Gray's *With the Bedouins* (1890). See also *Bibliographie des Ouvrages relatifs à l'Afrique et à l'Arabie* (1875).

Bed-sores are commonly the result of constant pressure on bony points, when the intervening tissues have lost vitality. The prevention of bed-sores depends upon careful nursing. An invalid who cannot move must be shifted frequently. The skin over any threatened point should be kept clean and dry, and the bedding must never be left damp from perspiration or any other cause. The points pressed upon must be washed daily with soap and water, and very carefully and thoroughly dried; and every day some methylated spirit, whisky, or brandy should be gently rubbed in, to harden the cuticle. A draw-sheet must be used if there is any risk of the under-bedding getting wet, and crumbs, creases, etc., must be guarded against. A firm hair mattress is preferable to a feather bed, and a water bed is better still, or its equivalent, a circular air-cushion. A non-paralytic patient generally complains of discomfort before a bed-sore occurs. The sore usually shows first as a dark-red patch on the skin. The colour darkens almost to black, and soon a slough forms, reaching at times to the bone, and at last comes away, leaving a deep ulcer. Cases are recorded in which, the bed-sore being over the spine, the spinal cord itself has suffered, and death has resulted. Once a sore has fully formed it must be treated antiseptically, every care as to position, etc., being still observed. If all pressure be removed, and if the sore be washed with antiseptic fluid, and protected with dry dressings, it may give no further trouble, unless far advanced. If a slough has formed, some recommend excising it, scraping the surface, and applying pure carbolic acid; others treat it antiseptically until the slough comes away. Guaiamar, a derivative of phenol, has been recommended as a dressing, with balsam of Peru and benzoated zinc oxide ointment. See *N.Y. Med. Jour.*, Sept. 23, 1899, and *Brit. Med. Jour.*, Mar. 10, 1900.

Bedstraw (*Galium*), a genus of the order Rubiaceæ (the coffee and cinchona order). The species are numerous, chiefly in temperate regions, and ten are found in Britain; they are all herbs, with four or more leaves in a whorl. The flowers are minute, honeyed, and sweet-smelling, and often in conspicuous clusters. Yellow or lady's bedstraw (*G. verum*) was formerly used for curdling milk; and a yellow dye was obtained from the flowers by boiling them in an alum solution. A red colour is also got from the roots. Cleavers, or goose-grass (*G. aparine*), is the rough trailing herb found in hedges, where it climbs by means of minute hooked hairs. Its spherical fruits, roasted and ground, are said (doubtfully) to be an excellent substitute for coffee.



Bedstraw.
A, *Galium aparine.* 1, Flower; 2, fruit.
B, *Galium verum.* 1, Flower.

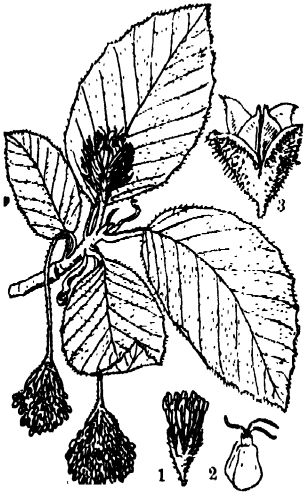
Bedworth, par. and tn., Warwickshire, England, 5½ m. N.E. of Coventry, on L. & N.W.R. The Coventry Canal runs through the parish, which contains coal and ironstone mines. Pop. of par. (1901) 7,169.

Bee, St. See Begha, St.

Beech. By almost general consent, the beech (*Fagus sylvatica*) is, next to the oak, given the highest rank among British trees. It was an honoured tree among the Romans, and Cæsar specially wrote that he had failed to find beeches in Britain. That the tree is, nevertheless, a native of these islands seems to be certain. The beech occurs almost throughout Europe, and is the Danish national tree. It will grow on almost any soil that is not water-logged, but thrives best on chalk or limestone.

Gerard referred to the beech-nut as being fattening food for swine and deer, as 'pleasant' to thrushes and pigeons, and as 'greatly delighting mice and squirrels.' They have also been dried and made into flour, and have been used as a source of oil.

In autumn the leaves take on glowing yellow, orange, gold, and purple tints. The male and female flowers occur on the same tree. The former consist of little bunches of brown pendent catkins, each catkin including ten or more flowers; the female flowers are enclosed within a mass of scales, which develops into the prickly husk that ultimately ripens and bursts open in four valves, liberating the two nuts within. The beech is easily propagated by sowing the nuts in March at a depth of one inch in carefully-prepared soil. If kept closely trimmed, it makes an excellent hedge; for not only does it become a closely interlaced arrangement of twigs, but the dead leaves, by remaining attached through most of the winter, add to the density and shelter afforded.



Beech.

1, Male flower; 2, female flower; 3, fruit.

There are some fourteen other species of *Fagus* distributed over the temperate and sub-frigid zones, and there are also many varieties of *F. sylvatica* itself. Of these the copper beech and purple beech are best known. Both these are very beautiful when the leaves are expanding in the spring, but become dull and monotonous as the colour deepens with advancing summer. The weeping beech (*F. s. pendula*) and the fern-leaved beech (*F. s. asplenifolia*) have their admirers. See Johns's *The Forest Trees of Britain* (1869); Hulme's *Wild Fruits of the Countryside* (1902).

Beecher, HENRY WARD (1813-87), American preacher and abolitionist, was the fourth son of Dr. Lyman Beecher and brother of Harriet Beecher-Stowe. From the first he took a great interest in public questions, identifying himself with the anti-slavery party. In 1847 he was called to the pastorate of Plymouth Congregational Church, Brooklyn. Here he gathered round him the largest congregation in the States. For nearly forty years he laboured with zeal and earnestness. His sermons were marked by great freshness, originality, eloquence, and imagination. He edited the *Independent* in 1861-3, and contributed to it for twenty years. His efforts in favour of abolition were untiring, and in 1863 he delivered in England a course of lectures on the subject. In 1870 he became editor of the *Christian Union*, and edited it until 1881. In 1882 he withdrew from the Association of Congregational Churches, owing to divergence of doctrine. He again visited England in 1886, and died the following year. His works include *The Star Papers* (1855-8); *Lectures to Young Men* (1844; new ed. 1850); *Aids to Prayer* (1864); *Yale Lectures on Preaching*, in 3 vols. (1872-4); *The Life of Jesus Christ* (1871-91); and *Evolution and Religion* (1885). See the *Life of Henry Ward Beecher*, by J. Howard, jun. (1887); *Henry Ward Beecher: a Sketch of his Career*, edited by Lyman Abbott (1883); *Beecher: his Life and Work*, by J. T. Lloyd (1881); and *Henry Ward Beecher: a Biography*, by W. C. Beecher, Rev. S. Scoville, and Mrs. Beecher (1888).

Beecher, LYMAN (1775-1863), American preacher, born at New Haven, Connecticut. Minister (1810) of Lichfield Congregational Church, he soon took foremost rank as a preacher, and (1832-52) was president of Lane Theological Seminary, near Cincinnati. Three volumes of his works were published in 1852. His *Autobiography*, was edited by his son C. Beecher (1864-5). He was father of Harriet Beecher-Stowe, of Henry Ward Beecher, and of the following:—CATHERINE ESTHER (1800-78), born in Long I. At the head of a school at Hartford (1822-32), and (1832-4) of a seminary in Cincinnati, she devoted herself to female education by organizing societies for this object, and by numerous writings. CHARLES (1815-1900), editor of his father's *Autobiography*, and author of *Pen Pictures of the Bible* (1855). EDWARD (1803-95), editor of *Congregationalist* (1849-53) and author of *The Conflict of Ages* (1853), *The Concord of Ages* (1860), and *Scriptural Doctrine of Retribution* (1878).

Beecher-Stowe, MRS. HARRIET ELIZABETH (1812-96), American novelist, was born at Lichfield, Conn. In 1850, when the anti-slavery movement was at its height, she contributed to the anti-slavery paper, *The National Era*, her celebrated story *Uncle Tom's Cabin*. It excited little attention until it was brought out by a Boston firm in 1852. It then speedily attained a success probably beyond parallel. Half a million copies were sold in the United States in a few months, and the sale in Britain was scarcely less extraordinary. It was translated into over two dozen different languages. In 1853 the writer published a key to the work, showing that it was largely based upon fact. In 1832 she married the theological professor, C. E. Stowe, and with him lived at Andover, Mass. (1852-63), and Hartford. Succeeding works by Mrs. Beecher-Stowe were *A Peep into Uncle Tom's Cabin for Children* (1853); a second anti-slavery novel, *Dred: a Tale of the Dismal Swamp* (1856); *The Minister's Wooing* (1859); and *Oldtown Folks* (1869). In 1870 she published *The True Story of Lady Byron's Life* and *Lady Byron Vindicated*, containing scandalous allegations against Lord Byron, which severely injured Mrs. Beecher-Stowe's reputation. *The Life of Harriet Beecher-Stowe*, by her son, appeared in 1889. See also M'Gray's *Life-work of the Author of 'Uncle Tom's Cabin'* (1890), and Mrs. Annie Fields's *Life and Letters of H. Beecher-Stowe* (1899).

Harriet Beecher-Stowe.

Beechey, Frederick William (1796–1856), English rear-admiral and geographer, son of the following, served under Franklin in the Arctic expedition of 1818, and under Parry in 1819. He co-operated, by Bering Strait, with polar expeditions from the east (1825), and at various periods was employed in survey work on the north coast of Africa, the coast of S. America, and the Irish seaboard. Author of various geographical works, including a *Voyage of Discovery towards the N. Pole* (1843), and an account of his Bering Strait explorations (1831).

Beechey, Sir William (1753–1839), English painter, entered as student at the Royal Academy (1772). Elected A.R.A. in 1783, his portrait of Queen Charlotte, painted the same year, procured him the post of portrait painter to her majesty. In 1798 he was knighted and elected R.A. His reputation depends on his portraits, which are marked by good colouring, but by stiff and ill-arranged draperies.

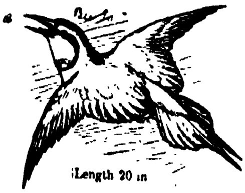
Beechey Island, islet, Arctic Archipelago, N. of Barrow Str., Canada, 74° 43′ N., 91° 39′ W.; so called from Admiral Beechey. Here Franklin's second expedition wintered for two years, and here memorials have been erected to the members of this and of a later British expedition. There is also a memorial to Lieutenant Bellot, who perished in 1853.

Beeching, Henry Charles (1859), English man of letters. From 1885 to 1900 he was rector of Yattendon, Berks, and in 1900 was appointed chaplain of Lincoln's Inn, and professor of theology at King's College, London. In 1896 he won the Oxford sacred poem prize, and in 1900 was the Clark lecturer in English literature at Trinity College, Cambridge. In 1901–3 he was professor of pastoral theology at King's College, London. His publications are: *Love in Idleness*, with J. W. Mackail and J. B. B. Nichols (1883); *Love's Looking Glass*, with the same (1891); *In a Garden, and other Poems* (1895); *Pages from a Private Diary* (1898); *Conferences on Men and Books*, under pseudonym 'Urbanus Sylvan' (1900); *Two Lectures introductory to the Study of Poetry* (1901); *Religio Laici* (1902); and three anthologies—*Paradise of Eng. Poetry* (1893), *Lyra Sacra* (1894), and *Lyra Apostolica* (1901).

Beeching, James (1788–1858), inventor of self-righting lifeboats, and originator of the type of fishing vessel used at Yarmouth. In 1851 his lifeboat was awarded the Prince Consort's prize, and was taken as the model for the boats of the National Lifeboat Institution.

Beechworth, tn., co. Bogong, Victoria, Australia, 172 m. by rail N.E. of Melbourne; principal town (alt. 1,805 ft.) of the Murray district and of the Ovens gold field. Pop. (1901) 3,000.

Bee-eater, a term applied especially to *Merops apiaster*, a migratory African bird which occasionally visits Britain, but also generally to the members of the family Meropidæ. All the bee-eaters are brilliantly-coloured birds, green predominating, with long bills and great power of flight; the majority are Ethiopian forms. The common bee-eater of Europe (*M. apiaster*) has an extensive range over Asia, Europe, and Africa, and earns its name by its habits, but all the members of the family subsist on insects caught during flight. The colours of *M. apiaster* are very bright and varied, and the bird can be at once recognized by the two elongated and tapering median feathers of the tail. It breeds in deep holes excavated in river banks.



Bee-eater.

Beefeater. (1.) A term popularly applied to some of the retinue of the English royal household, notably to the yeomen of the guard, whose original duties were those of service at the king's table. The word has been derived from the corrupted French *beaufetier*, or *buffetier*, one who waits at the buffet or sideboard. Skeat, however, maintains that its natural English meaning is the right one. See Yeomen of the Guard. (2.) A bird (*Buphaga africana*) similar to the starling, called also ox-pecker, and found only in Africa. It is seen in small flocks, alighting on the backs of cattle and other animals, where it searches for and picks from their hide the larvæ of botflies, on which it feeds. A variety of the beef-eater is the buffalo bird.

Beefsteak Club. The earliest club of this name is said to have been founded in the reign of Queen Anne. In 1709 it was referred to as a 'new society,' and its members were said to include the chief wits and great men of the nation. A Society of Beefsteaks was established some years later, and to avoid confusion with the above, the members designated themselves 'The Steaks.' The Sublime Society of the Steaks was founded at Covent Garden Theatre in 1735, and numbered amongst its members the Prince of Wales. It was dissolved in 1867. See Arnold's *Life....of the Sublime Society of Beefsteaks* (1871). Another club of this name was connected with the Theatre Royal, Dublin, and was founded by Sheridan in 1749. There is also a modern Beefsteak Club in London, founded in 1876.

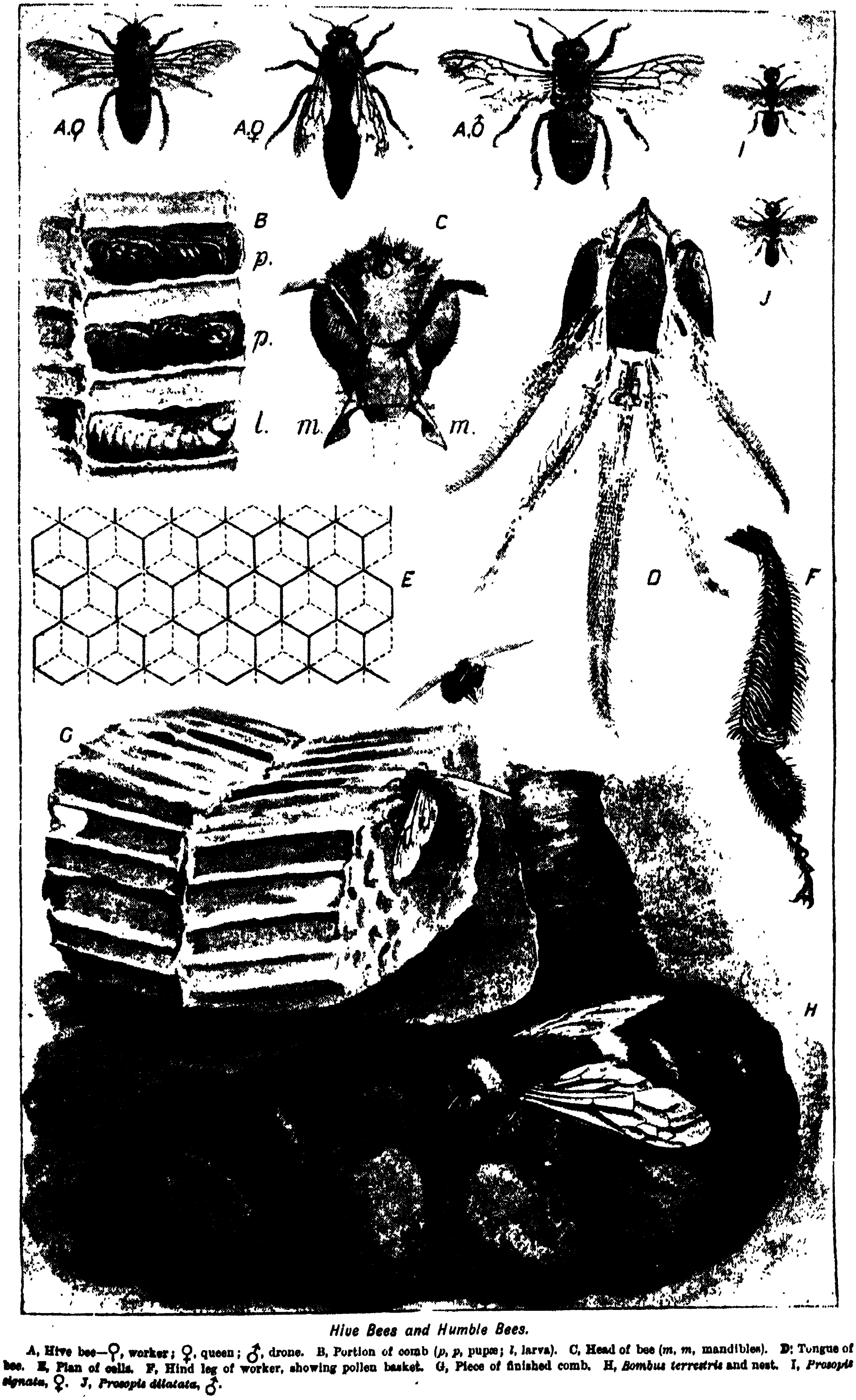
Beef-tea is best made by putting the beef into *cold* water, and heating the water slowly, so that the outer fibres of the beef may not be coagulated and so form a seal to keep the juices in. Even the best beef-tea is practically no more than a stimulating drink. It is, however, useful for that very reason, when invalids are more in need of rest for the stomach than of food. It must never be used to replace nutriment where that is needed. The composition of well-made beef-tea is—water, 96·31; fat, 1·00; albuminoids, 0·82; extractives, 2·09; salts, 0·78 per cent. Take a pound of lean beef, free from tendon, fat, etc.; chop fine, and let it lie in a pint of cold water for two hours. Simmer for three hours at a temperature never over 160° F. Make up the water lost with cold water, so that a pint of beef-tea represents a pound of beef. Strain, and carefully express all fluid from the beef. Beef extracts, from which beef tea may be expeditiously prepared, are numerous, such as Liebig's (Lemco), bovril, oxo, etc.

Beefwood, a name applied to the wood of two different kinds of tree—the bully tree (*Swartzia*) of the order Leguminosæ, in Guiana, and the various species of *Casuarina*, found in Australia.

Beelzebub, or, in the Old Testament, Baalzebub, 'Baal of flies,' *i.e.* a god who controls insect plagues (*cf.* Zeus Apomuios of the Greeks—Pausanias, viii. 26, 7), a deity whose shrine was at Ekron, a Philistine town (2 Kings 1:2). As the later Jews considered heathen gods to be demons, the New Testament transference of the name (which, according to the best MSS., should be Beelzebul) to Satan is easily understood. The word is now believed to be a derisive corruption of Baalzebul, 'lord of the high house'—*i.e.* the temple—and Matt. 10:25 seems to hint at the original meaning, the 'high house' being now 'the pit.' See Baal.

Beer. See Brewing.

Beer Acts. By an act of 1830, licences for the sale of beer could be obtained without application to the magistrates; but several acts passed since that date have put beerhouses under magisterial control. The principal act regulating the traffic in beer is the Wine and Beerhouse Act of 1869.



Hive Bees and Humble Bees.

A, Hive bee—♀, worker; ♀, queen; ♂, drone. B, Portion of comb (*p*, *p*, pupæ; *l*, larva). C, Head of bee (*m*, *m*, mandibles). D: Tongue of bee. E, Plan of cells. F, Hind leg of worker, showing pollen basket. G, Piece of finished comb. H, *Bombus terrestris* and nest. I, *Prosopis signata*, ♀. J, *Prosopis dilatata*, ♂.

Previous to the passing of the Inland Revenue Act of 1880, the government tax was levied on malt, not on beer; but since 1880 the tax can be charged either on the raw material or the finished product, at the option of the excise authorities.

Beeroth, a city of Benjamin (Josh. 18:25, etc.), N. of Jerusalem and S. of Bethel; now the village Bireh, on the main N. road. It has a small church, built in the 12th century, and ancient tombs.

Beersheba, tn. of Palestine, on the S. border of Judah (hence the phrase 'from Dan to Beersheba'—*i.e.* all Israel), in the territory assigned to Simeon; now Bir-es-Seba. Both as a place of wells and as a sanctuary, it is intimately associated with the history of the patriarchs (see Gen. 21, etc.), and it seems to have preserved its character as a sacred resort even to the times of Amos (ch. 8:14). It was subsequently the station of a Roman garrison, and an episcopal see. The numerous ruins in the district date chiefly from early Christian times. See G. A. Smith's *Hist. Geog. of Holy Land* (7th ed. 1901).

Bees constitute the division Anthophila of the sting-bearing Hymenoptera, the Hymenoptera being insects which have two pairs of membranous wings, and are distinguished from wasps and ants by the possession of more profuse branched and plumose hairs on the body. The common hive-bee (*Apis mellifica*) is the most highly specialized member of the Anthophila, probably modified by prolonged domestication. In early summer the bee-keeper recognizes the premonitory symptoms of swarming—first, an unusual restlessness among the bees; and second, a large decrease of the workers entering and leaving the hive on the ordinary business of pollen and honey gathering. Within the hive the signs of the coming change are even more obvious—many of the workers being occupied in gorging themselves with honey from the store, or loading their legs with propolis, the resinous substance which bees collect from plants. Suddenly more than half of the workers, with the queen of the hive, leave their old home, and fly to some previously fixed place, where they 'swarm.' Sometimes a second and third swarm will be given off from the same hive (this depending upon the strength of the hive), each with a queen, without whom the swarm will not settle. The first or top swarm is always the most important, and the honey of the greatest value. Immediately the swarm is hived the workers climb to the roof, forming a pendent curtain of suspending bees, widening towards the base. Here they remain from eighteen to twenty-four hours, the temperature of the hive rising to a considerable height, till the old home wax, secreted by the eight pockets on the surface of the abdomen, appears on each bee as eight whitish plates. These are then removed by the bees from their pockets, and, after mastication and kneading, are fastened to the roof of the hive. When the foundations of the comb are thus laid, other bees form hexagonal cells, until the honeycomb is made. Meantime the queen has been impatiently waiting to lay her innumerable eggs as soon as provision is made for them. As this period of comb-building is exhausting to the workers and delays their honey-making, it is the object of the bee-keeper to diminish the bees' labour by the supply of comb foundations and other mechanical appliances. When completed, the comb consists of a number of so-called worker cells, about one-fifth of an inch in diameter, serving for ordinary storehouses and for cradles for developing workers; and the larger (a quarter-inch) drone cells, in which the drones or males develop, but which are used for superabundant food; and the formation of the 'royal cells,' in which queens develop.

This is the ordinary comb of the colony, and as fast as the workers are able to build worker cells the queen lays in them her eggs. As these will speedily develop into maggot-like larvæ, requiring to be fed, foraging parties become necessary.

The working duties of the hive may be divided into external and internal—the former mainly performed by the older, the latter by the younger bees.

The external duties consist in collecting pollen, or bee-bread, from flowers, and conveying it to the hive; in sucking up nectar from flowers, carrying it to the hive in the so-called honey-bag, and transforming it into honey; and finally, in collecting the sticky substance known as propolis, which the bees use for varnishing purposes. As in the case of ants, the workers are sterile females. The mouth is furnished with strong jaws or mandibles, used for constructive purposes, and also with an elongated tubular apparatus for nectar-gathering. This consists chiefly of the lower lip of the bee, but is often called the tongue, whence the classification of bees into short and long tongued forms a distinction of great importance; for the evolution of tubular flowers has apparently taken place simultaneously with the evolution of the latter type of bees, which alone can reach the honey of such flowers or fertilize them. Another important feature in the structure of the working bee is the presence on the last pair of legs of the 'pollen basket,' the beautiful arrangement of hairs by means of which the bee carries pollen to the hive.

The workers have arduous internal duties. They feed and rear the larvæ; they build the comb and arrange the entire internal economy; they keep the interior clean and sweet; they ventilate the hive by movements of the wings; and this though the life of the worker does not exceed six weeks in the summer months.

The life-history of the worker may be given as follows:—From the egg laid by the queen in a worker cell an eyeless larva is hatched, and is fed by the workers, at first by a secretion from certain glands—the so-called pap—and later apparently on honey and pollen. After several moults it develops into a pupa, the cell being sealed by the workers. After some twelve days the perfect worker emerges, and in about twenty-four hours enters on its duty as a nurse.

The development of the larger-sized drone, or stingless male, is similar, though the cell in which it occurs is naturally larger. With regard to the determination of sex, it is usually believed that the drone is produced from an unfertilized egg; but others hold that though this may be the case, proof of the assertion is still to be furnished, and that the question of worker or drone is solved by the respective treatment of egg and larva.

In regard to the queen, it appears certain that the sex is determined by the 'royal jelly'—different from worker' pap—furnished to the developing larva.

The position of the queen in the hive may be best appreciated by returning to the queenless hive from which the primary swarm escaped, and which contains perhaps one-third of the original workers, but has the stores of the original colony, and in its brood comb probably several queen cells containing pupæ and larvæ. One of these cells speedily liberates a virgin queen, who endeavours to destroy her rivals within their cells. She is prevented or permitted by the workers according as they do or do not contemplate another swarm. In the latter case, the execution is postponed until after the nuptial flight. The virgin queen quits the hive, and rises, pursued by a crowd of drones, to a great height in the air, where the union occurs, and is followed by the return of the queen to the hive, when she begins her life of continuous egg-laying.

If a new swarm is contemplated, the nuptial flight is delayed until new queens are ready to emerge, and then the first queen escapes, accompanied by workers, to found a new colony. In this case the swarm often travels to a distance, and the possibility of cross-fertilization with drones from another hive is increased. The workers exhibit extraordinary intelligence in connection with the economy of the hive; but they have a tendency to swarm with a frequency which produces several weak and failing stocks instead of a few strong ones.

So long as the weather suggests the possibility of swarming, drones are present in the hive; but as soon as the swarming season is over, these are killed by the workers, if the hive has a breeding queen. If the queen be semi-sterile, or capable of laying drone eggs only, the destruction is delayed. The drones never take any part in the work of the colony, although they feed on the stores collected by the workers. As, further, one drone only is required to mate with the queen, and the mating is followed by death, the over-production of drones or their prolonged preservation is a needless drain on the resources of the colony.

Even on *a priori* grounds, it is obvious that so elaborate a social system as that of the hive bee is one of gradual growth, especially in view of the numerous structural adaptations involved in the production of the different castes—workers, drones, and queens. In point of fact, the evolution of the habits and structure of the hive-bee may be admirably traced by a study of other bees. Not a few of the wild bees are solitary—*e.g. Prosopis*, a genus including several British bees of very primitive nature. Here the mothers dig burrows in wood, earth, or bramble stems, and lay one egg in each of the several cells, each egg being surrounded by food material. After doing this the mother bee dies, and never sees the larvæ which emerge from the eggs. In these bees there are no pollen baskets, the proboscis is very short, and wax is not produced. The cells are lined with a silky material, and the food-store consists of a mixture of pollen and honey—the former being carried in the alimentary canal mixed with the latter, and collected by the mouth. From this primitive condition a series of forms leads up to the highly specialized hive bee.

See *Insects*, Part II., by D. Sharp, in the *Cambridge Nat. Hist.* (1899). For British bees, see F. Smith's *Brit. Museum Cat. of Brit. Hymenoptera* (new issue 1891). For bees in relation to flowers, see Lubbock's *Brit. Wild Flowers in Relation to Insects*, Nature Series (1885); and Hermann Müller's *The Fertilization of Flowers* (trans. 1883). For the hive bee, see Sir John Lubbock's *Ants, Bees, and Wasps* (1889); Romanes' *Animal Intelligence* (1881); and Maurice Maeterlinck's wonderful eulogy, translated as *The Life of the Bee* (1901).

BEE-KEEPING.—Apart from the frequent Scriptural mention of bees and honey, and the allusion to bees in the hieroglyphics of ancient Egypt four thousand years ago, Aristotle the philosopher, in the 4th century B.C., and, two hundred years later, Virgil the poet and Pliny the naturalist, all wrote about bees—Virgil's fourth Georgic being in itself a valuable book on bees and bee-keeping. In mediæval times, too, it is recorded that the Saxon lord of the manor sometimes took part payment for rent of holdings in honey.

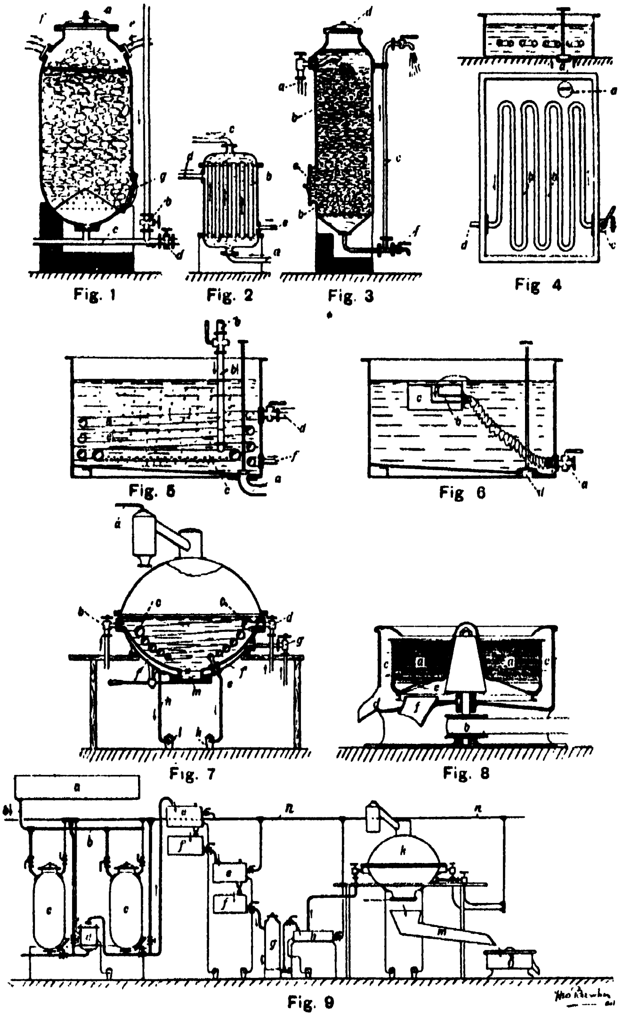
The 17th century was prolific in bee literature, but little additional knowledge was gained, and it was not until Huber, the blind naturalist of Geneva, began his investigations, and in 1792 published his *Nouvelles Observations sur les Abeilles*, that marked progress was made. In 1841 Prokopovitsh, a Russian bee-keeper, who owned an apiary of 2,800 colonies of bees, made the first known attempt at constructing a hive with an upper chamber for surplus honey, and frames of combs that were capable of being removed. The introduction of the methods of modern bee-keeping may, however, be said to date from the invention (1851) of the movable frame by the Rev. L. L. Langstroth, an American clergyman, who made perfect the frame devised by the Russian apiarist. The next important advance was made by the introduction of what is known as comb foundation—*i.e.* thin sheets of beeswax, which, on being passed between embossed metal rollers, have impressed on their surface the outline of the cell base of natural comb. These sheets, when fitted in frames, ensure perfectly straight combs, and are readily adopted by bees as their own handiwork, thus effecting an enormous saving to them in labour and material. The primary merit of this invention is due to J. Mehring, a Bavarian carpenter, who in 1865 discovered that a sheet of wax so impressed would be accepted by bees and built out into comb in a very short time. Mehring's idea has since been improved upon and perfected by the American 'Weed' process of manufacture. Then followed, in 1865, the invention of the honey extractor, by Major Von Hruschka, an Austrian officer. After the cell cappings are removed, the frames of comb are placed in a metal cylinder containing a revolving cage. The cage is fixed on a vertical spindle, with cog gearing at top, and works on a central pivot. By this means the honey is thrown out without injuring the combs, and the latter are returned to the hive for refilling by the bees.

Other inventions tending to increase the production of honey, and render the management of bees more easy, include the small box or frame of thin wood made to hold about 1 lb. of comb honey, and known as a section. By using these, comb honey is secured in attractive portable form for market and table use. Some millions of these sections are made yearly in America and Canada for use in Britain. By means of the very useful appliance called a super-clearer, bees can now be removed from surplus chambers almost without labour, and an entire avoidance of the former trouble through stings from the insects when being deprived of their stores. The appliance referred to is put on at night, and next morning the honey can be removed quite freed from bees, which have passed into the brood chamber below.

The British Bee-keepers' Association, founded in 1874 under the auspices of Sir John Lubbock (now Lord Avebury), has marked a new era in the industry, the parent association having now affiliated to it county bee-keepers' associations all over the kingdom. The education committees of many county councils also now include bee-keeping in their schedules of technical instruction in agricultural pursuits, as a means of helping small farmers, labourers, and cottagers in rural districts. Examinations are also held periodically for the experts' certificates of the Bee-keepers' Association, in order that duly qualified persons may be available as instructors in bee-keeping under the Education Acts.

The amount of honey obtainable from a single colony of bees under the modern system is very remarkable. Formerly 50 or 60 lbs. from one of the old-fashioned skeps was considered an unusually good return, the average from a skep apiary rarely exceeding 30 or 40 lbs. per hive. By the adoption of modern appliances a bee-keeper in the year 1899 secured 352 lbs. of honey from one hive, while the nine hives of his whole apiary yielded 2,088 lbs., or an average of 232 lbs. per hive, in the same year. These results are, however, exceptional, 60 to 80 lbs. being considered a fair annual average in Britain.

See F. R. Cheshire's *Bees and Bee-keeping* (1886); T. W. Cowan's *British Bee-keepers' Guide Book* (18th ed. 1904), *The Honey Bee: its Natural History, Anatomy, and Physiology* (2nd ed. 1904); S. Simmins's *A Modern Bee Farm* (1893); W. B. Webster's *The Book of Bee-keeping* (2nd ed. 1901); *Modern Bee-keeping*, published by British Bee-keepers' Association (9th ed. 1903); *Langstroth on the Hive and Honey Bee* (rev. by C. Dadant and Son, 1889); A. J. Cook's *The Bee-keepers' Guide* (1902); A. I. Root's *A B C of Bee Culture* (1903); Dr. C. C. Miller's *Forty Years among the Bees* (1903); Éd. Bertrand's *Conduite du Rucher* (1895); Dzierzon's *Rational Bee-keeping* (trans. from German by H. Dieck and S. Stutterd, 1882); G. de Layens and Gaston Bonnier's *Cours Complet d'Apiculture* (1897).



Manufacture of Beet Sugar.

Fig. 1. Diffusing Vessel: sliced beet enters at lid *a*, water at *f*, steam at *b* and *e*; the juice is drawn off at *d*, and the exhausted slices are removed through manhole *g*. **Fig. 2. Reheater**: juice enters at *a*, and flows upwards to *c*; steam enters at *d*, and escapes at *e*. **Fig. 3. Charcoal Filter**: juice enters at *a*, passes down through charcoal *b*, and leaves by pipe *c*; *f*, drain cock; *e*, manhole. **Fig. 4. Steam Heater**: sectional elevation and plan; *c*, steam entrance; *b*, coil; *d*, steam outlet; *a*, valve for emptying pan. **Fig. 5. Carbonating Tank**: lime is added to the juice, carbonic acid gas is forced through pipe *b* and perforated coil *c*, and steam through cock *d* and coil *e*, escaping at *f*; *a*, valve. **Fig. 6. Decanting Vessel**: a float *c*, with outlet *b*, communicates by a flexible pipe with outlet *a*; deposited matter is removed by valve *d*. **Fig. 7. Vacuum Pan**: by air pump *a* juice is drawn in at *b*, and heated by steam entering coil *c* at *d* and steam jacket *f* at *g*; *k* and *l*, steam traps to remove condensed water; the sugar crystals formed are removed at *m*. **Fig. 8. Centrifugal Drying Machine**: sugar crystals are put in wire cage *a*, and the rapid revolution forces out the moisture through casing *c* to pipe *d*; the dried sugar is removed by door *e* and spout *f*. **Fig. 9. General Arrangement of Plant**: *a*, water tank; *b*, water pipe; *c*, *c*, diffusers, juice passing from *c* to *c* through reheater *d* (only two diffusers are shown, but seven are commonly used); *e*, defecator or carbonating tank; *f*, decanting vessel (two pairs of these are shown); *g*, charcoal filter; *h*, boiler or steam heater; *k*, vacuum pan; *l*, drying machine.

Beestings, or Beastlings, a term used for the first milk taken from a cow or other milch animal after calving. It can be distinguished from ordinary milk by its thick yellowish appearance and its viscidity. Beestings has not so much casein as milk, but it has a larger percentage of albumin and thrice the quantity of salts in its composition.

Beeswax, a yellow solid secreted by bees to form the honeycomb. It breaks with a granular fracture, and has an agreeable honey-like odour. It is prepared for use by draining away the honey and heating the wax in water, on which it floats, and solidifies on cooling. It melts at about 64° C., is soluble in ether, chloroform, or benzene, but only partly soluble in alcohol. It may be bleached by chlorine or nitric acid, but a much better product is obtained by exposure in thin layers to sunshine, it being at the same time kept moist. Beeswax is used for making candles, waxing polished floors, in medicine as an ingredient in plasters and ointments, and for many other purposes. It is often adulterated with paraffin wax, vegetable waxes, and fats.

Beet, like spinach, is a member of the order Chenopodiaceæ. All the varieties of beet cultivated in gardens are derived from a species, *Beta vulgaris*, which occurs wild in the countries bordering the Mediterranean, and also in some of the more northern districts of Europe. The Greeks and Romans grew it in their gardens; and Theophrastus, Pliny, and Aristotle make reference to distinct varieties. In Neckam's *De Naturis Rerum* (ed. 1858), published in the 12th century, beetroot is referred to as being then in use in Britain.

There are numerous garden varieties, perhaps the best being Dobbie's globe in the turnip-rooted class, and Cheltenham green top in the long-rooted section. The beet is not a difficult root to grow, but thrives best in a deeply-dug, friable soil, moderately rich from the manure applied for a previous crop. Fresh manure should not be added immediately before sowing, or both form and flavour will be spoiled. Salt is a desirable addition to the soil. Turnip-rooted varieties may be sown in April, May, and July, in drills one inch deep, six inches from plant to plant, and twelve inches from row to row. Thin early, and keep free from weeds. The long-rooted varieties should be given a little more room, and should not be sown quite so early as the earliest of the turnip-rooted. The roots should be lifted in late autumn, placed in a cool shed, and covered with sand or light soil.

Since the middle of the 18th century the beet has acquired commercial importance as a sugar-yielding plant, over six million tons of sugar being prepared from beetroot in Europe annually. The best varieties yield from twelve to sixteen per cent. of sugar, and from twelve to twenty tons of roots per acre. The beet requires deeply-ploughed and well-worked land; and it is to this that the exceptional fertility of the Prussian province of Saxony, where most of the German beet is grown, is largely attributed.

The Wild Beet: Root and Inflorescence.

After the beets have been washed and sliced by suitable machinery, hot water is passed among them under pressure, and the diffusion juices thus obtained are conveyed to carbonating tanks, where they are treated with from two to three per cent. of their weight in lime, and afterwards with carbon dioxide, until nearly all the lime is precipitated. The juices are filtered, again carbonated and refiltered, and evaporated to syrup. A portion of the syrup is next placed in an evaporating apparatus known as a strike pan, where it is evaporated until it reaches a condition of supersaturation. In this condition, if a portion of fresh syrup be introduced, the whole mass in the pan becomes charged with exceedingly fine crystals of sugar. By manipulation these crystals are made to grow. Eventually it is found that the mass in the vacuum pan consists of a dense mass of sugar crystals mixed with a quantity of molasses. The latter is separated by means of a centrifugal apparatus, and is subsequently reboiled and more sugar crystallized out. The product thus obtained is raw sugar. By means of bone black, sulphurous acids, and certain manipulation, the refined sugars of commerce are prepared therefrom. See SUGAR; also Wythes's *Book of Vegetables* (1901); Vilmorin's *The Vegetable Garden* (1885); Wiley's *The Sugar Beet.*

Beet-fly (*Anthomyia betæ*), an insect the maggots of which feed on the pulp of beet leaves, and thus reduce them to nothing but dry skin. The eggs are laid beneath the leaves, and as soon as the maggots are hatched they start feeding, feed for a month, and then turn to chestnut-brown pupæ. The flies come out in about a fortnight—ashy gray, with black, bristly hairs. There are two broods—one in summer and one in autumn.

Beethoven, LUDWIG VAN (b. Bonn, Dec. 16, 1770; d. Vienna, Mar. 26, 1827), one of the greatest of musical composers. As a child he displayed unusual talent for music, and from the age of four was taught the violin and clavier by his father, a tenor singer in the band of the elector of Cologne at Bonn. When nine years old he was placed with Pfeiffer, and received lessons on the organ from Van der Eeden, and then from Neefe. Before Beethoven was twelve he could play the greater part of Bach's *Wohltemperierte Clavier*, and had acted as deputy organist during Neefe's temporary absence in Münster. About this time he was appointed *cembalist*—practically conductor of the opera band at the theatre. During 1785 he studied the violin with Franz Ries, and in 1787 paid a visit of some months to Vienna, where he had a few lessons from Mozart. His career at this period was greatly influenced by his friendship with the Breuning family and with Count Waldstein—to whom, in 1803, Beethoven dedicated his famous piano sonata (Op. 53). Beethoven had already earned much distinction as a pianist and improviser, but now he enhanced his reputation as a composer by writing a set of brilliant variations for the piano, which he dedicated to his friend the Countess of Hatzfeldt. In July 1792, while on a visit to Bonn, Haydn 'greatly praised' a composition of Beethoven's which had been submitted to him; and in the autumn of that year Beethoven placed himself under Haydn in Vienna, where he spent the rest of his life. Not wholly satisfied with his progress under Haydn, he also became a pupil of Schenk; and after Haydn left for England, he studied counterpoint with Albrechtsberger, the violin with Schuppanzigh, the writing of quartets with Aloys Förster, and Italian vocal composition with Salieri. Of the many friends Beethoven made among the aristocracy of Vienna may be mentioned Prince and Princess Lichnowsky, whose admiration for him took the practical form of presenting him with a quartet of valuable instruments and a pension of £60 a year, in addition to giving him a home with them; but the regular hours and formalities soon proved irksome to him. When twenty-eight years of age he began to suffer from partial deafness, which increased to such an extent that from 1822 onwards all communication with him had to be made in writing. Notwithstanding this, many of his greatest works were composed during this period. In 1808 Jerome Bonaparte, king of Westphalia, offered Beethoven the post of *maître de chapelle* at Cassel, with an annual salary of £300; but as several noblemen subscribed to a fund which guaranteed him a yearly pension of about £210, he was induced to remain in Vienna. Unfortunately, after the death of Prince Lobkowitz (1816) this pension was reduced to about £110.

At the age of ten Beethoven began the work of composition, and even for some time after the years of his pupilage wrote in accordance with the principles observed by Haydn, Mozart, and others; but at a later period he gradually introduced changes of treatment in individual sections, and also developed considerably some of the musical forms of his predecessors. His greater choice of keys in modulations, his development of the minuet into the scherzo, his unique use and treatment of variations, his revival of *programme* music, which had been almost entirely neglected since its introduction by Bach, also his innovations in the construction of the introduction, coda, finale, and connective phrases of symphonies, may be instanced as indicating the nature of his principal divergences from pre-existing compositions. His symphonies, concertos, chamber music, string quartets, sonatas for violin and for violin and piano, would each have been sufficient to earn for their composer undying fame. His vocal compositions include an oratorio, *The Mount of Olives*, two *Masses*, the *Choral Symphony*, and many other great works, besides a large number of songs, etc. By executive musicians Beethoven's compositions are acknowledged to be the supreme test, intellectual gifts of the highest order being as essential as technical skill. See *Beethoven*, by Moscheles (1841); *Étude Analytique des Symphonies de Beethoven*, by Berlioz (1844); *Beethoven*, by Richard Wagner (Eng. trans. 1893); *Beethoven and his Nine Symphonies*, by Sir G. Grove (1896); and the most exhaustive work yet written, his *Life*, by A. W. Thayer (1866-78; 2nd ed. 1901).

Beetles (Coleoptera), a well-defined order of insects in which the cuticle is hard, and the first pair of wings are converted into scale-like wing covers (elytra), which cover and protect the posterior part of the body. The second pair of wings may function as organs of flight, or may be absent; but, as a rule, beetles are not adapted for an aerial life, and live mostly in concealed situations. The order is rich in species, some 150,000 being said to be known. In classifying beetles, reliance is chiefly placed upon the shape of the antennæ and the number of joints in the tarsus. Thus, the lamellicorns—beetles with the terminal joints of the antennæ leaflike—constitute a very familiar series, including the stag-beetles and the very numerous chafers. The diet of beetles is very varied, but all are voracious; the weevils (Rhynchophora) may be mentioned as a group whose destructive habits render them of economic importance.

Beets, Nicolaas (1814-1903), Dutch writer, born at Haarlem; was pastor of Heemstede (1840) and Utrecht (1854), and professor of theology (1875-84) at Utrecht University, but is chiefly noteworthy as the author of stories and sketches of Dutch life in graceful and humorous prose—*Camera Obscura* (1839; 18th ed. 1888), a Dutch classic, published under the pseudonym of Hildebrand, and with a continuation, *Na Vijftig Jaar* (1887). Besides this he wrote critical essays on literature, theological works, and poems (*Dichtwerken*, 5 vols. 1886-91).

Befana (corruption of 'Epiphany'), legendary old woman who, sweeping the house when the three wise men passed by with gifts to the infant Christ, put off seeing them till their return, and is still awaiting them. At her festival (Jan. 5) in Italy her effigy is in places carried about, followed by an admiring crowd. Counterpart to the Wandering Jew and Santa Claus, and fused in Germany with the heathen Berchta, Befana served as a scare to naughty children. On Twelfth Night, in Italy, Befana brings to good children toys and sweets, but to bad children ashes.

Beg, more commonly Bey ('lord'), Mohammedan title of the governor of a district or town, but now also applied to officers, and used by almost every Turk of gentle birth.

Begas, Reinhold (1831), German sculptor, a pupil of Rauch. He first attracted notice by the *Borussia* (1861), on the façade of the Berlin Exchange, and confirmed his reputation by his statue of Schiller (1863), in the same city. Other works are monuments to the Emperor William (1893-97), Bismarck (1901), the bronze Neptune fountain in Berlin (1891), and very successful busts of the Emperor, Frederick III. and his Empress, William II., Moltke, Menzel, etc.

Begg, James (1808-83), Free Church minister, one of the leaders of the evangelical party in the movement that culminated in the disruption of the Church of Scotland (1843). In the new Free Church, Dr. Begg was the leader of the constitutional (or conservative) party, and the resolute opponent of voluntaryism, of relaxation of the terms of subscription, and especially of the projected union with the United Presbyterian Church in the 'sixties. See *Memoirs*, by Professor T. Smith (1885-8).

Beggar. See Vagabond and Vagrant.

Beggar-my-neighbour, a game at cards similar to that of 'catch honours.' The cards are dealt face downwards among the players. The first player lays down card after card face uppermost till he turns up a court card. If this be a king, his neighbour pays him three cards; if a queen, two cards; and if a knave, one card; while he takes up the whole of the cards laid down, and puts them underneath those in his hand. Play continues till one player obtains all the cards in the pack.

Beghards ('Beggars'), an association of men corresponding to the female Beguinages (see Beguines). The earliest record shows them established at Louvain in 1220. About the end of the 14th century they had almost disappeared from Europe.

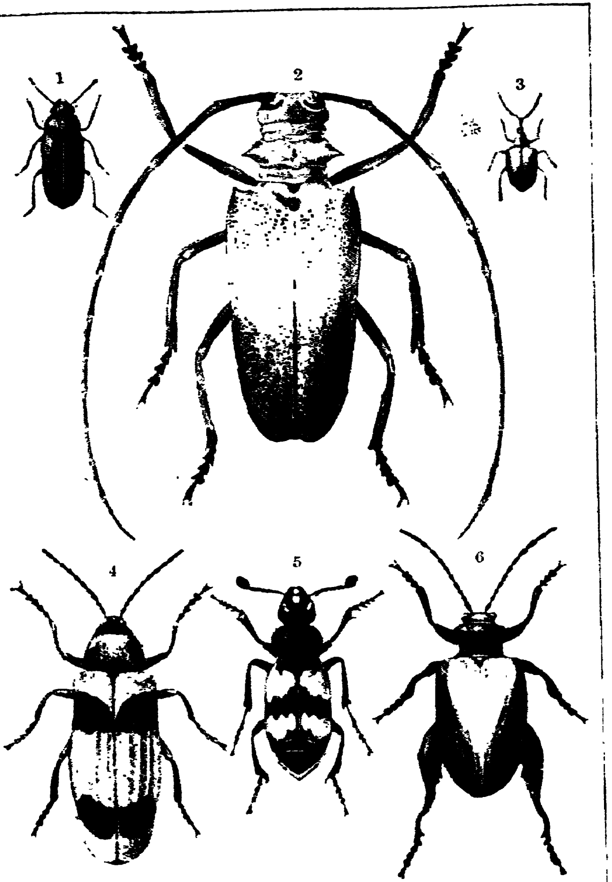
Begles, tn., dep. of Gironde, France, 2½ m. S.E. of Bordeaux, near l. bk. of the Garonne. Pop. (1901) 12,104.

Begharmi. See Baghirmi.

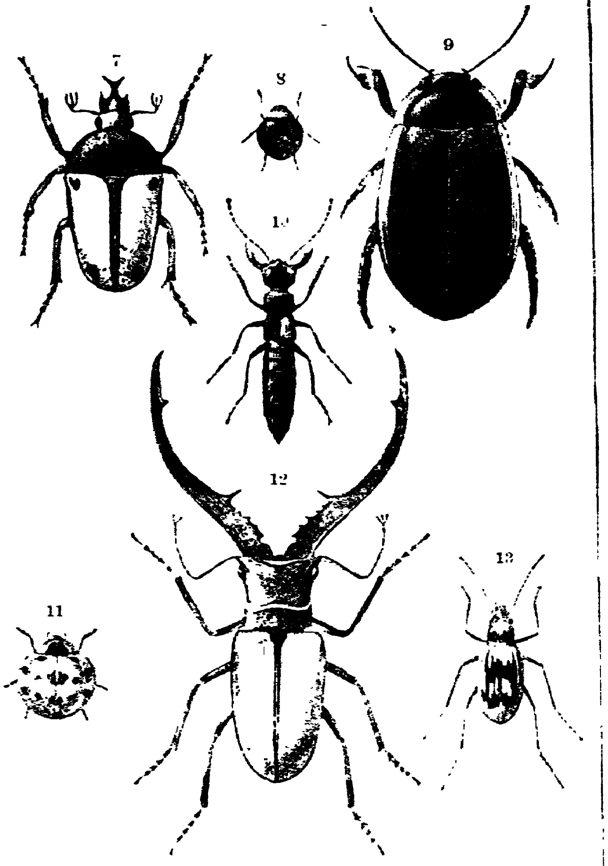
Begonia. The cultivated varieties of begonia may roughly be considered under three headings—the fibrous-rooted, or winter-flowering; the ornamental-leaved, or rex; and the tuberous, or summer-flowering. The first includes such species as *B. nitida*, *B. semperflorens*, and *B. Haageana*, and requires a temperature which never falls below 50° at night. Cuttings taken in March from vigorous stems, immediately below the fourth joint, will strike in a frame or propagating box. Keep close to the glass, but shade from ardent sun. Suitable soil is composed of two parts loam, one part rotten manure, one part leaf mould, and one part sand. Pot on gradually until six-inch or eight-inch pots are attained.

The rex class includes a number of varieties derived from *B. rex* crossed with two or three other species. They are all grown for their large, beautifully-shaped, and often brilliantly-coloured leaves, their flowers being usually small and insignificant. They do not need so high a temperature as that required for the winter-flowering begonias, but do best in the intermediate house or a warm greenhouse. They should be shaded from very strong sunlight during the summer months, and they require a moist atmosphere to do them full justice. Soil similar to that suggested for the fibrous-rooted class is suitable for the rex varieties. Propagation is best effected by means of leaf cuttings. Healthy mature leaves with strong midribs may be cut across the veins at intervals and weighted down on to the surface of a light, moist compost, and subjected to bottom heat; or the leaf may be separated and treated in like manner, or cut into pieces, each piece having a vigorous vein, and these separately planted, with the proximal end inserted in the soil. In either way young rooted plants may quickly be obtained. A great range of colour is afforded by the different members of this class, metallic effects predominating. Green, silver, copper, bronze, gold, red, purple, white, are among the colours most often seen.

Of all the classes, however, that of the tuberous-rooted is by far the most important to the gardener. Its profuse flowering habit, the great range and brilliance of its colours—from yellow to bronze, red to orange, white to pink—and the ease with which it may be cultivated, have all contributed to its success. It is half hardy, and the tubers accordingly require to be lifted before frost has touched them; but as they are dormant during the winter, they may be stored in any corner, provided only that the temperature about them does not sink to freezing point. In addition to their use for the decoration of beds and borders in the open air, summer-flowering begonias may be grown in pots in room or conservatory. The flowers are either single or double. The male and female organs are borne by different flowers on the same plant. The tubers should be planted early in March, in pots containing soil similar to that already suggested for fibrous-rooted varieties, and started in moderate heat. Keep fairly dry until the plants are an inch high. In May begin to harden off, and at about the end of the month plant out into light, moderately rich, well-cultivated soil, allowing ten inches from plant to plant. Propagation may be effected by seeds



1. Heteromera (*Tenebrio molitor*). 2. Longicornia (*Batocera rubens*). 3. Rhyncophora (*Eustales circumductus*). 4. Serricornia (*Chrysochroa Corbettii*). 5. Clavicornia (*Necrophorus vespillo*). 6. Phytophaga (*Sagra bugneti*).



7. Lamellicornia (*Ceratorrhina Smithii*). 8. Malacodermata (*Allochotes bicolor*). 9. Hydradephaga (*Cybister japonicus*). 10. Brachelytra (*Ocypus olens*). 11. Pseudotrimera (*Synonycha grandis*). 12. Pectinicornia (*Cyclommatus tarandus*). 13. Geodephaga (*Nebria complanata*).

There are 150,000 different species of Beetles. Those given here represent some of the more common and more striking forms.

(which must be sown on the surface of moist, well-prepared soil containing plenty of leaf mould, and be left uncovered except by a pane of glass), or by means of cuttings. See Ravenscroft's *Begonia Culture for Amateurs* (1898), Wynne's *Tuberous Begonias* (1888).

Beguines, the members of a religious sisterhood of the third order, at once lay and religious, admission to which does not involve the taking of perpetual vows. The community is called a beguinage (*beguinagium*). The balance of opinion seems to favour the view that both the name and the institution are derived from Lambert Beghe, who, about 1184, founded at Liège a house for poor women. The Beguines lived together by the labour of their hands, under a superior of their own election, and were free to go out to nurse the sick, but not to beg. Similar associations arose of rich and noble ladies following monastic rule, yet at liberty to return to the world. These communities spread in the 13th century in the Rhinelands and Low Countries, especially Belgium. A branch, affirming the capacity to live a sinless life, was abolished in 1311. Beguinages still exist at Amsterdam and Breda. In Belgium, where the Beguines wear the ancient Flemish headdress, there are 15, including the Great Beguinage of Ghent, with nearly 1,250 sisters. See Hallmann's *Geschichte der Belgischen Beghinen* (1843).

Begum, a Hindustani name denoting a woman of high rank, used principally of Mohammedan queens-regnant. The term is also applied to the sultanas of seraglios.

Behaim, BOEHEIM, or BEHEM, MARTIN (c. 1459-1506), German cosmographer, born at Nuremberg; studied under Regiomontanus, and in 1484 accompanied the Portuguese Diego Cão (Cam) to the mouth of the Congo R. In 1486 he settled at Horta, the capital of Fayal, in the Azores. He is remembered for the globe which he constructed at Nuremberg in 1492: it is twenty-one inches in diameter. He also devised a portable sundial to be used in finding the latitude at sea, and is credited with having introduced small astrolabes of brass into the Portuguese navy in place of the unwieldy instruments previously in use.

Behar. See BIHAR.

Behemoth, a colossal animal, real or imaginary, described with leviathan in Job 40:15-24, and referred to in the Book of Enoch, 60:7-9, and 4 Esdras 6:49-52. It is generally identified with the hippopotamus, but the representation shows traces of a mythical element. See A. B. Davidson, *Job* (1884), on passage quoted; Cheyne, *Expositor*, July 1897.

Behera, prov. of Lower Egypt traversed by the Alexandria-Cairo Ry.; cotton is extensively cultivated. Area under cultivation is about 610,000 acres. Pop. (1897) 631,225. The capital is Damanhur, on the railway, about 40 m. S.E. of Alexandria.

Behistun, BISUTUN, or BAGHISTAN, rock in prov. of Ardelan, Persia, about 22 m. E. of Kirmanshah. It rises to a perpendicular height of 1,700 ft., and bears, about 300 ft. above ground, two cuneiform inscriptions (in three languages—Persian, Assyrian, and Median) recording the deeds of Darius Hydaspes (500 B.C.). These were deciphered and translated by Major-general Sir Henry Rawlinson in 1835 7.

Behm, ERNST (1830-84), German geographer, born at Gotha. His chief work was the compilation (with Hermann Wagner) of *Bevölkerung der Erde* (7 vols. 1872-82). He was also editor of *Geographisches Jahrbuch* (1866-86), and of *Petermann's Mitteilungen* (1878-84).

Behmen, JACOB. See BOEHME.

Behn, APHRA (1640-89), English dramatist and novelist, 'the George Sand of the restoration,' was driven after the death of her husband, a wealthy Dutch merchant, to support herself by her pen, and thus became the first professional Englishwoman of letters. Her dramas (of which the most successful, *The Rovers*, held the stage long after her death) are marked by much coarseness, but also by ability and a genuine lyrical faculty. The best known of her tales is probably *Oroonoko, or The Royal Slave* (1698; new ed. 1889). A late ed. of her *Works* appeared in 6 vols. in 1871.

Behring. See BERING.

Beibars, or BAYBARS, two Egyptian rulers. (**1.**) BEIBARS I. (d. 1277) was first a leader of the Bahri Mamelukes, a corps of Turkish slaves who formed the bodyguard of the Egyptian successors of Saladin. Having defeated the crusaders under St. Louis IX. of France, he assassinated a rival chief, Kutz, and was elevated to the throne by the soldiery. His first tasks were to quell a revolt in Syria and repel the Mongol hordes of Hulagu, grandson of Jenghiz Khan. Shortly afterwards a representative (Hakim) of the royal line of the Eastern caliphate (then overthrown by the Mongols) took refuge in Egypt, and was proclaimed caliph by Beibars. But the title of caliph was an empty name; the real rulers of Egypt were Beibars and his military successors. The reign of Beibars was one long course of savage warfare against the Christians in Palestine and against the Mongols, during the course of which he took Antioch, ravaged the vicinity of Acre, and destroyed the Church of the Nativity at Nazareth. He also conquered Armenia, curbed the power of the sect of the Assassins, and subjected Nubia to his rule. He founded the great mosque at Cairo that bears his name, and in other ways embellished the city; he also ruled with enlightenment and vigour. (**2.**) BEIBARS II., a Circassian by birth, was raised to the throne of Egypt by the Mamelukes in 1309, but reigned less than one year, being strangled by a rival (1310).

Beijerland, isl., Holland, between the Oude Maas and the Hollandsch Diep.

Beilan, tn. and pass in the N. corner of Syria, on trade route from interior to Alexandretta (Iskanderun). The pass (1,800 ft. high) lies between the Alma-Dagh Mts. and Jebel-el-Ahmar, and is believed to be the ancient Syrian Gates. The town is the site of the battle between the Turks and the Egyptians in 1832. Pop. 5,000.

Beilstein, FRIEDRICK KONRAD, Russian chemist, was born in St. Petersburg in 1838, and studied under Bunsen, Liebig, Wöhler, and Würtz, amongst others. He graduated in 1858 at Göttingen, became assistant in the university laboratory in 1860, and extraordinary professor of chemistry in 1865. He was appointed to the professorship of chemistry at the Technological Institute in St. Petersburg in 1866, from which he retired in 1896, holding also during part of the time the professorship in the Imperial Academy of Science, and other posts. Beilstein is world famous for his *Handbuch der Organischen Chemie* (3rd ed. 4 vols. 1892-9; with continuations from 1900 onwards, ed. Jacobson). He also wrote *Anleitung zur qualitativen Analyse* (8th ed., by E. Schulze and Winterstein, 1898).

Beira. (**1.**) Province of Portugal, stretches right across the kingdom from the Atlantic to the frontier of Spain, and has the Douro for its N. boundary, and the Tagus for part of its S. boundary. Its most prominent feature is the Serra da Estrella, a bare, heath-clad, granite range (6,540 ft. high), seamed by numerous picturesque dells and valleys. The coast belt yields fish and salt, and the high grounds feed sheep and pigs. There are several mineral springs. Area, 9,255 sq. m. Pop. (1900) 1,518,406. Chief town, Coimbra. (**2.**) District, Portuguese E. Africa, occupying the lower course of the Pungwe R., and including the territories of Manica and Sofala. India-rubber and cocoanut trees have been planted. Alluvial gold is washed in the Mudza valley. (3.) Seaport and cap. of above, at mouth of Pungwe R.; the gateway of Mashonaland, with which it is connected by railway, completed in 1902 (Umtali, 203 m.; Salisbury, 375 m.). A breakwater guards Beira from the encroachments of the river. Beira is visited regularly by British India Steam Navigation, German E. Africa, and Austrian Lloyd vessels. Exports (1903) £57,621—sugar, rubber, beeswax, ivory, hides and horned heads; imports (1903) £498,799, of which £237,750 passed through Beira to the British sphere. Pop. (1900) 3,379 (1,438 whites).

Beiram. See BAIRAM.

Beirut, or BEYROUT. (1.) Seaport on the Mediterranean, cap. of vilayet of same name, in Syria, Turkey in Asia, situated on a bay at the foot of a prolongation of the Lebanon, 55 m. by rail W.N.W. of Damascus, whose port it is. Beirut is the healthiest place on the coast, having temperate summers, and a plentiful supply of rain in winter. It is the seat of a Greek and a Maronite bishop, and the centre of several foreign missions. It possesses a university, an astronomical observatory, a society of Oriental languages. Beirut manufactures silk stuffs, gold and silver thread, porous earthenware, etc., and is the entrepôt for the exports and imports of the whole of Syria—the exports consisting chiefly of silk, wool, oils, soap, lemons, and oranges; and the imports of iron, cotton goods, coffee, fancy goods. Total value of imports in 1903 was £1,258,950, and of exports £692,275; half the value of imports being from the United Kingdom, and more than three-fourths of the exports being to France. Pop. (1900) 140,000, over one-fourth Mohammedans. Beirut is the ancient Berytus, and was a port of the Phœnicians. It came later under the power of Egypt, from whom it was taken by Antiochus the Great, and so became part of Syria. Conquered for the Romans by Agrippa, it was made by Augustus a military colony, under the name of Colonia Julia Augusta Felix Berytus. During the crusades it belonged alternately to the Christians and to the Saracens. In 1763 it fell into the power of the Turks; was conquered by Ibrahim Pasha, son of Mehemet Ali of Egypt, in 1831; and played an important part in the Oriental question in 1840, when it was bombarded on Sept. 10 by the allied English, Austrian, and Turkish fleets, until evacuated by the Egyptians. Its modern growth dates from 1843, when steam navigation was introduced. (2.) Vilayet in Syria, Turkey in Asia, with an area of 11,773 sq. m., and pop. of 533,600.

Beishehr Göl, lake, Asia Minor, 40 m. W. of Konieh, 38 m. long by 5 to 10 m. broad. It drains into the Soghla Göl (lake), to the S.E. The town of Beishehr is situated on its E. shore, and Kirili near its N.E. shore, whence the lake is also called Kirili Göl.

Beit, ALFRED (1853), S. African financier, born in Hamburg of an old Jewish family. In Beit, Cecil Rhodes found one of the ablest and most loyal of financial supporters; and as one of the directors of the Chartered Company, he gave evidence in the Jameson Commission in May 1897. He is partner in the firm of Wernher, Beit, and Co., a director of the Rand Mines, Rhodesia and other South African railways, and of the Consolidated Co. Bultfontein Mine. In 1902 he founded at Oxford a chair of colonial history.

Beit-el-Fakih, trading centre, Yemen, Arabia, near the Red Sea, 37 m. S.E. of Hodeida. Pop. 8,000.

Beith ('birch tree'), tn., N. Ayrshire, 15¼ m. N.N.W. of Kilmarnock. Industries: linen thread, ropemaking, tanning and currying of leather, cabinet-making and upholstery. It has two ry. stns. (G. & S.W., and Barrhead and Kilmarnock Joint Ry.). Pop. (1901) 4,963.

Beja. (1.) An episc. tn. (anc. *Pax Julia*) of Portugal, chief town of dist. Beja, 95 m. by rail S.E. of Lisbon. It has a castle, a cathedral, and noted fairs, and manufactures pottery, leather, and olive oil. Pop. (1900) 8,895. (2.) Administrative dist. of Portugal, in S. of prov. of Alemtejo. Area, 4,209 sq. m. Pop. (1900) 161,602.

Bejan, or BAJAN (*cf.* Fr. *bec jaune*, Med. Lat. *bejanus*, 'yellow beak'), was the common name for freshmen in universities in the middle ages, and is still used in St. Andrews and Aberdeen. The idea, which appears also in the German *Gelbschnabel*, is that of a young bird whose beak has not lost its first yellow tint.

Bejapur. See BIJAPUR.

Bejar, fort. tn., prov. Salamanca, Spain, 41 m. S. of Salamanca, on railway from that town to Plasencia; has factories of flannels and serges. Pop. (1900) 9,488.

Bek, ANTHONY (d. 1310), bishop of Durham (1283), the most magnificent prelate of his day, was one of the English commissioners at Brigham to arrange the marriage of Prince Edward with Margaret of Scotland (1290), and throughout the negotiations with Baliol was one of Edward's chief advisers. In 1300 his dispute with Prior Richard at Durham brought him into conflict with king and Pope; and in consequence of his departure to Rome to prosecute his appeal without the royal permission, Edward seized his temporalities (1302), but Bek regained them on application to the Pope. Bek submitted for a time, but on the accession of Edward II. took ample revenge on his enemies. By this king he was granted the sovereignty of the Isle of Man (1307). See W. Hutchinson's *Hist. of Durham* (1823); J. L. Low's *Diocesan Hist. of Durham* (1880).

Bek, THOMAS (d. 1293), lord treasurer of England (1279), bishop of St. David's (1280), was the elder brother of Anthony Bek, whom he consecrated bishop of Durham. In 1290 he took the crusading vow, but probably never left England. See Jones and Freeman's *History of St. David's* (1856).

Bekaa, EL, or EL BIKA, a valley between the ranges of the Lebanon, in Syria, stretching from the sources of the Jordan to the upper course of the Nahr-el-Asi (anc. *Orontes*), and traversed by the Nahr-el-Litany (anc. *Leontes*). This valley is the ancient Cœle-Syria (in the O.T. *Hamath*), and has an alt. of 2,600 to 3,000 ft. Its principal town, Baalbek, situated near the source of the Nahr-el-Litany, is mentioned in the hieroglyphic and cuneiform inscriptions as Balbiki, from the Semitic Baal-Beka.

Beke, CHARLES TILSTONE (1800-74), Abyssinian explorer, published his *Origines Biblicæ* in 1834. In 1840 he visited Abyssinia, and made important discoveries as to the true structure of the mountain ranges in E. Africa. In 1848 he organized an expedition to explore the sources of the Nile, starting from Zanzibar; but the expedition was only partially carried out. He visited Theodore of Abyssinia in 1864, to urge the release of Capt. Cameron and the other imprisoned British subjects, and afterwards furnished maps and information to Napier's military expedition (1868). Much of his time was devoted to the identification of Biblical localities, especially of Mount Sinai (1874). Chief works: *The Sources of the Nile* (1860), a plea for the opening up of Africa; and *Discoveries of Sinai in Arabia, and of Midian*, published by his widow (1878).

Bekes. (1.) County of Hungary, in the E., between the Tisza and Transylvania, on both sides of the Körös, which forms extensive marshes. Cereals, wine, fruit, and tobacco are the principal products. Area, 1,373 sq. m. Pop. (1900) 277,734. Cap. Gyula. (2.) Town of above co., 47 m. by rail N. by W. of Avad. Pop. (1900) 25,473.

Bekker, Elisabeth (1738-1804), Dutch novelist and poetess, wrote, in conjunction with Agatha Deken, what are practically the first modern Dutch novels—*Historie van Mejuffrouw Sara Burgerhart* (1782; 7th ed. 1886), *Historie van den Heer Willem Leerend* (1784-5), *Brieven van Abraham Blankaart* (1787-89), *Cornelia Wildschut* (1793-6)—long-winded moral works in the style of Richardson, but written in easy, natural language. She also wrote semi-satirical sketches of contemporary life—*e.g. De Menuet en de Dominées-Pruik*—besides dull philosophic poems. See J. van Vloten's *Het Leven en de Uitgelezen Werken van E. W. Bekker* (1866).

Bekker, Immanuel (1785-1871), German philologist, born at Berlin, where he became professor of philology in 1810. He is best known by his editions of the classics, including *Homer* (1858), *Plato* (1816-23), *Attic Orators* (1822-24), *Thucydides* (1821-32), *Aristophanes* (1829), and *Aristotle* (1831), the text of which he rectified from manuscripts in the chief libraries of Europe.

Bela, the name of several Hungarian kings of the Arpad dynasty. Bela i. deposed his brother Andrew i. in 1060. A strong ruler, he introduced many reforms, and suppressed the last pagan rising. Bela iii. (d. 1196) succeeded his brother, Stephen iii., in 1174. He was a brother-in-law of Philip Augustus of France. His reign of twenty-two years was signalized by wars with the Poles and Austrians, and the recovery of Dalmatia from the Venetians. Bela iv. ascended the throne in 1235, and six years later was driven from it by the Mongols under Batu Khan. He sought refuge in Austria, and regained his throne in 1244. He was one of the greatest kings of Hungary: he curtailed the privileges of the nobles, improved the condition of the peasantry, fostered agriculture, encouraged Germans to settle in his kingdom, and founded towns. He reigned until 1270. See Pauler's *Geschichte d. ungarischen Nation unter den Arpaden* (1900).

Belalcazar, tn., Spain, prov. Cordova, 52 m. n.n.w. of Cordova. Pop. (1900) 7,682.

Bel and the Dragon, a book of the Apocrypha, consisting of two legends setting forth the wisdom of the prophet Daniel. In the Septuagint and other translations of the Bible they are attached (like the Song of the Three Holy Children and Susanna) to the canonical book of Daniel. In the first legend Daniel outwits the priests of Bel, the chief Babylonian deity (*cf.* Baal); and in the second he procures the death of a huge sacred dragon, for which presumptuous deed the populace compel the king of Babylon to cast him into the den of lions, where, however, he is miraculously preserved, and fed with provisions brought by the prophet Habakkuk from Judæa. It is probable that the original language of the book was Aramaic, but it is not known when it was appended to the Greek version of Daniel. See Apocrypha; and Ball, in *Speaker's Apocrypha.*

Belasco, David (b. 1862), American dramatist, is the author of a number of popular plays of a melodramatic type. He is a native of San Francisco, became an actor (1874) at an early age, and, after being stage manager at several San Francisco theatres, went to New York. His first success as a playwright was with *May Blossom*, in 1884. This has been followed by *Lord Chumley*, *Men and Women*, *The Charity Ball*, *The Wife*, *The Girl I left Behind Me* (1893), *The Heart of Maryland*, and *Madame Butterfly* (1900). His most recent and most remarkable work is his Japanese play, *The Darling of the Gods*, produced by Mr. Tree at His Majesty's Theatre in January 1904.

Belbeis (anc. *Bubastis Agria*), tn. in Lower Egypt, 28 m. n.e. of Cairo and 13 m. s.e. of Zagazig, on trade route from Syria; occupied by Napoleon's army in 1798. Pop. (1897) 11,267.

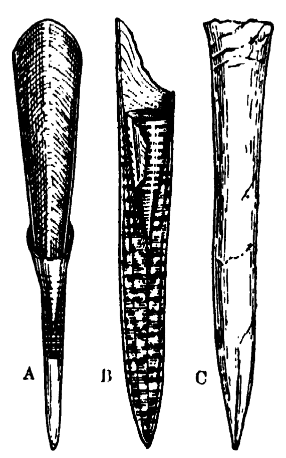
Belcher, Sir Edward (1799-1877), British admiral, was present at the bombardment of Algiers in 1816. In 1825 he went with Captain F. W. Beechey, in the *Blossom*, to Bering Strait, and in 1829 was promoted to be commander. For some years afterwards he was chiefly employed in surveying duties, but in 1841 he took part in the operations in China. He was appointed in 1851 to command the *Assistance* on an Arctic expedition. He became a rear-admiral in 1861. Among his works are *Narrative of a Voyage round the World in H.M.S. 'Sulphur' in 1834-42* (1843), and a treatise on nautical surveying.

Belchite, tn., prov. Saragossa, Spain, 21 m. s.e. of tn. of the same name. Here the Spaniards, under Blake, were defeated by the French, under Suchet, on June 18, 1809. Pop. (1900) 3,334.

Beledugu, a dist. of W. Africa lying s. of 15° n. lat., and between the Upper Niger and the Upper Gambia.

Belem. (**1.**) A w. suburb of Lisbon, Portugal, formerly a separate town. Here are a fortress and a monastery, built to commemorate Vasco da Gama's discovery of the route to India. (**2.**) Known to foreigners as Para, cap. of the state of Para, Brazil, situated on an elevated point in Guajara Bay, by the r. bk. of the e. mouth of the Tocantins (or Para R.), 110 m. by rail w. of Bragança, its seaport. It contains many fine buildings, including the Parliament House, cathedral, and the Theatre da Paz, one of the finest in S. America. Belem is the residence of a bishop, and a centre for the Amazon trade. Pop. (1890) 50,064; (1903) about 100,000.

Belemnite, the internal skeleton of an extinct animal allied to the cuttle-fish; and though differing in shape, it is similar in origin to the horny pen of *Loligo* or the 'cuttle-fish bone' of *Sepia.* In perfect specimens the outlines of a squid-like animal are to be seen surrounding the belemnite, with many arms provided with horny suckers; in very rare cases the ink-sac is preserved. Belemnites vary in length from one to fifteen inches, and many species are recognized. They are confined to the Jurassic and Cretaceous rocks, in which they are abundant and typical fossils. See works on *Palæontology* by Nicholson (1872), Woods, and Zittel (1895; trans. by C. R. Eastman, 1900); and Mantell's *Medals of Creation* (2nd ed. 1847).

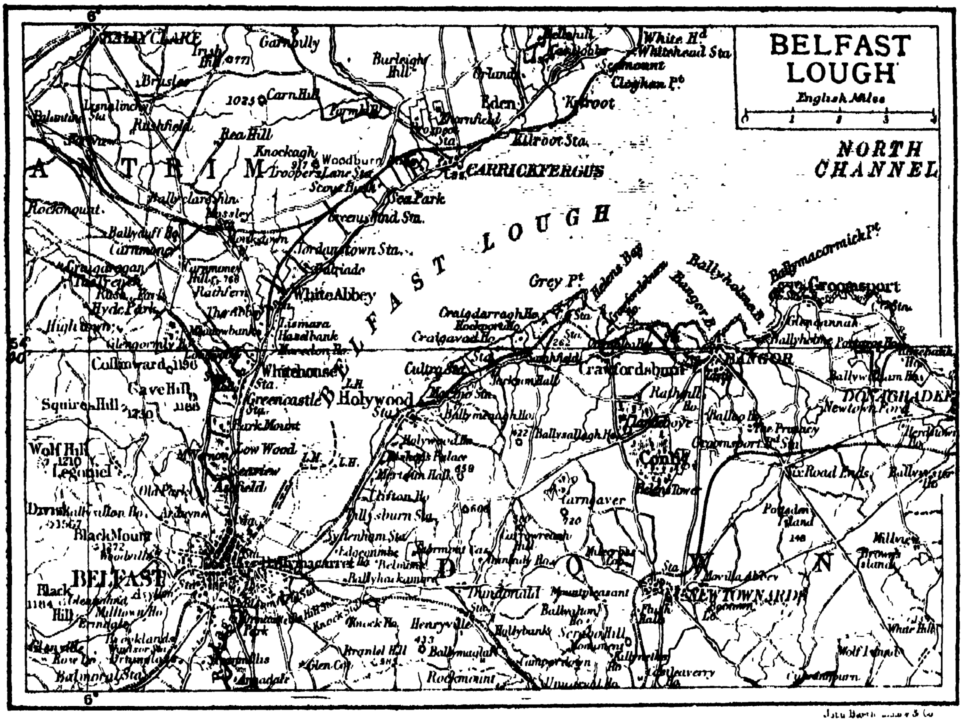


Belemnite.

A, Restoration of a belemnite shell (after Zittel). B, Vertical section of a belemnite. C, Belemnite shell.

Belfast. (**1.**) Seaport, parl. and munic. bor., in Cos. Antrim and Down, Ulster, Ireland; stands at the head of Belfast Lough, and on the river Lagan. It is an important manufacturing and commercial town; the chief manufactures are linen, chemicals, machinery, sails, ropes, damasks, and flax. Shipbuilding, dyeing, bleaching, brewing, distilling, and bacon-curing form the principal industries. The area of its docks and basin is about 136 ac. The chief docks are the Dufferin (635 ft. long by 225 ft. wide); the

Spencer (tidal, 600 ft. long by 550 ft. wide), the York (1,581 ft. long, and provided with first-class sheds), and the Clarendon (tidal). The Abercorn Basin is 727 ft. long and 646 ft. broad. There are three river quays—the Albert, the Queen's, and Donegal. The largest of the four graving docks (the Alexandra) has a length of 800 ft., a width of 80 ft., and a depth of 25 ft. In the harbour there are three large shipbuilding yards, in which have been built some of the largest ships afloat—the *Oceanic* (White Star Line), 17,274 tons, built by Harland and Wolff, 1888; the *Celtic* (White Star Line), 20,904 tons; the *Cedric*, 21,000 tons; and the *Baltic*, the largest ship in the world (1904). The harbour is at all times safe and accessible. In 1903 the total foreign and colonial trade amounted to £8,832,631, of which £1,058,993 were exports, and £7,773,638 imports. Inland trade is facilitated by a canal connecting the Lagan with Lough Neagh. The most noteworthy buildings are the Linen Hall (1853), the New City Hall, the Queen's College (1849), the Presbyterian College, the Roman Catholic College, and the Free Library. Belfast is well supplied with public parks, the principal being the Ormeau-Alexandra. There is also a very fine Royal Botanic Garden. Belfast is represented by four members of Parliament, and since 1892 the chief magistrate has enjoyed the title of lord mayor. Pop. (1901) 348,965. (**2.**) City and seapt., Maine, U.S.A., co. seat of Waldo co., on Penobscot Bay. Pop. (1900) 4,615.



John Bartholomew & Co.

Belfast Lough, deep and picturesque arm of the sea (14 m. long by 6 m. broad), between Cos. Antrim and Down, prov. Ulster, Ireland; generally free from rocks, the only dangerous reef being the Briggs or the Clachan (N. side). Near Belfast is Queen's I. (shipbuilding yards), connected with the mainland.

Belfort. (**1.**) Small district (235 sq. m.) in France, forming the remains of the former dep. of Haut-Rhin, ceded to Germany in 1871. It is limited by natural features only in the extreme N., where the Ballon d'Alsace (4,070 ft.) and two spurs separate it from the neighbouring department and from Alsace. It drains to the Saône. The land under irrigation yields good crops, and the meadow-lands are rich. The iron industry is flourishing. Pop. (1901) 92,304. (**2.**) Capital of above, 275 m. by rail E.S.E. of Paris; stn. on line to Basel. It is a commercial entrepôt for the trade with Switzerland and Germany. The town is in the centre of a vast system of fortifications, which made Belfort one of the first-class citadels of E. France. It commands the passage between the Vosges and the Jura, known as the Trouée de Belfort. In the Franco-German war it was besieged by the Germans. A fierce engagement took place outside its walls on Jan. 15-17, 1871; and on Feb. 13 the garrison capitulated, and were permitted to march out with full honours of war. There are metal-working and textile industries. Pop. (1901) 32,567.

Belfry, a word which has come to denote a bell-tower, and, in a more restricted sense, the chamber of a church tower in which the bells are hung, but which originally bore a perfectly different meaning. In mediæval times the word was applied to the wooden tower on wheels which was used by besiegers in attacking a castle, and occasionally to a stationary pent-house, under cover of which the attacking force shot their missiles, and from the upper story stormed the ramparts.

Belgæ, a nation of Germanic origin, who dwelt in the north-east of Gaul, between the Rhine, the English Channel, and the Seine. Cæsar subdued them after prolonged resistance.

Belgard, tn., prov. Pomerania, dist. Köslin, Prussia, 90 m. by rail N.E. of Stettin, and 15 m. S.W. of Köslin. Has noted horse marts. Pop. (1900) 8,047.

Belgaum, chief tn. in dist. of same name, Bombay Presidency, India. Has a military cantonment. Pop. (1901) 26,237.

Belgiojoso, tn., 8 m. S.E. by rail of Pavia, N. Italy; has an ancient castle of the princes of Belgiojoso, in which Francis I. of France was imprisoned, after the battle of Pavia, in 1525. Pop. (1901) 4,863.

Belgiojoso, CRISTINA, PRINCESS OF (1808-71), Italian writer and patriot, born in Milan, where she also died; married in 1824 to Prince Belgiojoso—an unhappy union. Full of enthusiasm for the liberty of Italy, in 1848 she equipped at her own cost a regiment of volunteers. Upon the failure of the rising she retired to Lorient, where she remained until 1855, when her confiscated estates were restored her. After a short stay in Italy she again went, in 1858, to Paris, where she worked energetically for the plans of Cavour, and at the same time founded in Milan the journal *Italia*. A little later she became the friend of the house of Savoy. She wrote *Essai sur la Formation du Dogme Catholique* (4 vols. 1842-3), *Souvenirs d'Exil* (1850), *Emina: Récits Turco-Asiatiques* (2 vols. 1856), *Scènes de la Vie Turque* (1858), *Histoire de la Maison de Savoie* (1860), etc.

Belgium, a small country of Europe lying between France, Prussia, and the Netherlands. The surface slopes generally from the S.E. to the North Sea, and is drained by the Scheldt and the Meuse (Maas) and their numerous tributaries, of which the most important is the Sambre. The triangular region S. of the Sambre-Meuse line consists of a series of plateaus, trenched by ravines and narrow valleys, belonging mostly to the system of the Ardennes. Where it is not marsh and moor land it is heavily wooded. To the N. of the same line the surface is nearly a level plain, which has been made exceptionally fertile by the unremitting labours of generations. Artificial embankments protect the low-lying lands and the seaboard from inundations. The country along the N. boundary, between the Scheldt and the Meuse, known as the Campine, was a region of barren sand; but here and in other parts the peasantry, by spade labour and heavy manuring, have, during the second half of the 19th century, won close upon 270,000 acres to effective cultivation. Of the total number of farms nearly two-thirds average 5 ac. in extent, equal to 22·5 per cent. of the cultivated area. Another 37·2 per cent. is divided into farms averaging 25 ac., and the remaining 40·3 per cent. into farms of 132 ac. About two-fifths are farmed by the owners. The heavy rent of land forms a serious drawback to agriculture.

The greatest wealth of Belgium lies in its deposits of coal and iron. The former stretch along the Sambre and the Meuse all the way from the Franco-Belgian frontier W. of Mons as far as Liège. The surface area is no less than 555 sq. m., and the annual output is about 23¼ million tons. The iron mines occur for the most part in the same localities as the coal, and the ore is worked especially in Liège, Seraing, and Charleroi. The annual production of pig iron, manufactured iron and steel, amounts to over 2 million tons. Zinc yields nearly 3 millions sterling, and argentiferous lead a quarter of a million annually.

Machinery is manufactured in Brussels and Seraing; hardware in Liège, Charleroi, Dinant, and Malines. Arms are made in Liège; glass and porcelain in Tournai, Brussels, Courcelles, Charleroi, Namur, and Liège. The once famous woollen manufactures of Flanders now flourish at Verviers, Limburg, and Liège. The linen centres are Courtrai, Ghent, Brussels, Bruges, and Alost. Among the other industries are the manufactures of lace, cotton (Ghent), sugar, hosiery, paper, furniture, leather; brewing and distilling; slate and marble quarrying.

The bulk of the foreign trade passes through Antwerp. Ostend, Ghent, Brussels, and Nieupoort come a long way behind. The foreign trade has risen from 84¾ millions sterling in 1850 to over 187 in 1903. The most important exports, the total value of which was £81,072,000 in 1903, are textiles, yarn, minerals, and coal, cereals, glass, hides, chemicals, and sugar. The Belgian mercantile marine does not much exceed 110,000 tons, but efforts are being made to increase it. There is a fishing fleet, belonging mostly to Ostend, engaged in the cod and herring fishery.

The people consist of two races, Flemings and Walloons, with small numbers of Germans, French, and Dutch. Of the total, who numbered 3,785,814 in 1831 and 6,693,810 in 1900, about 45 per cent. speak Flemish and 41 per cent. Walloon (*i.e.* French), and 11 per cent. speak both languages, now on an official equality. The total area being 11,070 sq. m., the density for the whole kingdom is 605 per sq. m., the most densely peopled provinces being Brabant, with 997; and E. Flanders, with 889 per sq. m. Almost the whole population belong to the Roman Catholic Church, presided over by the archbishop of Malines and the bishops of Bruges, Ghent, Liège, Tournai, and Namur.

Elementary education was not universally required by law till 1895, and consequently is not so advanced as might be expected. The highest branches of education are provided in the universities of Brussels, Louvain, Ghent, and Liège, and by engineering and mining schools attached to the universities.

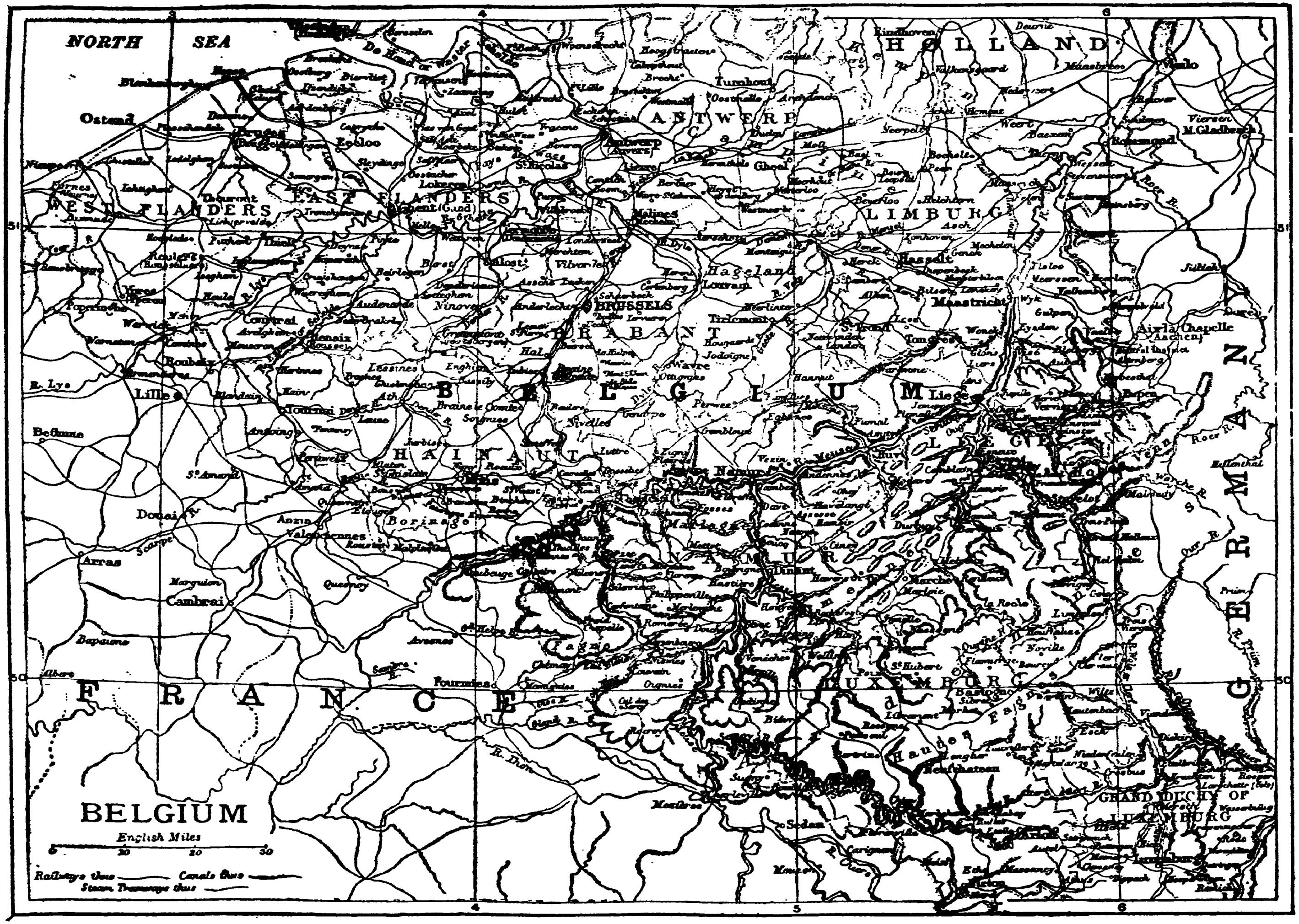
The government is a constitutional and hereditary monarchy. Socialism is a great and growing force in the country.

The capital is Brussels, though Antwerp is the most populous town; next come Liège and Ghent.

See A. Jourdain's and L. van Stalle's *Dictionnaire de Géographie de Belgique* (1895-6), Penck's *Das Königreich Belgien* (1889), C. Scudamore's *Belgium and the Belgians* (1901), and *Annuaire Statistique de la Belgique.*

History.—The kingdom of Belgium originated in 1830, by the severance from the kingdom of the Netherlands of its southern provinces the former Austrian Netherlands and the bishopric of Liège. A provisional government was formed, and was acknowledged by the whole of Belgium. The resolution of the Dutch Parliament that Belgium and the Netherlands should be separately administered, but under the same king, came too late to check the revolution. The crown of the new kingdom was offered to Leopold of Saxe-Coburg, husband of the Princess Charlotte of England and uncle of Queen Victoria, and accepted by him (June 4, 1831). In the ensuing struggle the Dutch forces defeated the Belgians; but the latter were speedily supported by a French army, and the Dutch ports were blockaded by British and French fleets. King William had, therefore, to recognize the inevitable, and Belgium became definitely (1832) a separate kingdom.

In 1842 a law was passed declaring religious instruction in primary schools compulsory, and entrusting it to the clergy, under state supervision. From this dates the chief political struggle in Belgian history. In the first instance it occasioned the formation of a Liberal alliance (organized by a prominent Freemason named Defacqz), which agitated for extension of the franchise by educational as well as property qualifications, and which gained sufficient hold on the electorate to necessitate the formation of a purely Liberal ministry (with Charles Rogier as premier) in 1847. The Rogier ministry promoted railway construction, abolished the stamp tax on newspapers, and reorganized secondary education, with the intention of freeing it from clerical control (1850). The city of Antwerp, however, evaded the measure in 1853, by putting priests


BELGIUM
English Miles
0 10 20 30
Railways thus
Canals thus
Steam Tramways thus
NORTH SEA
HOLLAND
GERMANY
FRANCE
BELGIUM
WEST FLANDERS
EAST FLANDERS
ANTWERP
LIMBURG
BRABANT
HAINAUT
LIEGE
NAMUR
LUXEMBURG
GRAND DUCHY OF LUXEMBURG
Ostend
Blankenberghe
Bruges
Eecloo
Ghent (Gand)
Antwerp (Anvers)
Turnhout
Gheel
Malines
Hasselt
Maastricht
Venlo
Roermond
M. Gladbach
Viersen
Jülich
Aix la Chapelle (Aachen)
Courtrai
Roubaix
Lille
Tournai
Renaix
Alost
Brussels
Louvain
Tirlemont
Hageland
St. Trond
Tongres
Liege
Verviers
Spa
Malmedy
Stavelot
Huy
Namur
Wavre
Nivelles
Braine le Comte
Soignies
Ath
Mons
Borinage
Charleroi
Dinant
Marche
La Roche
Bastogne
St. Hubert
Neufchateau
Arlon
Luxemburg
Sedan
Valenciennes
Cambrai
Douai
Arras
Bapaume
Albert
Bethune
Maubeuge
Fourmies
Avesnes
Hautes Fagnes
R. Lys
Scarpe
Sambre
Meuse
Ourthe
Roer R.
Our R.
R. Prüm
R. Oise
R. Ouse
Ardennes
3
4
5
6
50
51

on the governing bodies of the schools and subordinating the teachers to their authority. A more moderately Liberal ministry (1854) legalized this evasion, but was presently (1855) replaced by a militant Clerical ministry, whose promotion of a law facilitating the foundation of ecclesiastically managed charities created such excitement that the king dismissed it and appointed a Liberal cabinet, who found a majority at the general election of 1857. From that year to 1870 the Liberals, led by Frère-Orban, were in power, and effected many useful reforms—the abolition of the *octrois*, or municipal customs duties on provisions (1860), and of road tolls (1866); a reduction of postal rates (1868), and an abolition of the tax on salt (1870); while in 1867 the right of workmen to combine was recognized. In 1863 the tolls on vessels entering the Scheldt were extinguished by a payment of 36,278,566 fr., of which Belgium found about a third, Great Britain a fourth, and other nations trading with Antwerp the rest.

In 1865 Leopold I. died. He was succeeded by his son, Leopold II., the present king.

The ultimate cause of the defeat of the Liberal party was the Flemish movement. There had been a literary revival of the Flemish language about 1840, and attempts had been made to put it on a par with French in official use. The Flemish districts are ultra-Catholic; the Liberal strength is in the districts which speak French or Walloon. The Liberals therefore opposed the movement. At the elections of 1870 Antwerp and Ghent abandoned them, and Clerical ministries succeeded (1870-8). They succeeded in raising Flemish to the dignity of an official language. But the demonstrativeness of the Clerical party, at a time when there was a strong anti-Clerical reaction in other Continental countries, led to a considerable Liberal success at the elections of 1878. The resultant Liberal ministry (under Frère-Orban) carried a primary education law which placed the elementary schools under strict state supervision, the priests being admitted only to give religious instruction at the beginning or end of the school day (1879). The bishops protested, and organized a rival system of voluntary church schools. The premier broke off diplomatic relations with the Vatican (1880), which were not renewed until 1888. The ministry was severely defeated at the elections of 1884, and the disorganization of the anti-Clerical opposition was intensified by the appearance (1885) of a parliamentary Labour or Socialist party (Parti Ouvrier Belge), which began to agitate for a revision of the constitution which should establish manhood suffrage.

The advisability and the form of a revision were debated for two years by the chamber. The chamber having failed to pass any of the schemes before it (Apr. 1893), the Socialists at once proclaimed a general strike, the mere beginnings of which induced the chamber to accept manhood suffrage, tempered by the plural vote. A second vote was given to fathers of families possessed of a certain amount of property; a second and third to persons with certain educational or professional qualifications; and, to ensure that the well-to-do classes should exercise their full influence, voting was made compulsory. The details were worked out by Sept. 1893, and the subsidiary electoral legislation passed in November. Meanwhile a considerable body of opinion had arisen in favour of proportional or minority representation—which the chamber, however, rejected—and during the winter of 1894 a number of experimental elections, under the system proposed, were carried out by voluntary effort in Brussels and elsewhere. The election of Oct. 1894 was notable for the great increase of the Socialist strength, and the appearance of a new 'Christian Socialist' party (Demochrétiens), whose strength was among the agricultural labourers, but whose one candidate, the Abbé Daens, was defeated at Alost and condemned by the church. They did not return a candidate to the chamber till 1902. The Clerical majority was strengthened, and the state schools brought by legislation more thoroughly under clerical control.

Eventually, proportional representation in all parliamentary elections was introduced in 1900. So far it seems to have worked with unexpected ease and success. The Socialist and Progressist parties are, however, agitating for manhood suffrage pure and simple, the plural vote having been found to strengthen the power of the small Catholic landowners and the priesthood. Serious riots arose out of the agitation in Brussels in the spring of 1902, and a general strike began in the coal districts (Apr. 18-26), but failed at once. At the general election which took place a few weeks later (May 25) it was found that the ministerialists were stronger than before.

Of the other political questions agitated of late years in Belgium, the reform of military service is the most exciting. The king, the Liberals, and the Socialists favour universal compulsory service; the Clericals support the present system. The acquisition of the Congo Free State by Belgium has also been mooted at various times, and the state is understood to be left to Belgium by the king's will. The neutrality of Belgium is a principle of European public law, steps to protect which were taken by Great Britain during the Franco-German war of 1870.

The Abbé Balau's *Soixante-dix Ans d'Histoire Contemporaine de la Belgique* (1815-84; 4th ed. 1891) gives a Clerical view; so does Charles Woeste's *Vingt Ans de Polémique* (1885). No good and complete history of the Belgian kingdom alone exists; though the gap seems likely to be filled by Pironne's *Geschichte Belgiens*, vols. i. and ii. (1899 1902), coming down to 1477. Mr. Demetrius Boulger's *History of Belgium*, vol. i. (1902), only comes down to 1815. On Socialism in Belgium the standard work is *Le Socialisme en Belgique* (1898), by Vandervelde and Destrée.

Literature.—Belgian literature means the literature written by men and women of Belgian nationality, not literature written in the Belgian language; for there is no Belgian language *per se.* Belgians use as their vehicle of literary expression either French or Flemish. The former has been the official language since 1830, and is the mother tongue of very nearly one-half of the population. The other half speaks Flemish, though this language did not win complete official recognition and full equality with French until 1898—the crowning result of nearly sixty years' struggle. The earliest names of moment on the roll of Belgian literature are Baron de Saint-Genois (1813-67), who wrote *De Grootboekhouder* (1851), *Anna* (1844), and other historical romances; De Coster (1827-79), author of a version of the Flemish folk-tale, *La Légende d'Uylenspiegel*, and historical and realistic romances, as *Légendes Flamendes* (1857) and *Contes Brabançons* (1861). Greyson (1823), another realistic novelist and poet, has written *Juffer Daadje et Duffer Doortje* (1873) and *Teintes Grises* (1890); and the poet Pirmez (1832-83), who was influenced by the French romantic school, wrote *Feuillées, Pensées, et Maximes* (1862; 4th ed. 1881), *Jours de Solitude* (1869; 4th ed. 1883), and *Lettres à José* (1884). The year 1841 is the birth year of the 'Flemish movement,' which had for its objects the literary cultivation of the Flemish language and its establishment on a footing of complete equality with French. The originators and principal promoters of this movement were for the most part publicists, like Willems (1793-1846), called the 'father' of the movement, Blommaert, Serrure, Rens, Snellaert, Van Duyse, and Vleeschhouwer. But its most influential champion, from the literary point of view, was the novelist Hendrik Conscience (1812-83), who not only wrote good historical novels like *De Leeuw van Vlaanderen* (1838), but is especially famous for excellent little stories of Flemish life, such as *Hoe men Schilder wordt* (1843), *Siska van Roosemael* (1844), *Rikketikke-tak* (1851), *De Arme Edelman* (1851), and *Het Geluk van rijk te zijn* (1855). The most important supporters of Conscience were the poet Ledeganck (1805-47), in, for example, his poetic trilogy, *Les Trois Villes Sœurs* (Ghent, Bruges, and Antwerp); Rijswijck (1811-69), in political verse like *Refrains Politiques* (1844) and *Chansons Populaires* (1846); and De Cort (1834-78), in various volumes of *Liederen*. Flemish tendencies have also been predominant in the poetical productions of Hiel (1831-99), who wrote songs for children; Van Beers (1824-88), in the poem of humble joys and sorrows, *Begga;* De Laet (1815-91), in the romance *Het Huis van Wesenbeke* (1842), the village tale *Het Lot* (1846), and *Poems* (1848); Gezelle (1830-1900), who recorded his deep love for nature in, for example, *Rijmsnoer* (1897); Pol de Mont (b. 1857), who has put characteristic work into *Claribella* (1893) and *Iris* (1894); De Geyter (b. 1830), in the radical war-cry 'Hymne de Gueux,' in *Charles Quint* (1888), and in *Trois Hommes* (1861); Van Droogenbroeck (1835), in *Rayons de Soleil* (1866); the humorist Vuylsteke (1836), in *L'Amour Silencieux* (1860) and *La Vie d'Etudiant* (1868); Antheunis (1840), in poems of domestic life, *Du Fond du Cœur* (1875) and *Vivre, Aimer, et Chanter* (1879); and, last but not least, Hélène Lapidoth-Swarth (1859), in several volumes of limpid and harmonious verse, such as *Beelden en Stemmen* (1887) and *Riouwrioolen* (1889). Virginie Loveling (1835), in poems, but more especially in numerous novels, distinguished for that rare combination real power with a simple style —*e.g. Au Pays Flamand* (1877), *Le Clef de la Maison* (1883), *Sophie* (1886), *Een Dure Eed* (1892), and *Het Land der Verbeelding* (1896)—has well sustained the tradition of Conscience. Sleeckx and others have also ploughed the same furrows; and the study of Flemish folklore has been much developed by Vervliet, Cornelissen, Harou, Penken, and other writers in the Brabant journal *Ons Volksleven.* But since about 1883 French influences have been, on the whole, predominant in Belgian literature—(1) in the writings of the Parnassians; (2) in the works of the mystical Franco-Flemish school. The Parnassians, represented chiefly by Giraud and Arenberg, and the Walloons Gilkin, Gille, and Severin, and other supporters of the organ *Le Jeune Belgique*, aimed at preserving the ease, polish, and precision of the French classical style. The other stream, borne on for the most part by men of Flemish birth, but writing in French, is much more distinguished. It embraces such famous names as Maeterlinck, Eeckhoud, Verhaeren, and Rodenbach. The first strong note of the tendency was struck in Lemonnier's novel *Un Mâle* (1881), and the movement has been energetically championed by Picard (1836). Maeterlinck (b. 1862) has become known outside of Belgium as the author of mystical dramas—*La Princesse Malcine* (1889; trans. 1892), *L'Intruse* (1890), *Les Aveugles* (1890; trans. 1892), and *Monna Vanna* (1902); of an idyll—*Aglavaine et Selysette* (1896; Eng. trans. 1897); and of volumes of aphoristic philosophical reflections—*Le Trésor des Humbles* (1896; trans. 1897), *La Sagesse et la Destinée* (1898; trans. 1898), and *La Vie des Abeilles* (1901; trans. 1901). Typical illustrations of the 'barbaric' and 'volcanic' temperament of Verhaeren (1855) are the poems *Les Campagnes Hallucinées* (1893), *Les Villes Tentaculaires* (1896), and *Les Villages Illusoires* (1895). Eeckhoud (1854) has written patriotic novels—*La Nouvelle Carthagé* (1888) and *Kermesses* (1883 and 1887); and Rodenbach (1855-98) 'patriotic' poems in *Bruges la Morte* (1892), *Le Voyage dans les Yeux* (1893), *Le Carillonneur* (1897). Other poets infected with different forms of the prevailing mystic contemplation are Remouchamps (*Les Aspirations, Vers l'Ame*), Elskamp (*Six Chansons, Tours d'Ivoire, Les Grâces Evangéliques*), and Demolder (*Récits de Nazareth, La Route d'Emeraude*). Cyriel Buysse has written strong novels (*Het Recht van den Sterkste*, 1894; *Sursum Corda*, 1895), after the manner of Zola, but in Flemish. Except for Maeterlinck, Rodenbach (*Le Voile*), H. de Marez (*De Bruid van Quinten Metsys*, 1898), and Buysse (*Het Gezin van Paemel*, 1902), the Belgians have not distinguished themselves as playwrights. But many have won a good reputation in the fields of literary criticism (Max Rooses, Hamelius, Kurth, De Marez, Keymeulen), history (Pirenne, Kurth, De Potter, D'Alviella, G. de Marez), political and social science (Emile de Laveleye, Nys, Banning, Deschamps, Vandervelde), art history and criticism (Max Rooses, Wauters, and others), and on military matters (Brialmont). There are also two local schools of literature—one consisting of writers who use the Walloon dialect of Liège, the other the German speech of Aubel and Arlon, in the neighbouring state of Luxemburg. The Flemish aspirations have been greatly assisted by the foundation in 1886 of the Royal Flemish Academy; and there is a strong desire growing for an exclusively Flemish university at Ghent. See Potvin's *Hist. des Lettres en Belgique;* P. Hamelius's *Hist. Politique et Littéraire du Mouvement Flamand* (1894); T. Coopman and L. Scharpé's *Geschiedenis der Vlaamsche Letterkunde* (1899-1902), etc.; H. de Marez's *Nieuwe Paden* (1900); L. van Keymeulen's *Esquisses Flamandes* (1899); J. Defrecheux and C. Gothier's *Anthologie des Poëtes Wallons* (1895); and G. Barral's *Collection des Poètes Françaises de l'Etranger* (1897), etc.

Belgrade, cap. of Servia, at the junction of the Danube and Save; consists of two parts—the citadel and the town, the former standing on a hill 133 ft. high, and containing the tomb of Kara Mustafa. Most of the modern fortress dates only from the days of Prince Eugene (1717). Principal buildings are the 'great' mosque, the cathedral (built 1842) with the crypt of the Obrenoviches, the university (about 450 students), the national library (35,000 vols.), the museum, the theatre (built 1871), and the royal palace. Industries are comparatively insignificant, and only recently developing; but there is a brisk trade, Belgrade being the principal export place of Servia. The strategical importance of the place was recognized from the earliest times. During the 11th and 12th centuries the fortress was held by the Greek emperors till it fell into the hands of the Magyars, who for long successfully disputed its possession with the Servians and Turks. It was heroically defended in 1456 by John Hunyady, and remained one of the greatest obstacles to the advance of the Crescent till captured by Sultan Soliman in 1521. From 1521 to 1688 it remained in the hands of the Turks, when it was taken by the Austrians, who only retained it for eighteen months, for in 1690 the grand vizier Mustafa Köprili recaptured the place, which continued in the possession of the Ottomans till Prince Eugene retook it in 1717. In 1738 it was retroceded to the Turks, who kept it (despite its temporary capture by Laudon in 1789) till it was finally transferred to the Servians in 1867. Pop. (1890) 57,485; (1900) 70,516. See R. Nisbet Bain, 'The Siege of Belgrade by Mohammed II.' (in *Hist. Rev.* 1892); Joanne, *Etats du Danube* (1895).

Belgravia, quarter in s.w. of London, built between 1826 and 1852.

Belial, a Hebrew word supposed to mean 'worthlessness,' hence 'wickedness.' Found usually in phrases like 'man of Belial,' it came to be regarded as a proper name (so, even in *R.V.*, 1 Sam. 1:16, etc.). Paul uses it as the equivalent of Satan (2 Cor. 6:15); Milton, in *Paradise Lost*, i., as the name of the angel of impurity.

Beliapatam, tn. in Malabar dist., Madras Presidency, India, situated on the l. bk. of Beliapatam R., 4 m. from the cantonment of Cannanore; has trade in pepper and cardamoms.

Belief. This word is used in several senses, which need to be kept distinct. (1.) It may be used to signify an element in all serious judgment (as distinguished from mere imagination and from wilful falsehood)—*viz.* that the judgment is taken to be true of reality. It is to be observed, however, (*a*) that this truth may be asserted with various degrees of assurance, from full certainty to the vaguest probability; (*b*) that the reality may be that of a fictitious world, as, for example, when it is said that 'Ivanhoe did not *really* marry Rebecca, as Thackeray *falsely* makes him do.' *Cf.* W. James's *Psychology*, vol. ii. pp. 287 *ff.* (1890), on 'the various orders of reality.' (2.) Belief may be used in a narrower sense to signify the conviction that attaches to a probability, as distinguished from that which belongs to certain knowledge. (3.) Belief is also used as equivalent to faith in the religious sense—faith as contrasted with sight. In this sense, therefore, belief is opposed, not as probability to certainty, but as one kind of certainty to another. That is to say, the certainties of faith, resting upon moral and spiritual experience, are contrasted with those of physical science, resting upon sense-experience, or observation.

Belinsky, VISARION GRIGORIEVITCH (1811-48), Russian literary critic, born at Chembar, gov. Penza; studied at the Moscow University, and entered early upon a journalistic career. In 1834 appeared his first important critical work, the admirable *Survey of Russian Literature since the Eighteenth Century.* It was he who first showed the real value which the works of Pushkin, Lermontov, and Gogol possess for Russian literature. At first he wrote in the spirit of Hegel's and Schelling's philosophy, but later maintained that the essence of literature is to give an idealized picture of actual life. His complete works appeared in 1859-62 (12 vols.; St. Petersburg).

Belisarius (*c.* 500-565 A.D.), the greatest, perhaps the only, general of the Byzantine empire. He is said to have been a native of Thrace; his name has been explained as Slavonic in origin (*Beli-tsar*, 'white prince'). After Justinian's accession to the throne in 527 A.D., Belisarius, who had been one of his private guards, was promoted to the highest military command. Between 529 and 532 he was occupied in repelling the inroads of the Persians; but Africa and Italy were the scenes of his greatest exploits. In the African war (533-534) he overthrew the power of Gelimer, king of the Vandals, and destroyed the Vandal kingdom established in Africa. The Italian war, waged against the Ostrogoths, falls into two parts. The first war was caused by Justinian's claiming Sicily. Belisarius conquered Sicily in 535, Naples in 537, defended Rome against a new Gothic king, Vitiges (Mar. 537 to Mar. 538), and took Ravenna with Vitiges (Dec. 539). Then he was recalled by the jealousy of Justinian, and from 541 to 543 was engaged against the Persians under Chosroes. Recalled again, owing to the intrigues of the Empress Theodora and his own wife Antonina, he was heavily fined. In 541 the Goths revolted under a new king, Totila. Belisarius in vain tried to raise their siege of Rome (May 546 to Feb. 547); but when they left the city, he recovered and held it. In 548 court intrigues again led to his recall, and his rival Narses completed his work by finally overthrowing the Ostrogothic kingdom. Belisarius gained his last victory against the invading Bulgarians in 559. In 563 he was accused of conspiring against Justinian, and was kept in prison for eight months, his property being confiscated. The later legend, that he was deprived of his eyes and reduced to beg his bread, is absolutely without foundation. We only know that he died soon afterwards, in March 565. Our chief authorities are the *Histories* of Procopius (his private secretary), Agathias, and Theophanes. See Gibbon's *Decline and Fall*, ch. 41 and 43 (Bury's ed.); Lord Mahon's *Life of Belisarius* (1848); and Bury's *Later Roman Empire* (1893).

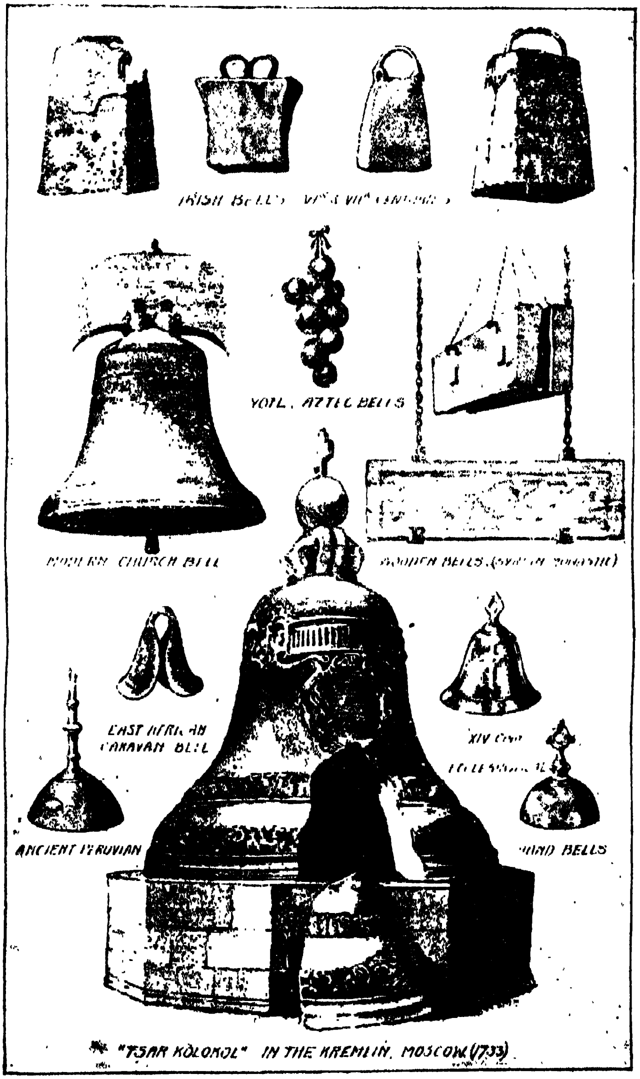
Belize (so named from the Spanish pronunciation of Wallace, a Scottish buccaneer), cap. of British Honduras, on the S. mouth of the Belize R., or Rio Viejo, which is navigable by canoes for 120 m. The ground being swampy, the houses stand on a ballast terrace. The harbour is shallow, and is being silted up, so that vessels are obliged to anchor more than a mile from the town. Pop. (1900) 9,075.

Beljame, ALEXANDRE (1842), professor of English literature at the Sorbonne, Paris, and author of numerous works and translations into French of English classics, among which are *Enoch Arden* (1892) and *Macbeth* (1897).

Bell. Early specimens of bells have been found in Egyptian tombs, and small bronze articles, supposed to be bells, have been dug up in the ruins of Nineveh. Their association with religion dates from a remote age. The festival of the Egyptian Isis was celebrated with the sound of bells. In the book of Exodus bells of gold are mentioned as being suspended from the robes of the high priest. In the prophecies of Zechariah they are spoken of as forming part of the caparison of horses; and Schoettgenais shows that they were attached as ornaments to the garments of Hebrew women and boys, and were also appendages to the royal costume of the ancient Persians. These bells, however, were probably rather jangling ornaments. It is believed that bells were known in India and China long before they were used in Europe. It is uncertain when bells were first used in the Christian Church, although their introduction has been generally attributed to Paulinus, bishop of Nola (400 A.D.). The rise of Christian architecture and the introduction of towers or turrets were favourable to the increase in the size of bells. Bede mentions bells as being in England about the end of the 7th century, and in the 10th century St. Dunstan appears to have introduced them very generally. Some specimens, however, still preserved in Scotland, Ireland, and Wales, belong, it is supposed, to the 6th century. Bells were first cast in England in the year 940. The bells of Russia are specially famous. The largest bell in the world, the great bell of Moscow, was cast in 1653, and weighs 198 tons; but unfortunately it was cracked in the founding, and was never hung. It now stands on a pedestal within the Kremlin. Another Moscow bell, said to be the largest in use, and given to the cathedral by the Czar Boris Godunof, weighs 128 tons; another, belonging to St. Ivan's Church, weighs 57 tons; one cast in 1819 weighs 80 tons. Other large bells may be summarized as follows:—Great bell of Peking, 53½ tons; bell at Nanking, 22 tons; bell at Olmütz, 18 tons; bell at Vienna, 17¾ tons; bell at Paris (1680), 17 tons; Great Paul (St. Paul's, London), 16¾ tons; bell at Erfurt, 13¾ tons; Great Peter (York Minster), 10¾ tons.

Bells seem to have been used in the services of the Roman Catholic Church from the earliest times. The more notable of these are the *Ave Maria bell*, the *vesper bell*, and the *compline bell*. The *sanctus bell*, used in the celebration of the mass, was formerly hung in a small turret outside the church, so that all within hearing of it might prostrate themselves. The *passing bell* was tolled when any one was passing out of life. This custom still survives in many parts of Britain, but the bell is now tolled *after* the death. In excommunication by *bell*, *book*, and *candle*, the bell was rung to summon the congregation to the ceremony. The consecration or baptism of bells is still practised in the Roman Catholic Church.

The most familiar secular use of the bell is the tolling or ringing of the hours. Lucian (b. *circa* 125 A.D.) refers to an instrument which marked the hours on a bell by means of water power. The curfew bell (Fr. *couvre feu*), introduced from Normandy by William the Conqueror, was rung at eight o'clock in the evening, to warn all persons to extinguish fire and light - a necessary precaution, when houses were built of wood. The curfew, however, was only enforced during the reigns of William I. and William II., and was abolished by Henry I. The vesper bell was the signal for the massacre known as the 'Sicilian Vespers' (1282), when 8,000 French were butchered in Sicily. The massacre of St. Bartholomew was started by the ringing of the bells of St. Germain l'Auxerrois, Aug. 24, 1572, the eve of the festival of St. Bartholomew.


IRISH BELLS VI & VII CENTURIES
YOKE, ATTIC BELLS
MODERN CHURCH BELL
WOODEN BELLS
EAST AFRICAN CARAVAN BELL
XIV CENT
ANCIENT PERUVIAN
HAND BELLS
"TSAR KOLOKOL" IN THE KREMLIN, MOSCOW (1733)

Various Types of Bells.

The art of bell-founding attained its perfection in Belgium and Holland in the 16th and 17th centuries. The Dutch bells of such founders as Hemony, Dumery, and Van den Gheyn still form the model for modern bells.

Bell metal is a mixture of copper and tin. The proportions are not fixed quantities. About the time of Henry III. the proportions were two to one. The quantity of copper, however, has been increased, and the proportions stand now about three or four to one. Other substances have been employed in bell-casting, such as gold, silver, copper, steel, and zinc and lead as an amalgam in small bells. Bells composed of the two first metals, however, are little better than mere ornaments. Bells have been made in many forms, ranging from the trumpet shape to that of the basin; these two are among the earliest forms, the present being midway between them. A bell should measure at the mouth fifteen times the thickness of the brim or edge, in width at the shoulder half the width of the mouth, and in height twelve brims. The bell is first designed on paper, and then the 'crook,' a double compass of wood, the legs of which are respectively curved to the shapes of the inner and outer sides of the intended bell, is made. The compass is made to revolve on a stake or pivot driven into the bottom of the casting pit. The 'core,' or inner mould, is built up of brickwork round the stake, a hollow being left in the centre for a fire, and the outside of the masonry is plastered over with clay. The inner leg of the compass is then rotated round the core, and the inside shape of the bell is defined upon the clay. This is then baked or fired, after which its surface is greased, or sprinkled with tan dust, and coated over with more clay. The outer leg of the compass is moved round this in turn, and it is given the form of the outside of the bell. The crown or head of the bell is fitted on the top, and the model is complete. The clay model is next baked, and any ornaments or inscriptions are moulded upon it when cool. The outer mould or 'cope' of the bell is now formed upon the clay model, and the core and cope are left with clear impressions of the bell. The one is then fitted over the other, the pit is filled up with earth, and the molten metal is run into the space between the core and the cope. When cool, the bell is dug out and tested. If too sharp in tone, it is turned thinner; if too flat, there is no perfect remedy, though by filing the outer edge the desired tone may be attained at the expense of quality.

A *peal* is several bells tuned to each other. The first in England, consisting of five bells, was presented to King's Coll., Cambridge, by Pope Calixtus III., in 1456. The largest peal in England is said to be that of St. Paul's; it consists of twelve bells, the tenor of which weighs over three tons. The custom of ringing peals or musical changes is of some antiquity; a notation for change-ringing was published in 1668 by Fabian Stedman. These changes are various, and some of them complex, and are known by such names as 'hunting,' 'dodging,' 'mapping,' and 'place-making;' 'plain bobs,' 'bob triples,' 'bob majors,' 'bob majors reversed,' 'double bob majors,' and 'grandsire bob cators.' The number of changes which can be rung on three bells is six—thus, 123, 132, 213, 231, 312, 321. Four bells can, in the same manner, ring 24 changes; five bells, 120; six bells, 720; and so on. At the rate of two strokes a second, it would take ninety-one years to ring the changes on twelve bells.

Another system of bell-ringing, much in vogue on the Continent, especially in the Netherlands, is the *carillon*. The bells are sounded by a barrel, worked either by the hand or by clockwork, or by a keyboard, like a piano. By the latter arrangement the musician strikes the keys with his hands or by a mallet, a set of pedals for the base bells being worked by the feet. The finest carillons in Europe are in the tower of Les Halles, Bruges. The most notable carillons in England are at Bradford town hall, Boston church, Worcester cathedral, Rochdale town hall, and Shoreditch.

A *chime*, like a peal, consists of several bells tuned in harmony. Chimes usually accompany the striking of the hours, half-hours, and quarters, and are generally sounded by clockwork.

For the playing of chimes and carillons tubular bells have recently been invented. They are much cheaper than bells of the usual form. They consist of tubes of varying lengths, ranging from about four to fourteen feet. They are hung upon a frame, and are struck by hammers above the point of suspension.

See also ELECTRIC BELL; and for pneumatic bell, see PNEUMATIC APPLIANCES.

Schiller has made excellent use of the processes of bell-casting in his beautiful *Lied von der Glocke*, and Poe of the sound of bells in his poem *The Bells*. See Denison (Beckett), *Clocks, Watches, and Bells* (7th ed. 1883); and Ellacombe's numerous works, especially *Chiming* (1859–60).

Bell, ACTON, CURRER, and ELLIS. See BRONTË.

Bell, ALEXANDER GRAHAM (1847), inventor of the telephone, and son of Alexander Melville Bell, author of *Visible Speech*, was born in Edinburgh, and settled in Canada in 1870; introduced his father's system for the education of deaf-mutes, and was appointed professor of vocal physiology in Boston University (1872). In 1876 he exhibited at the Philadelphia Exhibition the telephone, which he had invented some four years before. He also invented the photophone (1880) and the graphophone (1887).

Bell, ANDREW (1753-1832), founder of the Madras system of education, was born and educated at St. Andrews, Scotland. In 1789 he became superintendent of the Madras Male Orphan Asylum, where he developed the monitorial system of education, explained in his work, *An Experiment in Education* (1797). In 1811 he assisted at the formation of the National Society for Promoting the Education of the Poor, a church organization which founded over 12,000 schools on his method. In 1831 he transferred £120,000 to trustees for various educational purposes, principally in Scotland; half of this went to found the Madras College, St. Andrews. The chairs of education in Edinburgh and St. Andrews have grown out of the Bell Lecture on Education, established 1831. See Southey's *Life of Bell* (1844); Meiklejohn's *An Old Educational Reformer* (1881).

Bell, SIR CHARLES (1774-1842), discoverer of the distinct functions of the nerves; became fellow of the Royal College of Surgeons of Edinburgh (1799), and in 1804 contributed the account of the nervous system to his brother John Bell's *Anatomy of the Human Body*. The same year he removed to London, where his *Anatomy of Expression in Painting* was published (1806). Bell's great achievement was the discovery of the existence of distinct motor and sensory nerves, and the further discovery that the spinal cord gives off filaments of both kinds, the anterior roots being motor and the posterior sensory. The first hints of this discovery occur in a letter to his brother George (Nov. 26, 1807), but its final authoritative exposition was made in 1830, in a volume entitled *The Nervous System of the Human Body*. In 1812 he was appointed surgeon to the Middlesex Hospital, and in 1824 professor of anatomy and surgery at the Royal College of Surgeons, London. Knighted on the accession of William IV., Bell accepted the chair of surgery at Edinburgh University in 1836. Besides the volumes mentioned above, he was author of *A System of Operative Surgery* (1807), *Institutes of Surgery* (1838), and several other books, chiefly surgical. See *Letters of Sir Charles Bell* (1870).

Bell, CHARLES FREDERIC MOBERLY (1847), assistant manager of the *Times* since 1890, having previously acted as correspondent in Egypt from 1865. He wrote *Khedives and Pashas* (1884); *Egyptian Finance* (1887); *From Pharaoh to Fellah* (1889).

Bell, GEORGE JOSEPH (1770-1843), advocate, brother of Sir Charles Bell, was admitted to the Scots bar (1791). His *Treatise on the Laws of Bankruptcy in Scotland* (1804), republished in 1810 under the title *Commentaries on the Laws of Scotland* (7th ed. 1870), at once took rank as the authority in the domain of mercantile jurisprudence. Bell was elected to the chair of Scots law in 1822, and served on the commissions which resulted in the Scottish Judicature Act of 1825 and the Scottish Bankruptcy Act of 1839. He also wrote *Principles of the Law of Scotland* (1829; 6th ed. 1872). See *Edin. Rev.*, Apr. 1872.

Bell, HENRY (1767-1830), introducer of practical steam navigation into the United Kingdom, was born at Torphichen, near Linlithgow, Scotland. In Jan. 1812 his boat, the *Comet*, a thirty-ton vessel driven by an engine of three horse power, began plying between Glasgow and Greenock. This was the first steam vessel to be launched on European waters.

Bell, HENRY GLASSFORD (1803-74), Scottish sheriff and author, started the *Edinburgh Literary Journal*, which ran for three years, in 1828. From its columns he afterwards reprinted two volumes—*viz. Summer and Winter Hours* (1831), and *My Old Portfolio* (1832). His latest work, *Romances and Minor Poems*, appeared in 1866.

Bell, HENRY THOMAS MACKENZIE (1856), Scottish poet and critic. He went to London in 1884, publishing in the same year *Charles Whitehead*, a monograph on the poet (new ed. 1894). Among his works are *Spring's Immortality, and other Poems* (1893; 3rd ed. 1896); *Christina Rossetti: a Biographical and Critical Study* (1898); and *Pictures of Travel, and other Poems* (1898). A selection of verse appeared in 1901.

Bell, SIR ISAAC LOWTHIAN (1816-1904), English metallurgist, born in Newcastle; founded the Clarence iron works on the Tees in 1852; M.P. for Hartlepool (1875-80). He was created a baronet in 1885. He published *Chemical Phenomena of Iron Smelting* (1872) and other works.

Bell, JAMES (1825), Irish chemist, born at Armagh; has made a special study of the chemistry of food stuffs, and has embodied his researches in numerous monographs—*e.g. The Chemistry of Foods* (3 vols. 1881-3) and *The Chemistry of Tobacco* (1887). From 1867 to 1894 he was associated with the chemical department of Somerset House.

Bell, JOHN (1691-1780), Scottish traveller, born at Antermony, Stirlingshire. He went to St. Petersburg in 1714, served as physician to the Russian embassy in Persia (1715-18), and in a similar capacity in China (1719-21). In 1737 he went to Constantinople on a Russian mission, afterwards settling there as a merchant until 1747, when he returned to Antermony, his estate in Scotland. See his *Travels* (2 vols. 1763), reprinted in Pinkerton's *Collection of Voyages and Travels; Quart. Rev.*, 1817.

Bell, JOHN (1745-1831), publisher, and the pioneer of popular publications. In 1782 he issued a pocket edition of *The Poets of Great Britain complete from Chaucer to Churchill*, in 109 volumes, with frontispieces. This was followed by similar editions of *Shakespeare* and *The British Theatre*. He established *Bell's Weekly Messenger*, a Sunday county newspaper, and an illustrated monthly, *La Belle Assemblée*. He was the first to discard the long *s* (ſ) in printing.

Bell, JOHN (1763-1820), surgeon, elder brother of Sir Charles Bell, became fellow of the Royal College of Surgeons, Edinburgh (1786), and in 1790 established himself in that city as an independent lecturer on anatomy and surgery. For twenty years Bell remained the leading operating surgeon in Edinburgh, and showed himself a bold innovator in surgical practice. Chief works: *Anatomy and Physiology of the Human Body* (1793-98); *Discourses on the Nature and Cure of Wounds* (1793-5); *Principles of Surgery* (1801-8; new ed. 1826).

Bell, JOHN (1797-1869), American politician, a native of Tennessee, studied law at Nashville University; was member of Congress (1827), secretary of war (1841), member of United States Senate (1847), and Union candidate for the presidency (1860).

Bell, JOHN (1811-95), an English sculptor, born in Norfolk. His first exhibited work was a religious group (Royal Academy, 1832). His *Eagle-slayer* (1837) was exhibited in 1844; the well-known *Dorothea* belongs to 1841. For the Houses of Parliament he executed the statue of Lord Falkland (1847), and among his public works are the *Guards' Memorial* in Waterloo Place (1858), the *Crimean Artillery Memorial* (Woolwich), the *Wellington* monument at the Guildhall (1855-6), and the *United States* group in the Prince Consort Memorial, Hyde Park (1873). He also executed statues of Sir Robert Walpole (1854), Newton, James Montgomery the poet, and Cromwell. His other works are nearly all of a poetic character, the chief being *The Babes in the Wood* (S. Kensington), *Andromeda*, *Una and the Lion*, and *Imogen*. He was largely instrumental in bringing about the International Exhibition of 1851, and in projecting the S. Kensington Museum.

Bell, MRS. NANCY R. E., daughter of P. J. Meugens, London; a contemporary writer on art subjects, and translator of standard German and French works on art and other subjects. She has published the *Tourist's Art Guide to Europe* (1893), *The Saints in Christian Art*, and other works.

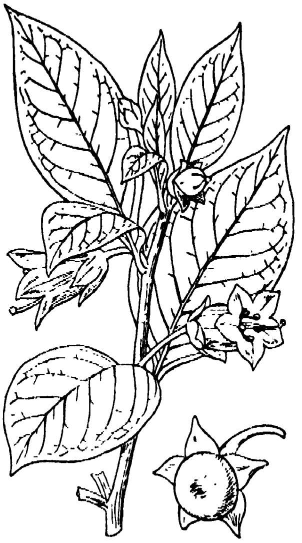
Bell, ROBERT (1800-67), Irish journalist and miscellaneous writer, edited the London *Atlas* for many years, contributed the 'History of Russia' and 'Lives of English Poets' to *Lardner's Cyclopædia*, became editor (1840) of the *Monthly Chronicle*, and published three comedies—*Marriage* (1842), *Mothers and Daughters* (1843), and *Temper* (1847)—together with two novels. His great work is his unfinished annotated edition of the English poets in 24 vols. (1854-7; new ed. 1866-7).

Bell, ROBERT CHARLES (1806-72), line engraver, was a native of Edinburgh. He reproduced many important pictures of contemporary Scottish artists, including Sir William Allan, J. E. Lauder, Sir Noel Paton, and Sir David Wilkie. Allan's *Battle of Prestonpans* (1872) was his most important plate.

Bell, ROBERT (1841), director of the Geological Survey of Canada, is a native of Toronto. Joining the Canadian Geological Survey in 1857, he was geologist and medical officer on the expedition of the *Neptune* in 1884, and of the *Alert* in 1885, to Hudson Strait and Bay. The western branch of the Nodaway, which he surveyed in 1895, is named Bell River after him. He was from 1863-7 professor of chemistry and natural science at Queen's University.

Bell, THOMAS (1792-1880), dental surgeon and zoologist, was appointed dental surgeon to Guy's Hospital (1817), professor of zoology at King's College, London (1836), secretary of the Royal Society (1848-53), president of the Linnæan Society (1853-61). Chief works: *Hist. of British Quadrupeds* (1837; revised 1874); *British Reptiles* (1839); *British Stalk-eyed Crustacea* (1853); and an edition of White's *Selborne* (1877).

Bella, tn., prov. Potenza, Italy, 22 m. by rail N.W. of Potenza; suffered from an earthquake in 1857. Pop. (1901) 4,849.



Belladonna and Fruit.

Belladonna, a name for the deadly nightshade or common dwale (*Atropa belladonna*), a perennial poisonous plant of the order Solanaceæ, indigenous to S. Europe and Asia, and cultivated in the United States. It is found in England, Scotland, and Ireland, generally near ruins, as if it had formerly been grown in gardens. It has a much-branched rhizome, which yearly sends up rank stems to the height of three feet; its leaves are alternate, broad, pointed, and from three to eight inches long. The flowers are one inch long, arise singly in the axils of the leaves, and are of a greenish purple colour; the berries, about the size of cherries, are deep violet black, and have a sweet taste. The whole plant has a heavy, unpleasant smell, especially when crushed. Belladonna is useful in medicine chiefly by virtue of its active principle atropine, procured from the root by distillation, first with alcohol, and at a later stage with chloroform, after which it forms colourless crystals. There are two extracts of belladonna, a tincture, a plaster, ointment, and liniment; atropine is also used hypodermically, in an ointment, and in lamellæ or discs, for ophthalmic purposes. For external application, belladonna is prepared with alcohol, chloroform, or some other volatile substance, that it may penetrate the unbroken skin. An inflamed surface or a mucous membrane will admit it more readily. So applied it affects the sensory nerve terminations, depressing them, and thus acting as a local anæsthetic and anodyne. Hence its use in superficial inflammation, and in muscular rheumatism, gout, and neuralgia. It also affects the special nerves to sweat-glands and milk-glands, and is therefore useful in hyperidrosis, and as an antigalactagogue. Applied to the eye, it dilates the pupil by paralyzing accommodation, and is therefore used by the ophthalmic surgeon when examining the fundus of the eye, and to prevent adhesions of the iris in inflammation. Internally given, its action proceeds on the same lines. It lowers all secretions except those of the kidneys, and it lessens sensitivity. It is used for lessening sweat production in phthisis. The brain is not affected by medicinal doses, but poisoning has been caused by the free application of belladonna to inflamed or broken skin. The commonest form of poisoning is found among children who have eaten the berries, all parts of the plant being poisonous. In such cases dryness of the mouth and throat is followed by dilated pupils, a flushed face, uncertainty of gait, and possibly delirium and stupor, followed by death. Treatment is first by the stomach-pump or emetics, and next by such a stimulant as hot coffee, with warmth, and, if need be, artificial respiration. Pilocarpine and morphine are said to be antidotes, but can only be administered by a medical man, while the other remedies could and should be used at once. Another effective and simple antidote is vinegar. Belladonna is also prescribed for nausea, vomiting, spasmodic coughs such as whooping-cough, hay-fever, and asthma.

Belladonna Lily (*Amaryllis belladonna*), a native of Cape Colony, has been grown in Britain since 1712. It has large bulbs; its leaves develop in early summer, and die down before the flowering stems appear. The flowers are in umbels, pale rose in colour, and about the size of white lilies.

Bellagio, tn. and summer resort, prov. Como, Italy, on the S. shore of the Lake of Como, at the apex of the peninsula which divides the two S. arms of the lake. It is in a most charming situation. It has numerous handsome villas and gardens—the Villa Melzi, built in 1810-15, being the most noteworthy. There is regular steamboat communication with Como and Lecco. Pop. (1901) 3,635.

Bellahouston, S.W. suburb of Glasgow, in par. of Govan, Lanarkshire, Scotland, on G. & S.W.R.; has a very valuable cannel-coal pit. Pop. (1901) 10,903.

Bellaire, city, Belmont co., U.S.A., 4 m. W. of Wheeling; has numerous manufactures of glass and of agricultural implements. Coal and limestone are found. Pop. (1900) 9,912.

Bellamy, EDWARD (1850-98), American communist and author, was trained for the bar, and practised journalism. He is remembered for one book, *Looking Backward, 2000-1887* (1888), an anticipation of his ideal socialistic community. The rest of his life was devoted to the propaganda of this ideal.

Bellamy, GEORGE ANNE, 'GEORGIANA' (?1731-88), actress, was daughter of Lord Tyrawley, ambassador at Lisbon. Her first success was as Monimia in *The Orphan*, produced by Rich, Nov. 22, 1744. She afterwards acted at Dublin and at Covent Garden, and played Juliet with Garrick (1750). See her own *Apology* (6 vols. 1785); Genest's *Account of the English Stage*.

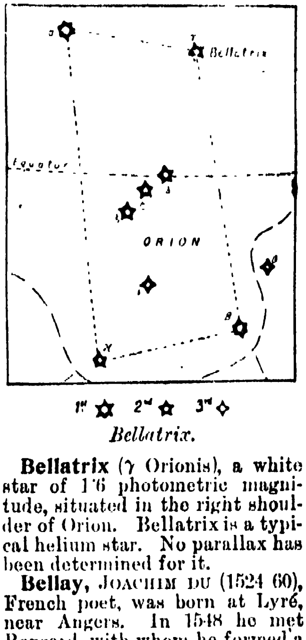
Bellamy, JACOBUS (1757-86), Dutch poet, was born at Flushing. He was first apprenticed to a baker, but sent (1782) by a clergyman to Utrecht University. He published *Gezangen mijner Jeugd* (1782), *Roosje* (1784), *Vaterlandsche Gezangen* (1783), and *Gezangen* (1785).

Bell Animalcules. See VORTICELLA.

Bellarmine, or BELLARMINO, ROBERT FRANCIS ROMULUS (1542-1621), Roman Catholic theologian, was born at Montepulciano in Tuscany. He became a Jesuit, and lectured at Louvain. Later he held an appointment in the Collegium Romanum, and in 1590 accompanied the legation sent into France by Pope Sixtus V. He was made cardinal in 1599, and archbishop of Capua in 1601, but resigned this post in 1605. For some years before his death he was archbishop of his native town. He died at Rome. He was a rigorous ascetic, and one of the greatest theologians (especially as regards polemics) that the Roman Catholic Church has produced. Works: *Disputatio de Controversiis Christianæ Fidei* (1581, '82, '93, 3 vols.), *De Potestate Summi Pontificis* (1610), *Institutiones Hebraicæ Linguæ*, *De Scriptoribus Ecclesiasticis*, *De Ascensione Mentis in Deum*. A *Life*, founded on autobiography, was written by Fuligatti (1624). Complete edition of his works (5 vols. 1721).

Bellary. (**1.**) District, Madras, India, with a dry and healthy climate, but subject to famine, owing to the scarcity of water. Iron, copper, antimony, and alum are found, and there are manufactures of cotton and woollen goods. Area, 5,714 sq. m. Pop. (1901) 947,214. (**2.**) Chief town of above district, a cantonment and cotton centre, with an important railway station. The fort is situated on a rock 450 ft. high, and the town lies below. Pop. (1901) 58,247.

Bellasis, EDWARD (1800-73), English serjeant-at-law and parliamentary counsel. He acted as one of the trustees over the Shrewsbury estates (1857-67), and in the litigation between the Earl of Shrewsbury and the Duke of Norfolk as to their possession. Bellasis, as a member of one of the old Roman Catholic families of England, wrote numerous pamphlets on the Oxford Tractarian movement.—EDWARD (b. 1852), son of the above, called to the bar (1873); made a study of heraldry, and was appointed Lancaster Herald (1882), and registrar of the College of Arms (1894). His many published works include *The Laws of Arms* (1879); *Memorials of Mr. Serjeant Bellasis* (1893).



Bellatrix.

Bellatrix (γ Orionis), a white star of 1·6 photometric magnitude, situated in the right shoulder of Orion. Bellatrix is a typical helium star. No parallax has been determined for it.

Bellay, JOACHIM DU (1524-60), French poet, was born at Lyré, near Angers. In 1548 he met Ronsard, with whom he formed a close friendship; he also joined the group of poets who constituted the Pléiade, a society formed to create a French school of renaissance poetry. It was at this time that he wrote his famous prose work, the *Deffense et Illustration de la Langue françoyse* (1549). Within a year followed the *Recueil de Poésie* and *L'Olive*. His grace and facility were excelled by none but Ronsard. Later works: *Les Antiquitez de Rome* (1558), *Regrets* (1559), *Les Jeux rustiques* (1560). Best edition, Marty-Laveaux's (1866-7). See W. H. Pater's *Studies in the Hist. of the Renaissance* (1873).

Bell-bird, a name given to various birds on account of their note, especially to *Chasmorhynchus niveus*, the campanero of the Spanish settlers in Guiana, one of the chatterers; and to *Anthornis melanura* in New Zealand, a member of the family Meliphagidæ. The former is remarkable for possessing a jet-black caruncle, about three inches long, which depends from the beak, and becomes elongated when the bird utters its bell-like note. See J. J. Quelch, in the *Field*, Nov. 26, 1892.

Belle Alliance, a farm in the centre of the French position at the battle of Waterloo, lies 13 m. s. of Brussels, in Belgium. Belle Alliance is the name the Prussians give to the battle.

Belle de Nuit, the French name of the herb *Mirabilis jalapa*, the 'marvel of Peru.' It has large smooth leaves and clusters of flowers, which expand at night and wither in the morning.

Belleek, par. and vil., Co. Fermanagh, prov. Ulster, Ireland, at w. end of Lough Erne, 3 m. E. of Ballyshannon; noted for its china manufactory.

Bellegarde, fortress (built 1679) in Pyrénées-Orientales, France, 17 m. s. of Perpignan, on Spanish frontier, near Col de Pertuis.

Belle-Ile-en-Mer, isl., Atlantic Ocean, 7 m. s. of Quiberon Pt., dep. Morbihan, France, 10 m. long, 2 to 5 m. wide. Area, 34 sq. m., with a few harbours and a pilchard fishery. Off its coast the British fleet under Hawke defeated the French under Conflans in 1759. It was taken by the British in 1761, and held until 1763. Pop. (1901) 9,771.

Belle Isle. (**1.**) Rocky island (British), 9 m. long and 3 broad, at Atlantic entrance to Str. of Belle Isle, Newfoundland; has two lighthouses. (**2.**) STRAIT OF, the shallow N. outlet of the Gulf of St. Lawrence, between Labrador and Newfoundland; used by vessels in the summer season only. During the winter it is blocked by ice. Its length is 80 m., and its breadth 12 m., and it is divided by Belle Isle.

Belle-Isle, CHARLES LOUIS AUGUSTE FOUQUET, DUC DE (1684–1761), French marshal, grandson of the famous intendant Fouquet, was born at Villefranche in Aveyron. He served with distinction in the war of the Spanish Succession, and was made governor of Metz and a marshal of France. In the war of the Austrian Succession he shared with Broglie the command of the forces, stormed Prague in 1741, and the following year conducted the masterly retreat to Eger. He became minister of war in 1758, and created the military Order of Merit in 1759.

Bellenden, JOHN (fl. 1508–50), Scottish poet and translator, employed by James V. to translate Hector Boece's Latin *History of Scotland*, editions of which appeared in 1536, 1541, and in another unknown year; it was reprinted at Edinburgh in 1821, edited by Thomas Maitland, Lord Dundrennan. This was followed, also at the king's request, by a translation of Livy, which was first published at Edinburgh in 1822, edited by Lord Dundrennan. Those translations are among the earliest examples now extant of Scottish prose. On the title-page of the Boece translation, Bellenden is described as 'archdene of Moray, channon of Ros.' After the reformation he retired to Italy, where he is supposed to have died.

Bellenden, WILLIAM (c. 1555–1633), classical scholar, was of the Scottish family of Ballantyne or Bellinden, and is said to have been professor at the University of Paris. A distinguished classical scholar and laborious student of Cicero, he published *Ciceronis Princeps* (1608), a collection of Cicero's remarks on regal government; *Ciceronis Consul* (1612), a similar work concerned with consular authority; *De Statu Prisci Orbis* (1615); *De Tribus Luminibus Romanorum* (1634)—unfinished an elaborate history of Roman institutions drawn from Cicero. C. Middleton compiled his *Life of Cicero* (new ed. 1823) from Bellenden's works.

Bellerophon, son of Glaucus, king of Corinth; his original name was Hipponous, but he was called Bellerophon from having killed Bellerus. He was sent by Prœtus, whose wife, Anteia (post-Homeric Sthenebœa), fell in love with him, to Iobates, king of Lycia, with a letter requesting him to procure his death. But by the aid of the winged horse Pegasus, Bellerophon killed the monster Chimæra, defeated the Solymi and the Amazons, and finally cut down an ambush of the bravest Lycians. Later the wrath of the gods fell on him, and he wandered, 'devouring his soul,' in loneliness through the Aleian fields. Later stories say that he tried to fly to heaven on Pegasus, but that Zeus sent a gadfly, the bite of which caused the horse to throw his rider, who was lamed by the fall. See Homer's *Iliad*, bk. vi.; Hesiod's *Theog.* 325; and Horace's 4th *Ode*, 11.

Bellerophon, a genus of univalve molluscs abundant in the earlier geological formations. The shells are globular, coiled in a flat spiral in one plane; the mouth is large and circular, with a deep notch in the outer lip, which, as the animal continues to grow, is gradually filled in with calcareous matter, forming a band or keel along the centre of the convex aspect of the shell. See Zittel's *Palæontology*; Nicholson's *Palæontology*; Woodward's *Manual of the Mollusca*.

Belleville. (**1.**) Manufacturing tn. in Hastings co., prov. Ontario, Canada, at mouth of Moira R., 48 m. w. of Kingston by rail; contains the Albert College. Pop. (1901) 9,117. (**2.**) City, Illinois, U.S.A., the county seat of St. Clair co., situated in the s.w. part of the state, 20 m. from St. Louis, on three railways—the Illinois Central, the Louisville and Nashville, and the Southern. It is a manufacturing place of some importance, and has large flour mills. The seat of a Roman Catholic bishop. Pop. (1900) 17,484.

Bellew, HAROLD KYRLE (1857), actor and playwright, achieved a rapid success on the English stage, and after winning considerable favour in America (1885-6), he began in 1887 to appear with Mrs. Brown Potter. They have been especially successful as Romeo and Juliet, and as Leander and Hero in Mr. Bellew's play, *Hero and Leander*. He is the author of *Yvonne* and *Iolande*.

Belley, tn., dep. Ain, France, near R. Rhone, 39 m. by rail s.E. of Bourg, with an interesting cathedral (9th century) and bishop's palace (1609); produces the best lithographic stones in France. Pop. (1901) 6,467.

Bellflower. See CAMPANULA.

Belli, GIUSEPPE GIOACHINO (1791–1863), Italian dialect poet, was born at Rome. In his youth he held a government post, and was secretary to a prince; but afterwards he devoted himself to poetry, writing in the Roman dialect more than 2,000 sonnets descriptive of the life of contemporary Rome (1831–46). His son published some 800 of his sonnets, with many alterations; and these in their original shape were afterwards edited by L. Morandi (Città di Castello, 1886–9, 6 vols.).

Bellicent, the half-sister of King Arthur, wife of King Lot of Orkney (this does not agree with Malory), and mother of Gawain, Mordred, and Gareth. See Tennyson's *Idylls of the King*.

Belligerent is the term applied to a nation in a state of war. Its use marks an important distinction in international law between a *de facto* government at war and a subject state or race in rebellion. In the former case belligerent states are bound by the laws of war, in the interest of humanity, to the conduct of the campaign on civilized methods, while they are also brought under definite obligations with respect to neutral powers. Recognition of belligerents by neutrals ensures the moral, and if necessary the material, support of the latter in the case of any violation of the laws of warfare. In the case of non-recognition of parties as belligerents, these conditions do not obtain. In some instances, even when a nation is divided by internecine strife, recognition of the combatants as belligerents may become inevitable. Such was the case when, during the American civil war, Britain and France recognized the Southern States as a belligerent power. The usual condition of such recognition is, broadly speaking, the existence of hostilities of some magnitude, and the maintenance of a civil government within the disaffected area.

Belligerents, Rights and Duties of. A brief and necessarily imperfect account of the rights and duties of belligerents as between enemies is all that can be attempted here. For the mutual rights and duties of belligerents and neutrals see NEUTRALITY and CONTRABAND. A belligerent has the right to use every means which he considers necessary to bring his enemy to terms. This broad and general right, however, is modified amongst civilized states by the humane usage of nations, and by international compact. These modifications, in their widest and perhaps in their ideal application, are summarized in the project of an international declaration concerning the laws and customs of war drawn up by the Brussels Conference of 1874, but not ratified. Great Britain expressly repudiated them as tending to 'facilitate aggressive wars, and to paralyze the patriotic efforts of an invaded people.' Nevertheless, though not binding, they are useful as indicating a definite code in accordance with the advanced views of the time, and possible of a more or less complete adoption in the future. The first eight articles of the project define military occupation, and give the victorious belligerent the right to take possession of all the property belonging to the government of the vanquished state, together with railways, ships, telegraphs, arms, and munitions of war, whether privately owned or not: these it must administer as usufructuary. Parish property, religious, charitable, educational, artistic, and scientific establishments come under the head of private property (see below). The belligerent occupying a territory may levy all the taxes, dues, duties, and tolls already established in the vanquished state, and must carry out, as far as possible, the ordinary law and administration. Art. 12 prohibits the use of poison or poisoned weapons, the murder of enemies or antagonists who lay down their arms, the employment of arms, projectiles, or substances which cause unnecessary suffering, such as explosive bullets (prohibited by the declaration of St. Petersburg in 1868, and signed by most European states), and the abuse of a flag of truce, the national flag, the Geneva Cross, or the insignia or uniform of the enemy. Succeeding articles forbid the attack or bombardment of open or undefended towns or villages, and in case of bombardment of a fortified place directs that hospitals, religious, artistic, scientific, and charitable buildings, not used at the same time for military purposes, shall be spared, such buildings being indicated by special visible signs. No town taken by storm shall be given up to plunder. Lawful and disarmed enemies are prisoners of war, to be maintained and treated with humanity, and not to be deprived of their personal property. They may be interned in any locality, but may not be placed in confinement unless such is absolutely necessary. They may be employed on public works, but not in the operations of war. Prisoners attempting to escape may after summons be shot, and if retaken may be punished, but an escaped prisoner retaken is not liable to punishment for his previous escape. Exchange of prisoners and release on parole are lawful. If parole is broken and the prisoner is recaptured, he is deprived of the rights accorded to prisoners of war. War correspondents and other non-combatants with an army may be treated as prisoners of war, but spies and marauders have no such rights. For duties of belligerents with regard to the sick and wounded, see GENEVA CONVENTION. The population of an occupied territory cannot be compelled to fight against their own country, nor be made to swear allegiance to the enemy's power. The honour and rights of the family, the life and property of individuals, and their religious convictions and exercises, should be respected. Private property cannot be confiscated, and pillage is expressly forbidden. Regulations are also made as to the duties of belligerents with regard to flags of truce, capitulations, armistices, belligerents interned and wounded treated in neutral territory.

Instances of the violation of this code in recent warfare will readily occur to the reader. A distinct step towards its adoption was made by the Peace Convention at the Hague in 1899, when the following three special declarations were adopted: 1. Prohibition of the throwing of projectiles and explosives from balloons or by other analogous means; this prohibition to be in force for five years. 2. Prohibition of projectiles intended solely to diffuse asphyxiating or deleterious gases. 3. Prohibition of the use of bullets, such as the dum-dum, which expand easily in the human body. See WAR, LAWS OF; PARIS, DECLARATION OF; HAGUE CONFERENCE; INTERNATIONAL LAW; official documents of proceedings mentioned above; also Maine's *International Law* (1899); Wheaton's *International Law*, ed. by Boyd (latest ed.); Hall's *Peace Conference at the Hague* (1900).

Bellingham. See PERCEVAL.

Bellingshausen, FABRIAN GOTTLIEB VON (1778 1852), Russian explorer and naval commander; headed an expedition which sailed in 1819 for the Antarctic regions. He discovered Peter Island and Alexander Land, bestowing on them their respective names. Returning to Russia in 1821, he subsequently received the command of the Russian fleet in the Baltic, and finally became military governor of Cronstadt. A report of his work of exploration appeared in 1831.

Bellini, name of a family of Italian painters, founders of the great Venetian school of the 15th and 16th centuries. (**1.**) JACOPO or GIACOMO BELLINI (*c.* 1400-66), b. in Venice; pupil of Pisanello, and of Fabriano, with whom he went to Florence. His frescoes in Verona have been destroyed; two of his pictures are extant; his sketch-book is in the British Museum. He was a portraitist of repute, and opened a school in Padua. (**2.**) GENTILE BELLINI (?1426 1507) settled in Venice in 1460. On account of his fame as a portrait painter, he was invited (1479) to Constantinople to paint the sultan, Mohammed II.; he also visited Rome. The glory of Venice was expressed in his great pageant pictures, such as his *Corpus Christi*, his *Miracle of the True Cross*, the *Preaching of St. Mark* (in the Brera, Milan). The National Gallery, London, is rich in examples of his work. (**3.**) GIOVANNI or GIAMBELLINI BELLINI (1428-1516), the greatest artist of the 15th century in Italy; he united purity of religious aim with perfection of artistic power. In 1582 he was appointed state painter, and his studio became a famous school in which Titian, Giorgione, and Tintoretto were trained. The National Gallery, London, possesses his portrait of the doge, Leonardo Loredano, and three religious subjects. See Ruskin's *Arrows of the Chace* (1880); Roger

Fry's *Giovanni Bellini* (1899); Kugler's *Schools of Painting in Italy* (1851).

Bellini, VINCENZO (1802–35), an Italian operatic composer, born at Catania, Sicily; studied at the Conservatorio, Naples. His most popular operas are *La Sonnambula* (1831), *Norma* (1831), and his last work, *I Puritani* (1835). *La Sonnambula* was an unparalleled success when it was produced in London, with Madame Malibran as Amina, the heroine. It is interesting to note that it was in the part of Amina that both Adelina Patti and Albani made their first appearances in Britain. Though Bellini had little dramatic power, he possessed a gift of delicious melody.

Bellinzona, cap. of the Swiss canton of Ticino, with a station on the St. Gothard line, 40 m. below Airolo, and 20 m. above Lugano. Pop. (1900) 4,949.

Bellis Perennis. See DAISY.

Bellite, an explosive prepared from nitrate of ammonia and mono or di nitro-benzene. It can be stored and transported with safety, not being exploded by a blow or by friction. It was discovered in 1886, and is said to be three times more powerful than ordinary gunpowder.

Bellman, KARL MIKAEL (1740–95), poet and improvisator, who used the pseudonym of Fredman, and is the most original figure in Swedish literature, was the prince of boon companions, full of the joy of life, frivolous, indolent, and good-natured. His experiences of Stockholm taverns were preserved in verse of exquisite pathos and humour, in *Fredmans Epistlar* (1790) and *Fredmans Sånger* (1791). Gustavus III. gave him a small pension. He generally accompanied his songs with the lute, and the admirable adaptation of tunes to words gives to his works their absolutely unique character. It is very difficult, however, for any one but a Swede properly to appreciate his genius. Burns is the British poet whom he resembles most. See eds. of works by Sondén (1835-6) and Carlén (1855-61; new ed. 1881); also Björkman's *Memoir* (1893), and Erdmann's (1899).

Bell-metal, an alloy used in the manufacture of bells. The usual composition is 75 parts of copper to 25 of tin, or 78 of copper and 22 of tin, although sometimes the alloy consists of copper, tin, zinc, and lead. A large percentage of copper gives a deep tone, but iron, zinc, and tin give a sharper ring.

Bello, FRANCESCO, Italian epic poet (c. 1450–1505), known from his blindness as Cieco da Ferrara, lived at Mantua and Ferrara in great poverty. His poem in 45 cantos, *Mambriano* (first ed. 1509), is a chivalrous romance depicting the adventures of an Oriental prince, and is one of the books which directly inspired the *Orlando Furioso* of Ariosto.

Bello Horizonte, the new capital of Minas Geraes, Brazil, on the slopes of the Serra de Espinhaco, N.W. of the old capital, Ouro Preto, and 390 m. (a day's journey) by the Central Brazilian Ry. from Rio de Janeiro. There are gold mines in the neighbourhood. Pop. 20,000.

Bellona, the Roman goddess of war, and sister or wife of Mars. Her worship is possibly of Sabine origin, but her first temple at Rome was only founded in 296 B.C., in the Campus Martius. See Keightley's *Mythology of Ancient Greece and Italy.*

Bellona, a British third-class cruiser (1830 tons) launched in 1890, commemorates the capture of the French frigate *Bellone* in 1747. As many as seven *Bellonas* were captured from the Dutch, French, and Venetians. The name is associated with the capture of the *Courageux* (1761), the battle of Copenhagen (1801), and the action in Basque road (1809).

Bellot, JOSEPH RENÉ (1826–53), French naval officer and explorer, born at Paris; distinguished himself in Madagascar (1845), and joined the British Franklin expedition (1851). Two years later he accompanied another Franklin expedition, in which he perished. Bellot Strait is named after him. See *Journal,* ed. Lemer (1854).

Bellot Strait, between N. Somerset I. and Boothia, and connecting Gulf of Boothia and Franklin Channel, N. America.

Bellows-fish, the Cornish name for a group of fishes, sometimes known as sea-snipes, of the family *Tetrodontidæ,* of which other species are popularly known as trumpet-fish, swell-fish, bottle-fish, egg-fish, globe-fish, swell-toad, blower, box-fish, etc., from their peculiar inflated appearance.

Belloy, PIERRE LAURENT BUIRETTE DE (1727-75), French dramatist, a native of Auvergne, entered the dramatic profession, and acted with success in Russia. At Paris, in 1760, he produced *Zelmire,* a marked success, followed by *Le Siège de Calais* (1765), also well received, and *Gaston et Bayard* (1771), which procured his admission to the Academy. Among his other plays are *Gabrielle de Vergy* (1770) and *Pierre le Cruel* (1772). His collected works were published by Gaillard in 1779 and 1787, and a selection by Anger in 1811. See Brongniart's *Pierre Belloy* (1887).

Bell Pepper, the fruit of the *Capsicum grossum,* or Guinea pepper; used in the East as a vegetable, and for pickling.

Bell Rock, or INCHCAPE ROCK, rocky reef, 6 ac. in extent, off coast of Forfarshire, Scotland, 12 m. E.S.E. of Arbroath, surmounted by lighthouse 120 ft. high. The tradition that the bell placed there by the abbot of Aberbrothock was removed by a pirate whose vessel was at length wrecked on the reef is celebrated in Southey's ballad, *The Inchcape Bell.*

Bells, a nautical term used to express the time of day. Thus the twenty-four hours are divided into periods of four hours. Each half-hour of these represents one bell. Thus, beginning at twelve o'clock, half-past twelve is 'one bell,' one o'clock 'two bells,' half-past one 'three bells,' two o'clock 'four bells,' continuing up to four o'clock, when the round begins again.

Bells, THE, the name of a well-known poem by Edgar Allan Poe; also the title of the English version of Erckmann-Chatrian's *Le Juif Polonais,* in the dramatic form of which Sir Henry Irving has created the part of Mathias.

Bell-the-Cat. See DOUGLAS, ARCHIBALD.

Belluno. (1.) Mountainous prov. of N. Italy, covered almost entirely by the Dolomite Alps (11,000 ft.), and stretching between Tyrol and Venetia. Its principal stream is the Piave. Area, 1,292 sq. m. Pop. (1901) 192,800. (2.) Episcopal town, cap. of above, stands on a hill (1,265 ft. above sea-level) above the Piave, 72 m. by rail N. by W. of Venice, with a fine Renaissance cathedral (1515) and silk mills. Pop. (1901) 19,050. Belluno is the Roman Belunum; it fell into the hands of Venice in the beginning of the 15th century. Pope Gregory XVI. was born here in 1765, and the town gave a ducal title to the French marshal Victor.

Belmez, busy and flourishing tn., prov. Cordova, Spain, 35 m. by ry. N.N.W. of Cordova; centre of important coal field now actively worked. Pop. (1900) 8,978.

Belmont, tn., Cape Colony, on ry., 50 m. S.W. of Kimberley. Here, on Nov. 23, 1899, Lord Methuen drove the Boers from a strong position on the railway, and two days later stormed Enslin (or Gras Pan).

Belogradum. See BELGRADE.

Beloit, city, Rock co., Wisconsin, U.S.A., on the S. boundary of the state, 47 m. S.E. of Madison. It contains Beloit College (1847). Pop. (1900) 10,436.

Belomancy, divination by means of arrows. In Ezek. 21:21, 22, Nebuchadnezzar had recourse to this form of divination. It was in extensive use among the Arabians.

Belon, PIERRE (1517–64), French naturalist, was born at Soulletière, near Mans. Under the patronage of the Cardinal de Tournon, he travelled for scientific purposes in Greece, Asia Minor, Palestine, and Egypt (1546-9). In 1553 he published his *Observations* during these journeys; he also wrote books on sea-fishes (1551) and birds (1555).

Belone, the typical genus of a group of fishes called the gar, or gar-fish, which have both jaws prolonged into long, narrow, but strong bills. Some of the Belones of the Indian and Pacific Oceans reach a length of five feet.

Belovar, co. of Hungary, in the kingdom of Croatia and Slavonia, lies between the Drave and the Save; is for the most part mountainous, but has fruitful soil. Area, 1,442 sq. m. Pop. (1900) 300,951. Cap. Belovar; pop. (1900) 4,889.

Belpasso, tn., prov. Catania, Sicily, on the S. slope (1,805 ft.) of Mt. Etna, 9 m. N.W. of Catania. It replaces the old town of Belpasso, which in 1669 was overwhelmed in an eruption of the mountain. Pop. (1901) 9,734.

Belper, par. and mrkt. tn., Derbyshire, England, on Derwent, 7 m. N. of Derby, on Midland Ry.; cotton yarn, hosiery, engineering works, and nail factories; coal and ironstone. Pop. of par. (1901) 10,934.

Belphœbe, a character in Spenser's *Faërie Queene*, bk. iii. and iv., twin-sister of Amoret. Belphœbe (who is meant for Queen Elizabeth) represents a stern and self-reliant chastity.

Belsham, THOMAS (1750-1829), English Unitarian divine, was appointed minister of the Independent chapel at Angel Street, Worcester, in 1778, and head of Daventry Academy (1781). He was successively professor of divinity at the Hackney College (1789), minister of the Gravel Pit Unitarian chapel (1794), in succession to Priestley, and of Essex Street chapel (1805). Author of *Memoirs of Theophilus Lindsey* (1812); *Elements of the Philosophy of the Human Mind* (1801); *Letters to the Bishop of London in Vindication of Unitarianism* (1815). See Williams's *Memoirs* (1833).

Belsham, WILLIAM (1752-1827), English political writer and historian, brother of the preceding, devoted his life to the furtherance of Whig doctrines. He wrote *Essays, Philosophical, Historical, and Literary* (1789-91), and *Remarks on the Nature and Necessity of Political Reform* (1793). His historical works were reissued in 1806 in 12 vols., under the title *History of Great Britain to the Conclusion of the Peace of Amiens.*

Belshazzar, according to Dan. 5 the son of Nebuchadnezzar, and the last Chaldæan king of Babylon, who was slain, and his empire subjugated, by the Medes, under Darius. Now, profane history agrees with the monuments in stating that the last king of Babylon was Nabonidos (Nabuna'id), who was conquered by Cyrus, and the consequent difficulty of finding a historical place for Belshazzar has long been recognized. The inscriptions reveal further, however, that Nabonidos had a son named Bel-sharra-uzur, who seems to have acted in Babylon as prince-regent, and whose identity with the Belshazzar of Daniel is therefore hardly open to doubt. See Sayce, *Higher Criticism and the Monuments*, p. 525 *f.* (3rd ed. 1894).

Belt, GREAT, strait between Zealand and Funen, Denmark, the middle channel connecting the Baltic and the Kattegat; about 40 m. long, and from 11 to 17 m. broad, the depth varying from 30 to 150 ft. Navigation is rendered difficult by shoals, and in winter by ice.

Belt, LITTLE, strait between Jutland and Fünen, the W. channel connecting the Baltic and the Kattegat; about 30 m. long, and from 1 to 12 m. broad, the depth varying from 30 to 180 ft. The hindrances to shipping are similar to those of the Great Belt. During the first four months of the year it is generally frozen.

Belt and Rope Gearing. When shafts are too far apart to be connected by toothed wheels, a continuous rotary motion may be transmitted from the one to the other by means of endless flexible bands, belts, or ropes and suitable pulleys, the friction between the bands and pulleys being sufficient to overcome the resistance which the pulleys offer to motion. Because of its tendency to slip on its pulley, a belt should not be used in cases where the ratio of the number of revolutions between the shafts has to remain fixed. At the same time, this possible slipping of the belt may save the machine which is being driven from serious injury in the event of a sudden increase of the driving pressure. Belts are made of leather (oak-tanned or raw-hide); cotton; waterproof canvas; india-rubber and canvas; gutta-percha, canvas, and balata; llama hair, etc.

Leather Belts.- Most belts are made from oak-tanned leather; but raw-hide belts are strongly recommended by some belt-makers, as the fibre is not dried or hardened, but remains soft and pliable, and retains the full strength, toughness, and elasticity of the green hide. Raw-hide belting is certainly stronger than ordinary tanned leather, and it is much thinner.

Chain or Link Belting is made of a series of short pieces or links of leather joined together by pins. The links hinge on these pins; consequently a link belt, without undue straining, can drive a comparatively small pulley, and is very suitable for high speeds. Messrs. Tullis make this class of belt with a flexible centre, and arched on the running side to fit the convexity of the pulley (Fig. 1). The illustration also shows another feature in belt-driving - the running of one belt on the top of another. An ordinary double belt is here shown working independently on the top of the link belt. The outside belt is thus practically working on a pulley with a leather face. Ordinary flat belts (two or more) are compounded in the same way. They may all drive the same pulley, or be taken to different pulleys. This system allows a large increase in the power transmitted, without increasing the width of pulleys. The belts are not in any way connected together, and the outer belt 'creeps' over the inner belt. This creeping action does not, however, affect the efficiency of the drive.

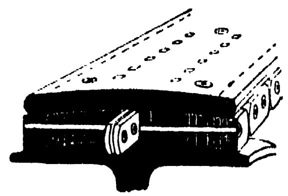


FIG. 1.

Hendry's Patent Laminated Belting consists of a number of narrow leather strands placed side by side on edge and sewn together. The strands are well stretched before being built up, so that the after-stretching of the belt should be very small. It can be made continuous—*i.e.* without a cross-joint—and in this respect it is distinctly valuable. The construction of the belt and the method of making a splice are shown in Fig. 2.

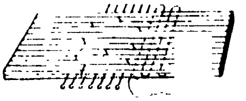


FIG. 2.

Woven Leather Belts.—Another very interesting form of belt, single or double, is made from continuous thongs of leather, woven together by a specially constructed loom to any width or length. These belts are generally made continuous, but if necessary, a joint may be made in the usual way by lapping and lacing, or by means of a splice similar to an ordinary rope-splice. The chief features of these belts are said to be great strength, lightness, pliability, and non-liability to aircushioning. As practically all the stretch is removed from the belt during manufacture, there is very little after-stretch, and the belt runs straight.

Cotton Belting.—The Gandy cotton belts are made from hard woven American cotton duck or canvas. A special width is woven for each width of belt, so as to secure two selvage edges and uniformity of cross-section. The canvas thus woven is folded and stitched, and after being treated with oil and paint is stretched in a frame. This belt is waterproof and unaffected by temperature, so that it is suitable for exposed situations. Another cotton belt is made of several plies of canvas, treated with gutta-percha and balata; it possesses considerable strength, and is thoroughly waterproof. A third belt is manufactured from American cotton canvas, cemented in layers by vulcanized india-rubber, and covered by a specially prepared compound of india-rubber. The rubber is forced into the canvas while passing through the rolls of a special form of calender. These belts, which have a smooth, even surface, are very durable, and are unaffected by damp or exposure; the tensile strength per unit width is greater than that of leather belting, and they obtain a very good grip of the pulley. Resistance to slip round the pulley is naturally a most valuable property of a driving belt. These belts can be made endless, or may be jointed by using a suitable belt-fastener.

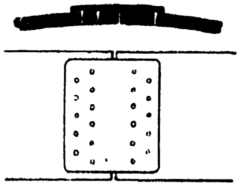


Fig. 3.

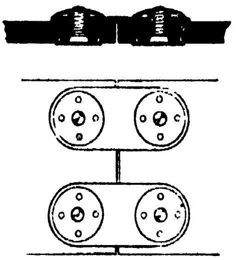


Fig. 4.

Belt-Fasteners.—The following illustrations show a few of the most commonly used belt-fasteners, the method of attachment to the belt being clearly indicated in each case. Harris's (Fig. 3) and Jackson's (Fig. 4) fasteners are very suitable for india-rubber or canvas belts. Green's belt-fasteners (Fig. 5) are made of tough brass, and are mainly used for leather belts. A very good form of double-laced butt joint is shown in Fig. 6.

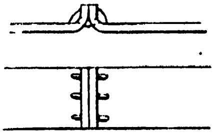


Fig. 5.

Rope-Driving.—This method of power-transmission is now being widely used, especially for large installations. The ropes are made of hemp, manilla, or cotton. The pulleys used for this kind of gearing are made with V grooves on their peripheries. (See Fig. 7.) The angle of groove generally adopted is 45°, and it should be so constructed as to avoid all possible chance of the rope reaching the bottom. With ropes the resistance to slipping is largely augmented by the wedging action of the grooves, so that the ropes are put on the pulleys with very little initial tension. The Lambeth cotton rope (Fig. 8), manufactured at Blackburn, is made up of four strands twisted round a central core; each strand is covered spirally with ten twisted cords of cotton yarn, which serves as a protecting envelope to the inner or working part of the strand, and preserves it from contact and wear in the groove, without interfering with its flexibility or strength. No pulley for rope-driving should be less than thirty times the diameter of the rope, as the internal compressive stresses set up on the inside of a rope by bending quickly round a too small pulley soon break up the rope. The following extract from a table compiled by Mr. C. N. Pickworth shows the horse power that may be safely transmitted by cotton driving ropes at different speeds:—

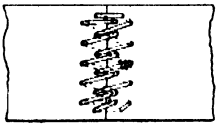


Fig. 6.

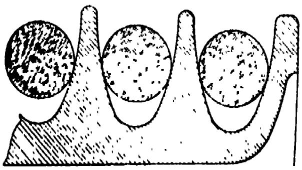


Fig. 7.

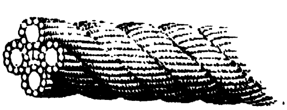


Fig. 8.

Velocity of Rope in Feet per Min.	Diameter of Rope in Inches.				
	1 in.	1¼ in.	1½ in.	1¾ in.	2 in.
1,000	4·5	7·1	10·2	14·0	18·2
2,000	9·1	14·2	20·5	28·0	36·5
3,000	12·6	19·8	28·4	38·7	50·4
4,000	14·8	23·2	33·4	45·5	59·4
5,000	15·4	24·1	34·6	47·1	61·5

A rope 1½ in. in diameter will transmit as much power as a leather belt 6 in. wide. The most economical speed for rope-driving is from 3,600 to 5,000 ft. per minute. At high speeds centrifugal action has a prejudicial effect. In large mills, where it is necessary to transmit power to several stories, rope-driving is especially applicable, as a few ropes may be taken direct from the engine fly-wheel to each story. Fig. 9 shows how the power is subdivided in a large cotton-spinning mill. The fly-wheel, in this instance, is grooved to receive thirty ropes. The initial cost of a rope-driving installation is stated to be less than with belt or wheel gearing, and the cost of renewals and repairs is also reduced. The ropes are jointed by an ordinary long splice.

Steel or iron wire ropes are sometimes used for power-transmission. Wire ropes are naturally exceptionally strong, and can be used for transmitting power over long distances. They are not, however, much used for mill purposes. Pulleys for wire ropes are wider in the groove than for cotton or hemp ropes. The groove must not grip the rope, and the bottom of the groove is generally lined with gutta-percha, wood, or leather, to increase the resistance to slipping.

Transmission of Power by Belts.—The effective driving force is the difference between the tensions on the tight and slack sides of the belt. The tight or driving side should always be underneath. The natural sag of the slack side, due to the weight of the belt, increases the arc of contact of the belt on the pulley, and adds to the frictional resistance to slipping.

Transmission of Motion by Belts.—The revolutions of pulleys connected by belts, provided there is no 'slip,' are inversely proportional to the diameters of the pulleys: thus (Fig. 10),

$$n : N :: D : d,$$

where n and N represent the revolutions per minute of d and D respectively.

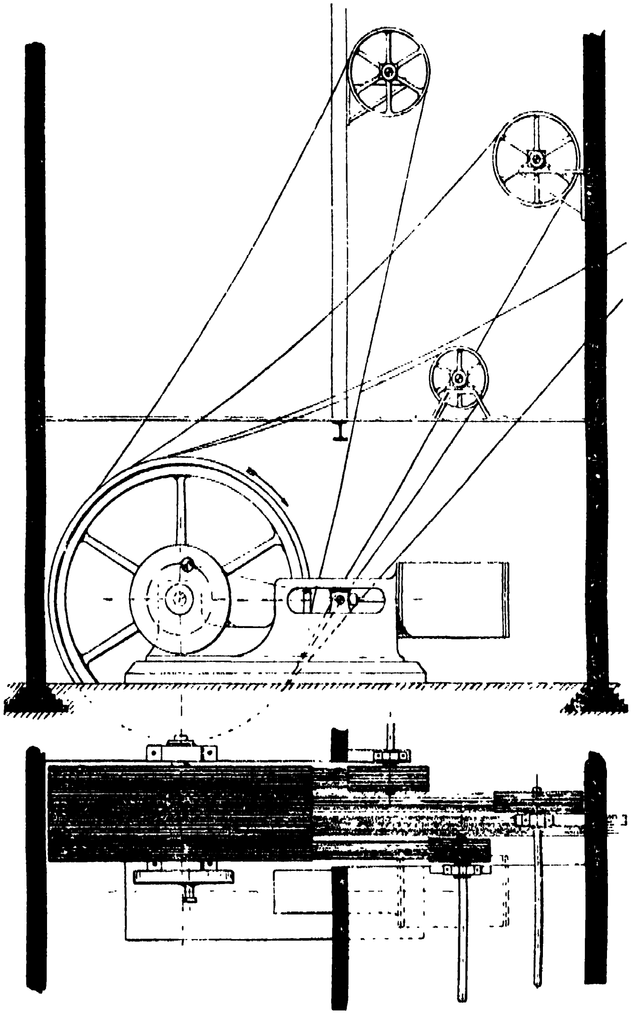


FIG. 9.

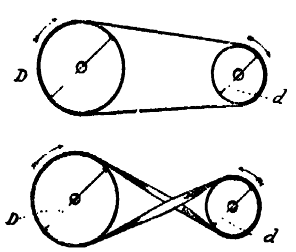


FIG. 10.

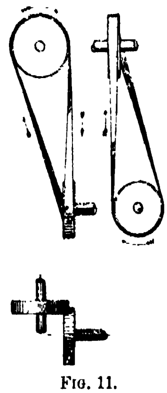


FIG. 11.

In certain machine tools it is often necessary to change speed, and this is effected by using cone or speed pulleys. The driving and driven pulleys have a series of steps, whose diameters are so proportioned that the belt fits each corresponding pair of steps with equal tension. Fig. 10 shows an open and a cross drive. Two shafts at right angles may be connected by means of a belt, provided that the pulleys are so arranged that the point at which the belt leaves either pulley lies in the plane passing through the centre of width of the other pulley (Fig. 11). Motion may be conveyed by belts in almost any direction, provided suitable guide-pulleys are introduced, and the above condition observed as to the position of the pulleys.

Pulleys.—These necessary adjuncts in belt-driving are made of cast iron, wrought iron, steel, or wood. The driving face of the pulley should be very slightly convex, in order that the belt may remain in the centre of the pulley face. Split pulleys are often used, as they are easily erected or taken down without interfering with the shaft bearings. Wrought-iron and steel pulleys are generally split, the pulley arms being sometimes made of cast iron, though latterly, for safety at high speeds, wrought iron and steel have been used. Wood split pulleys, which are now extensively used, possess the following advantages over iron pulleys: great lightness (thereby lessening the weight on shaft and bearings, and reducing friction); easy attachment to shaft (no keys being required); better grip between belt and pulley. Wood pulleys are now made from 4 to 72 in. in diameter, and from 3 to 18 in. in width.

See *Elements of Machine Design*, Part I., by Professor Unwin (new ed. 1901); *Belts and Pulleys*, by J. Howard Cromwell (1885); *Belt-Driving*, by Halliday (1894).

Beltane, a word found in Scotland, Ireland, Cumberland, and Cornwall, applied in a secondary sense to the first of May (or, in some districts, to St. John's Eve and St. Peter's Day), but originally used to denote the great fire festivals which marked the beginning of summer. Traces of human sacrifices at them were particularly clear. Beltane cakes were baked for the occasion, and used in casting lots to determine which of the company was to be sacrificed as the Beltane witch (the death penalty being mitigated into a mild form of social outlawry). Songs and dances, known as Beltane games, were also an accompaniment of the ceremony. The antiquity of these observances is further indicated by the fact that the bonfire was kindled by the primitive method of 'forced' or 'need' fire (Gael. *tein-eigin*)—*i.e.* from combustion produced by the violent friction of two pieces of wood. The Beltane rites continued to linger on into the 19th century in certain parts of the British Isles. As to the etymology of the word there has been much discussion. See Frazer's *Golden Bough*, vol. iii. (1900).

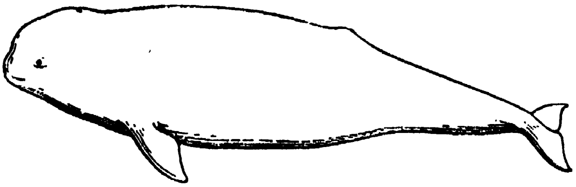
Belt Case (Belt *v.* Lawes), celebrated libel action, heard at Westminster by Baron Huddleston and a jury on forty-three days between June 21 and Dec. 28, 1882. Both plaintiff and defendant were sculptors, and Belt had been in Lawes's employment before setting up for himself. The libels complained of were contained in an article written by Lawes in *Vanity Fair* (Aug. 1881), and in a letter written by him to the lord mayor of London. In the article Lawes charged Belt with passing off as his own certain sculptures 'worked up' by persons in his service, and by them invested with whatever artistic merit they possessed. The trial was remarkable, not only for its duration, but for the number and position of the witnesses (several R.A.'s being called on the artistic questions involved), the extraordinary complications and side issues which resulted, and the curious disclosures which were made. The jury found for Belt, with £5,000 damages.

Beltrami, EUGENIO (1835-1900), Italian mathematician, remembered for the important departures which he made in the study of geometry. His was the theory that non-Euclidian geometry deals with surfaces of constant negative curvature. He published *Saggio di Interpretazione della Geometria non-Euclidia* (in *Giornale Matematica* VI.), and other valuable papers on mathematics and physics.

Beltrami, GIULIO CESARE (1779-1855), Italian traveller and patriot, born at Bergamo; was forced to leave Italy in 1821, in consequence of his relations with the Carbonari societies, and went to America, where he conceived the idea of searching for the sources of the Mississippi. In 1823 he took part in the scientific expedition under Major Long; but leaving his companions, he succeeded in discovering the sources of the Mississippi, and in 1824 published, at New Orleans, *La Découverte des Sources du Mississippi.* He afterwards made a long journey through Mexico, and proceeded to London in 1827, where he published *A Pilgrimage in Europe and America, leading to the Discovery of the Sources of the Mississippi* (1828). His latest work was *Le Méxique* (2 vols. 1830).

Beluchistan. See BALUCHISTAN.

Beluga, or WHITE WHALE (*Delphinapterus leucas*), a cetacean allied to the narwhal, but without the remarkable tusk of that animal. The beluga is from twelve to sixteen feet in length, as the name indicates is white in colour, and is found in the Arctic seas. It has occasionally occurred off the coast of Scotland. The name is also applied to the Russian sturgeon.



Beluga, or White Whale.

Belur-tagh, or BOLOR-TAGH. See PAMIRS.

Belus, in Greek mythology, son of Poseidon and Libya, and father of Ægyptus and Danaus. He was supposed to have founded Babylon.

Belvedere (*Kochia scoparia*), a plant belonging to the order Chenopodiaceæ, a native of Central and E. Asia, and employed medicinally in Japan. It is a common ornamental plant in British gardens, and is sometimes called the 'summer cypress.'

Belvedere, a summer-house or kiosk on a rising ground, or a room built above the roof of a house for the purpose of viewing the surrounding country. In France the term is also used for a summer-house in a garden.

Belvisia (*Napoleona imperialis*), an African plant closely allied to the mangrove, with flowers of a brilliant red, blue, or white colour, and an edible fruit resembling the pomegranate.

Belvoir Castle, Leicestershire, England, the seat of the Duke of Rutland. The original building was a fortress, erected soon after the Conquest by Robert de Todeni, standard-bearer to William I., and was several times burned down or otherwise destroyed. The present pile is a modern castellated, hollow quadrangle, restored by Wyatt, measuring 252 ft. along the east front, and containing a noble apartment called the Regent's Gallery, 127 ft. long. The castle stands on an isolated hill, and commands a view of thirty miles over the picturesque Vale of Belvoir. A fire destroyed part of it in 1816, including a famous picture gallery.

Belzoni, GIOVANNI BATTISTA (1778-1823), Egyptologist, was born at Padua. In 1803 he came to England, and for some time supported himself and his English wife by street acrobatic performances; but with an engagement at Astley's Amphitheatre his circumstances improved, and he devoted much time to studying mechanics. In 1812 he began to travel, visiting Portugal, Spain, and Egypt, where he designed a hydraulic machine for raising the waters of the Nile. He then visited Thebes, and removed the Young Memnon statue, which he sent to London. He investigated the temple of Edfu, visited Elephantina and Philæ, discovered the temple of Abusimbel, worked at Karnak, and found a magnificent tomb in the Bibân-el-Moluk. He was the first to enter the second pyramid at Gizeh, and to visit the oases west of Lake Moeris. In 1821 he published a record of his discoveries (*Narrative of Recent Discoveries in Egypt and Nubia*). He then attempted to reach Timbuktu, but died of dysentery on his way inland from Benin.

Bem, JOSEPH (1795-1850), Polish general, a native of Tarnov, Galicia. He took part in the Polish rebellion of 1830-31, and specially distinguished himself at Ostrolenka. After the fall of Warsaw (1831) he took refuge in Paris. In 1848 he was at the head of 10,000 Hungarian insurgents, with whom he overran Transylvania, but was defeated by the allies at Schässburg on July 31, and again at Temesvar on Aug. 9. Bem fled to Turkey, adopted Islamism, and entered the Turkish army, receiving the title of Amurat Pasha. He was sent to Aleppo in 1850, to suppress an Arab attack upon the Christian population, and there died of fever. See Pataky's *Bem in Siebenbürgen* (1850).

Bemba, lake. See BANGWEOLO.

Bembex, a genus of Hymenopterous insects specially noticeable for their burrowing propensities, and generally known as 'sand-wasps.' They are found chiefly in warm climates, where they affect sandy banks, on which the females deposit their eggs, provide food for the larvæ, and then close up the holes with earth.

Bembo, PIETRO (1470-1547), Italian humanist, born in Venice. He learned Greek under Laskaris, and became a leading member of the academy of Aldus Manutius at Venice. From 1513 to 1521 he was secretary to Pope Leo X., and in 1539 was made a cardinal, receiving in 1541 the see of Gubbio, and later that of Bergamo. His works greatly contributed to the creation of a good style, both in Latin and in Italian. Among them are: *Epistolæ* (1535); *Rerum Veneticarum Libri XII.*, from 1487 to 1513 (pub. 1551); *Carmina* (1533), clever imitations of Petrarch; *Prose nelle quali si ragiona della Volgar Lingua* (1525), an epoch-making book for Italian grammar; *Gli Asolani* (1505), philosophical talks about love; and *Rime* (1530). His *Tutte Opere* appeared in Venice (1729, 4 vols.) and Milan (1808 and 1824, 12 vols.).

Bembridge Beds, fresh-water deposits belonging to the Oligocene, and consisting of a creamy limestone composed of fresh-water shells - *e.g.* Paludina, Planorbis, Lymnæa—and blue and red calcareous marls. The little nucules of the fresh-water plant Chara are abundant in the limestone. Remains of the mammals Anoplotherium and Palæotherium have been obtained in these beds. The name is derived from Bembridge in the Isle of Wight. See Woodward's *Geology of England and Wales* (1887).

Ben. (**1.**) A Lowland Scotch word denoting the inner part of a house, the *ben* (or be-in), in opposition to the *but* (be-out), or outer chamber. (**2.**) Gaelic for 'mountain' (Cymric form, *pen* or *penn*), occurring as a prefix in the British Isles (*Ben* Nevis, *Pen*nigant, *Pen*maenmawr, Twelve *Pins*) and in S. Europe (*Pen*nine Alps, A*pen*nines, and *Pin*dus). (**3.**) A Hebrew syllable signifying 'son,' as in Benjamin and Benoni.

Benacus, LACUS. See GARDA.

Benares. (**1.**) Chief tn. of dist. and div. of same name, N.W. Provinces (United Provinces of Agra and Oudh), India; is situated on the l. bk. of the Ganges, and is 420 m. N.W. of Calcutta, with which it is connected by rail. Its narrow, tortuous, ill-kept streets are crowded with temples, Hindu and Buddhist. Extensive embankments of stone steps (*ghâts*) lead down to the sacred river, here accessible to large steamers. The city is the chief seat of Brahminical learning, and is annually visited by swarms of pilgrims from all parts of Asia. The centre also of wealth and commerce, it includes the manufacture of silk, cloth of gold, and gold filigree among its important industries. It has a large market for Manchester goods, and for sugar, saltpetre, and indigo, produced in the surrounding country. Sikrol, the European quarter, lies to the N.W. of the native city. Here, among other public buildings, is a college established by the British government in 1791 for the study of Sanskrit. Benares is one of the oldest cities in the world, and has been the 'holy city of the Hindus' for over twenty-five centuries. Pop. (1901) 209,331. (**2.**) Division; area, 10,423 sq. m.; pop. (1901) 5,069,020. (**3.**) District; area, 1,009 sq. m.; pop. (1901) 882,084.

Benavente, ancient walled tn., prov. Zamora, Spain, 35 m. from Zamora. It is the centre of an agricultural district. Here Moore began his retreat to Corunna (1808). Pop. (1900) 4,959.

Benbecula (Gael. 'mountain of the fords'), isl. between N. and S. Uist, Outer Hebrides, Inverness-shire, Scotland; contains numerous bays, and is largely engaged in the rearing of cattle and in fishing. Pop. (1901) 899.

Benbow, JOHN (1653-1702), British vice-admiral, commanded the fleet in the battle off Beachy Head in 1690, and at Barfleur and La Hogue in 1692. In 1693-4 he was in charge of a squadron which burned Dieppe, bombarded Havre and Calais, and otherwise annoyed the French coast. In 1696 he became rear-admiral, and in 1698 took command of a force in the Channel. In 1699 he commanded in the W. Indies. In 1700 he became a vice-admiral, and in 1702 returned to the W. Indies, where the French, under Du Casse, were active against the English. On August 19 he attacked the enemy, and although deserted by some of his captains, he carried on a running fight for five days almost single-handed. Benbow, who lost his leg, and was also wounded in the head, conducted the action from a cradle on his quarter-deck. Du Casse, however, escaped. Benbow died from his injuries at Jamaica.

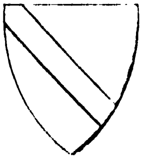
Benbow, a British first-class battleship (10,600 tons) launched in 1885. The ship-name is associated with the operations on the coast of Syria (1840).

Bencher. See INNS OF COURT.

Bench-warrant, an order by the judges in full court to enforce compliance with some behest, or to arrest an individual for contempt of court.

Bencoolen, or BENKULEN (Du. *Benkoelen*), seapt. tn. of the Dutch E. Indies, on the W. coast of Sumatra, in 3° 47′ S. lat. Vessels anchor 3 m. from the town. Fort Marlborough, the residence of the governor of the residency, was built in 1714. Pop. (1895) about 6,705. The residency of Bencoolen stretches along the Sumatran coast from 2° 30′ to 5° 58′ S. lat., and embraces an area of 9,440 sq. m., and pop. of (1895) 158,767. This part of Sumatra was an English possession from 1685 to 1825, when it was exchanged for the Dutch settlements on the Malay Peninsula.

Benczur, JULIUS (1844), Hungarian painter, studied in Munich from 1861, and in 1867 painted *The Departure of Ladislaus Hunyady*. He afterwards executed for the king of Bavaria several historical portraits, as *Louis XV. in the Boudoir of Dubarry*, *Louis XVI. and his Family at Versailles*, etc. In 1877 he produced a magnificent historical canvas, *The Baptism of St. Stephen, King of Hungary*, now in the National Museum at Budapest. In 1883 he was appointed professor, and later became director, of the Academy of Painting in Budapest, where he devoted himself to portrait-painting, and executed numerous portraits of the Hungarian aristocracy - Koloman Tisza, Count Julius Andrássy, and Count Julius Karolyi.

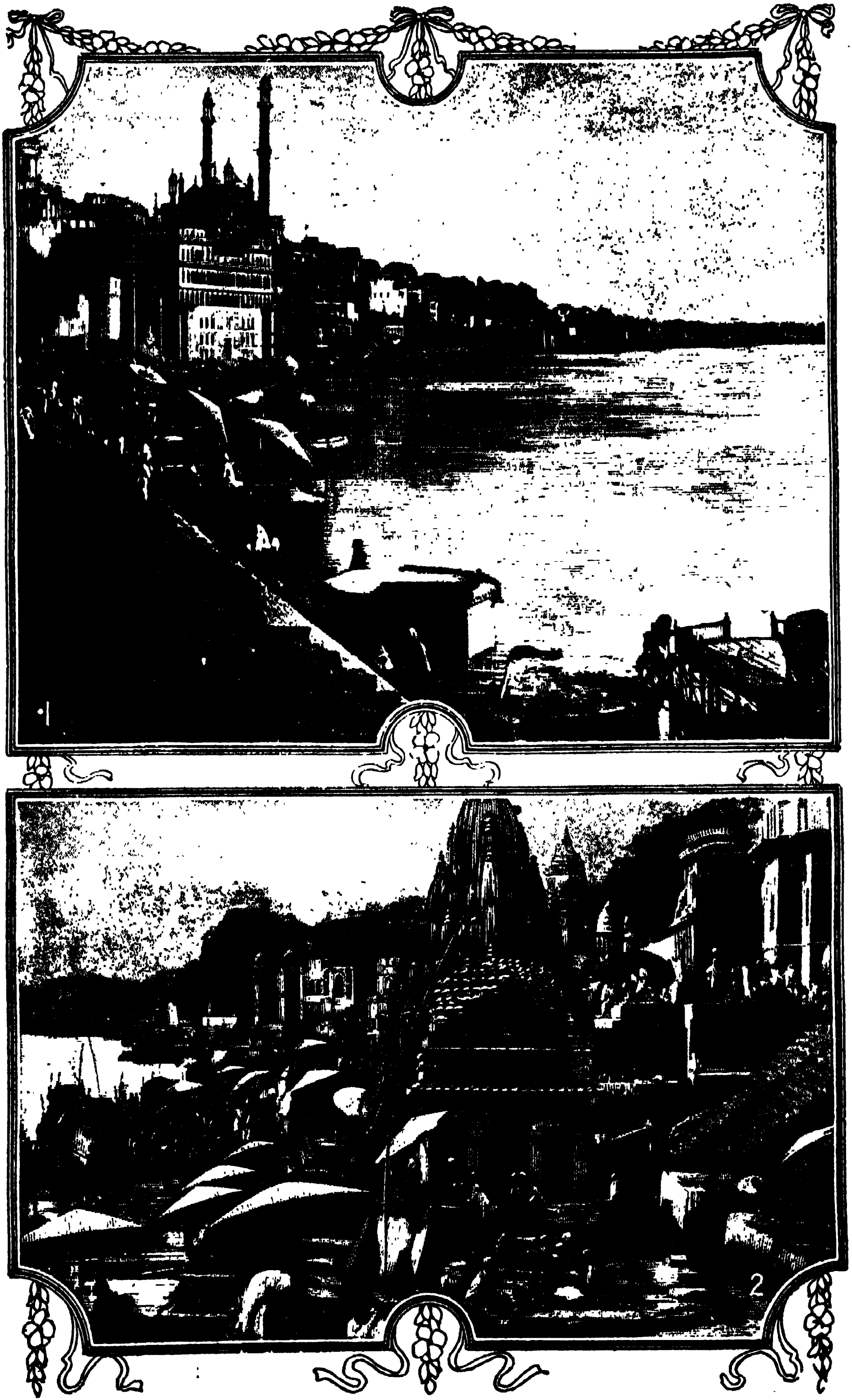


Bend.

Bend, in heraldry one of the honourable ordinaries, is a figure with parallel edges, extending diagonally right across the shield from the dexter chief to the sinister base. Its size (*i.e.* width) is, if charged, one-third of the field; if uncharged, one-fifth. It is supposed to represent the scarf or shoulder-belt of a knight. The bend has three diminutives—the *bendlet*, which is (in width) half the bend; and the *cost* or *cotice*, which is half the bendlet; the third is the ribbon, of the same width with the cost, but couped at the ends. The bend sinister is the bend dexter reversed—*i.e.* sloping from the sinister chief to the dexter base. It is needless to blazon the direction of a bend, however, unless it be sinister. The bend sinister has two diminutives - the scarp (half the bend) and the baton (half the scarp, and couped at the ends). BENDY, one of the varied fields, is formed by dividing the field into an equal number of bends of two alternating tinctures. 'In bend,' or 'per bend,' is said of charges or partition lines when placed in the direction of a bend.

Benda, GEORG (1722-95), Bohemian musical composer and musical director at Berlin (1740), Gotha (1748), Hamburg (1778), and again at Gotha in 1766. His *Ariadne in Naxos*, *Pygmalion*, and *Medea* enjoyed a high reputation.

Bendall, CECIL (1856), English Orientalist, fellow of Caius College (1879-85); assistant in department of Oriental MSS. and books at the British Museum (1882-98); and was appointed professor of Sanskrit in University College, London (1885). He has published *Catalogue of Buddhist Sanskrit MSS. in the University Library, Cambridge* (1883), *A Journey of Literary and Archæological Research in Nepal and Northern India* (1886), and *Cikshasamuccaya* (St. Petersburg, 1897-8).



Views in Benares.

1. The Great Mosque of Aurungzebe and adjoining ghats. 2. The Manikarnika Ghat.

Bendemann, EDWARD (1811-89), German painter of Jewish descent, born in Berlin; studied under W. von Schadow. In 1832 he produced *The Jews in Babylon*, now in the museum of Cologne, which excited a good deal of attention; in 1835 he produced another great work, *Jeremiah on the Ruins of Jerusalem*, now in the royal palace at Hanover. In 1838 he was appointed professor of the academy at Dresden, and at the same time was entrusted with the painting of a series of frescoes (historical, allegorical, and religious) in the throne-room and ball-room at the royal palace. This work, upon which he was engaged till 1855, illustrates *The Progress of the Human Race*. Of his later pictures the more important are: *The Carrying Away of the Jews into the Babylonian Captivity* (1872), now in the National Gallery at Berlin; and *Penelope* (1877), in the museum at Antwerp. Bendemann represents the older German school of historic painting, his canvases being nobly conceived and accurately drawn, but lacking in force and passion.

Bender, or BENDERI, chief tn. of Bender dist., Bessarabia, Russia, on r. bk. of the Dniester, 37 m. S.E. of Kishinev, 62 m. N.W. of Odessa; on the railway from Tiraspol to Jasi (Jassy) in Roumania; has an active trade in cereals, wine, wood, and cattle. Bender was the asylum of Charles XII. of Sweden after his overthrow at Poltava (1709). It was acquired by Russia in 1812. Pop. 31,851.

Bender Abbas, or BANDAR ABBAS (formerly *Gombrun*, or *Gombroon*), spt., prov. Kerman, Persia, 12 m. N.W. of Ormuz, on N. side of Ormuz Str.; so named after Abbas I., who, with the assistance of the English, drove the Portuguese out of Ormuz (1622), and transferred the trade to this new port. The harbour is exposed to the S., but much trade is done with Europe and India, chiefly in British vessels. Exports (1903, valued £138,632) are chiefly raw cotton, raisins, currants, almonds, dates, seeds, drugs, wheat, gum, wool. Imports (1903, valued £449,145—£151,211 to United Kingdom), piece goods, yarn and twist, indigo, glass, grain, hardware, and silk and woollen goods. Pop. 7,000.

Bendigo (formerly *Sandhurst*), cap. of the co. of Bendigo, Victoria, Australia, and the chief town of a large district devoted to gold-mining and farming. The gold field, 30 sq. m. in area, has, since its discovery in 1851, yielded gold to the value of £70,000,000. The town stands on Bendigo Creek, a trib. of the Campaspe, 101 m. by rail N.N.W. of Melbourne. Pop. (1901) 31,020.

Benedek, LUDWIG AUGUST VON (1804-81), Austrian general, was of Hungarian birth, but entered the Austrian army in 1822. After suppressing the revolt in W. Galicia (1846), he distinguished himself at Mortara and Novara (1849) in Italy, and at Raab, Komorn, Uj-Szegedin (1849) in Hungary. He again won further credit in the Italian campaign of 1859. He was appointed governor of Hungary in 1860, and subsequently commander-in-chief at Venice. In 1866 he commanded the northern Austrian army against Prussia, but at Sadowa, on July 3, the Austrian troops suffered a complete and disastrous defeat.

Beneden, PIERRE JOSEPH VAN (1809-94), Belgian zoologist, became head of the Louvain Museum of Natural History in 1831, and in 1835 was appointed to a chair at the University of Ghent, followed in 1836 by a professorship at the Catholic University, Louvain. He became president, in 1881, of the Belgian Academy of Sciences. In collaboration with Gervais, he published *Zoölogie médicale* (1859) and *Ostéographie des Cétacés vivants et fossiles* (1868-80); and alone, *La Vie Animale et ses Mystères* (1863), and other works.

Benedetti, VINCENT, COUNT (1817-1900), French diplomatist, born at Bastia in Corsica; was ambassador at Berlin in the last years of the second (French) empire, and was directly concerned in the sudden declaration of war by France against Prussia in 1870. His *Ma Mission en Prusse* (1871) and *Essais Diplomatiques* (1895-99) are very important for the understanding of Bismarck's diplomacy in 1866-70.

Benedicite, the canticle more properly called 'The Song of the Three Holy Children,' recorded in the Apocrypha as chanted by Shadrach, Meshach, and Abednego (therein styled Ananias, Azarias, and Misael) in the 'burning fiery furnace.' In the Prayer Book it is inserted as an alternative to the Te Deum in the morning service. Grace before meat, in the Catholic Church and in colleges, is also known as Benedicite. See Humphry's *Treatise on the Book of Common Prayer* (1885).

Benedict, the name of fourteen popes and of one anti-pope. BENEDICT VIII., elevated to the papal chair in 1012, crowned the Emperor Henry II., and defeated the Saracens, who had invaded his territory. He died in 1024. BENEDICT IX., 'the boy pope,' took office in 1033, but was deposed by Henry III. in 1048. The last of the Benedicts was Prospero Lambertini, BENEDICT XIV., who succeeded Clement XII. in 1740, and was a patron of literature and science, distinguished for the standard treatise which he wrote on the subject of 'beatification.' He died in 1758.

Benedict, surnamed BISCOP (c. 628-690), an Anglo-Saxon monk who journeyed several times to Rome, whence he brought books, pictures, and relics for the monastery which he afterwards founded (674) at Wearmouth. He also erected (682) another religious house at Jarrow, 6 m. distant. Leland ascribes to him *Concordantia Regularum*, a commendation of the rules of St. Benedict.

Benedict, ST. (480-543), founder of the first religious order in the West, was born of a wealthy family at Nursia, near Spoleto, and was at a very early age convinced of the necessity of a life of solitary meditation. Appointed abbot of the monastery of Vicovaro, he left it because the life of the monks was not severe enough. In the course of a few years numbers flocked after him, including the sons of wealthy Romans and uncivilized Goths, and he was able to found twelve monasteries. After some time he sought (about 529) another retreat, and, accompanied by a few followers, founded the monastery of Monte Cassino, near Naples, which afterwards became one of the richest and most famous in Italy. Here he had an interview with Totila, king of the Goths, whom he sternly reproved. In 515 he wrote his *Regula Monachorum*, which ultimately became the standard rule of the Western monastic orders. See Dugdale's *Monasticon* (1655), Mabillon's *Annales Ordinis S. Benedicti* (1703-39), and Stubbs's Preface to the *Memorials of S. Dunstan* (1858).

Benedict, SIR JULIUS (1804-85), musical composer and pianist, born at Stuttgart; was a favourite pupil of both Hummel and Weber, and held appointments as conductor at Vienna (1824) and Naples (1826). After becoming known as the composer of several operas, Benedict, acting on the advice of Malibran, went to London (1835), and was conductor at Covent Garden, Drury Lane, the Monday popular concerts, and various musical festivals. In 1850-51 he acted as concert director during a successful tour made through America by Jenny Lind. Besides much miscellaneous music, he composed two symphonies, the oratorios *St. Peter* (1870) and *St. Cecilia* (1867), the cantatas *Undine* (1860) and *Graziella* (new ed. 1882), the operas *The Gipsy's Warning* (1838), *The Crusaders* (1846), *The Brides of Venice* (1844), and *The Lily of Killarney* (1862). He was knighted in 1871.

Benedictine. See LIQUEURS.

Benedictines, an order of monks who profess to follow the rules of St. Benedict. The Benedictines, being those only that are properly called monks, wear a loose black gown with large, wide sleeves, and a capoch or cowl on their heads, ending in a point behind. They are sometimes styled Black Monks, but are not to be confounded with the Black Friars, who were Dominicans. By this order the English were converted to the Christian faith. St. Augustine, Archbishop of Canterbury, was a Benedictine. At the dissolution of the monasteries the number of Benedictine institutions was 186, with revenues amounting to over £65,000. Since its institution the order has given to the Roman Catholic Church no less than 40 Popes (including Gregory VII. and Urban II.). The Benedictines have produced eminent men of learning. In 1904 there were 128 Benedictine monasteries, numbering 4,565 inmates. See *The Holy Rule of St. Benedict* (1885), Montalembert's *Monks of the West* (trans. Gasquet, 6 vols., 1895), Cardinal Newman's *Mission of St. Benedict* (1858), and *The Benedictine Schools* (1859); Taylor's *Index Monasticus* (1821), and W. E. Addis and T. Arnold's *The Catholic Dictionary* (1897).

Benediction, the prayer for blessing pronounced by the minister at the close of divine service, usually either in the words of 2 Cor. 13 : 14, or in the form given at the end of the communion service of the Church of England. The custom of receiving benediction by bowing the head is of very ancient usage. In the Roman Catholic Church the benediction of the Blessed Sacrament—a comparatively modern rite—is a solemn function in which, after the host has been exposed in a monstrance, the priest, mantled with the veil, makes the sign of the cross with the monstrance held over the people. The Congregation of Rites orders this benediction to be given in silence.

Benedictus (Lat. 'blessed'), the hymn of Zacharias (Luke 1 : 68), used from ancient times in the services of the churches of Rome and England. The term is also applied to a part of the Roman mass service, beginning '*Benedictus qui venit*,' as well as to a musical setting of the same.

Benedix, (JULIUS) RODERICH, (1811-73), German author, actor, and singer, went on the stage in 1831, and for the next ten years appeared in various towns. From 1842 to 1861 he was mainly at Cologne, as director of the Stadttheater, teacher of dramatic art, and man of letters; from 1861 to his death he lived at Leipzig. His earliest success was *Das bemooste Haupt* (1841); other plays worth mentioning are *Doctor Wespe*, *Eigensinn*, *Das Gefängnis*, *Die Zärtlichen Verwandten*, and *Mathilde*. He was a master of the comedy of situation rather than of character, and pictured German middle-class life. He published a selection from his shorter plays—*Haustheater* (1862); a selection from the longer plays is the *Volkstheater* (1882). Besides this dramatic work he wrote *Bilder aus dem Schauspielerleben* (1847), *Die Lehre vom mündlichen Vortrag* (1852; 8th ed. 1897), *Das Wesen des deutschen Rhythmus* (1862). His posthumous work, *Die Shakespearomanie* (1874), has been much criticised.

Benefice. In England this term is applied to an ecclesiastical living in the Church of England, and sometimes, in a more general sense, to any form of ecclesiastical preferment in that church. A clergyman obtains a benefice by presentation by the patron of the advowson, or, if the patron is a bishop, by collation (which has the same effect as presentation), followed in each case by admission by the bishop, institution (by which the clergyman is vested with spiritual powers), and induction (which gives him the temporalities). A benefice may be lost by simony, or the possession of more livings than is lawful (see PLURALITIES), or continued disobedience to authority (see PUBLIC WORSHIP REGULATION), or by non-residence. A clergyman must reside on his benefice nine months in the year; but the bishop can authorize non-residence on the ground of mental incapacity or ill-health of the incumbent, his wife, or child, or if no residence is obtainable; and the bishop, with the consent of the archbishop, can grant leave in other cases. In Scotland the term 'benefice' may still be used of a living of the Established Church, consisting in the older parishes of the glebe, the manse, and the stipend from teinds, and in *quoad sacra* parishes of the manse and stipend, generally provided out of voluntary endowments; but it is not so generally used as in England, except with reference to the old state of things before the reformation, when benefices consisted of temporalities or lands, which have nearly all gone to the crown, and spiritualities or teinds, which still belong to the Established Church.

Beneficiary. See TRUSTS.

Benefit of Clergy was the term applied to the privilege by which a clerk in holy orders, when charged with an offence before a court, was entitled to have the case removed to the ecclesiastical courts. At first the offender could either purge himself on oath before the ecclesiastical courts, or he suffered degradation. At a later date imprisonment for life in the bishops' prison was substituted for degradation. Compurgation and imprisonment by the bishop were abolished in 1576. The privilege, which had been extended to peers in 1547, was eventually granted to all clerks—*i.e.* all persons who could read—and could only be claimed once. The offender was branded in the hand with M for a murderer, and T for a thief. The graver offences were successively excepted from the privilege by statute, and 'benefit of clergy' was abolished for peers in 1841, and commoners in 1827.

Benefit Societies. See FRIENDLY SOCIETIES.

Beneke, FRIEDRICH EDUARD (1798-1854), German philosopher, born at Berlin. His *Erkenntnisslehre*, or 'Theory of Knowledge' (1820), in which he opposes the philosophy of Hegel and Kant, shows a strong sympathy with the Scottish metaphysicians. In his view the basis of all philosophy consists in empirical psychology, and mental phenomena are to be treated by the methods of natural history. In 1832 he succeeded Hegel as professor of philosophy at Berlin. His system can be most readily grasped from his *Lehrbuch der Psychologie als Naturwissenschaft* (1833; new ed. 1877). There are Memoirs of him in German by J. Friedrich (1898) and Gramzow (1899).

Benevento. (**1.**) Mountainous and agricultural province, South Italy, midway between the Gulf of Naples and the Gulf of Manfredonia. Area, 837 sq. m. Pop. (1901) 256,504. (**2.**) The ancient *Beneventum*, capital and archiepiscopal see of above, stands on a hill, 60 m. by rail (*via* Aversa) N.E. of Naples. On the N. side of the town, which still retains its mediæval walls, stands the 'Golden Gate,' an exceptionally handsome triumphal arch, erected in 116 to do honour to the Emperor Trajan. The Lombardo-Saracenic cathedral dates from the 12th and 13th centuries. The church of St. Sophia, also Lombardic in style, was built four centuries earlier than the cathedral; it has been modernized. Pop. (1901) 24,137. Beneventum was a Sabine town, and was occupied by Rome in 300 B.C. Close by, Pyrrhus, king of Epirus, was defeated by the Romans in 275 B.C. Benevento was in part destroyed by Totila, king of the Goths, in 545 A.D. From the 6th to the 11th century it was the chief town of a Lombard duchy or duchies, but in 1053 was conferred by the emperor Henry III. upon the Pope. Owing to its commanding position on the Appian Way, it had long been a place of importance. In 1266 the German king Manfred was defeated and slain near Benevento by Charles of Anjou. The town was captured by the French in 1798; and in 1806 it was created a principality by Napoleon, and conferred upon Talleyrand. Benevento was nearly destroyed by an earthquake in 1668.

Benevolence, forced loans demanded from the English people by Edward IV. and succeeding sovereigns. Though such exactions had been not unknown before, it was in 1473 that the word was first used. Benevolences, though under the guise of a willing offering by the subject, were absolutely compulsory, and the custom became one of the chief grievances of the nation. Nominally abolished by Parliament in 1484, it yet persisted until the time of James I.

Benfey, THEODOR (1809-81), German Orientalist, and a very distinguished student of comparative philology and folklore, was born at Nörten, near Göttingen. For some time a teacher at Frankfort, he was appointed extra professor of Sanskrit and comparative philology at Göttingen in 1848, and professor in 1862. The chief result of his early studies was his *Griechisches Wurzellexikon* (1839-42). His works on Sanskrit include an edition of the *Sâma Veda* (1848), *Handbuch der Sanskritsprache* (1852-4), *Kurze Grammatik der Sanskritsprache* (1855; Lond. 1868), his edition of the *Pantschatantra* (2 vols. 1859), and his *Sanskrit Eng. Dict.* (1866).

Bengal, BAY OF, a N. extension of the Indian Ocean, which has India on the W., and Burma and the Malay Peninsula on the E. It receives the waters of the great rivers Salwin, Irawadi, Brahmaputra, Ganges, Mahanadi, Godavari, and Kistna. At its E. side are the Andaman, Nicobar, and Mergui Islands, and at its S.W. corner the island of Ceylon. It measures more than 1,200 m. from N. to S., and 1,350 m., at its widest part, from E. to W.

Bengal and North-western Railway was incorporated in 1882, and is a single-track system of rails on the metre gauge in N. India between the rivers Gandak and Gogra, and between the Gogra and the Ganges, in the neighbourhood of Ghazipur and Benares. The mileage in operation is 1,330. The capital expended on construction amounts to £7,531,534. The average net earnings of the company are about £469,773 per annum, the traffic receipts amounting to about £10,000 per week. The dividend for the year ending December 1904 was 6 per cent.

Bengal Gram, the seed of an Indian leguminous plant (*Cicer arietinum*), often called chick pea, which is used as food for cattle. Oxalic acid exudes from the plant, and is used by the natives as a refrigerant in fevers.

Bengal Hemp (*Crotalaria juncea*), a leguminous plant which produces a commercial fibre; is known also as sunn, shunum, and taag. It is also called Madras hemp and sun-hemp, and is used in the manufacture of cordage, fishing-nets, canvas, paper, and gunny-bags.

Bengal Hemp.

Bengali Language, one of the chief languages of India, spoken by upwards of 40,000,000 people, is an offshoot from Sanskrit, containing admixtures of Arabic and Persian. Grammars of the language have been published by Yates and Wenger (1885), and by Nicholl (1885). Dictionaries: Mitter (1870); English-Bengali by Marshman (1828), and Sykes (1874). See Dutt's *Literature of Bengal* (1895).

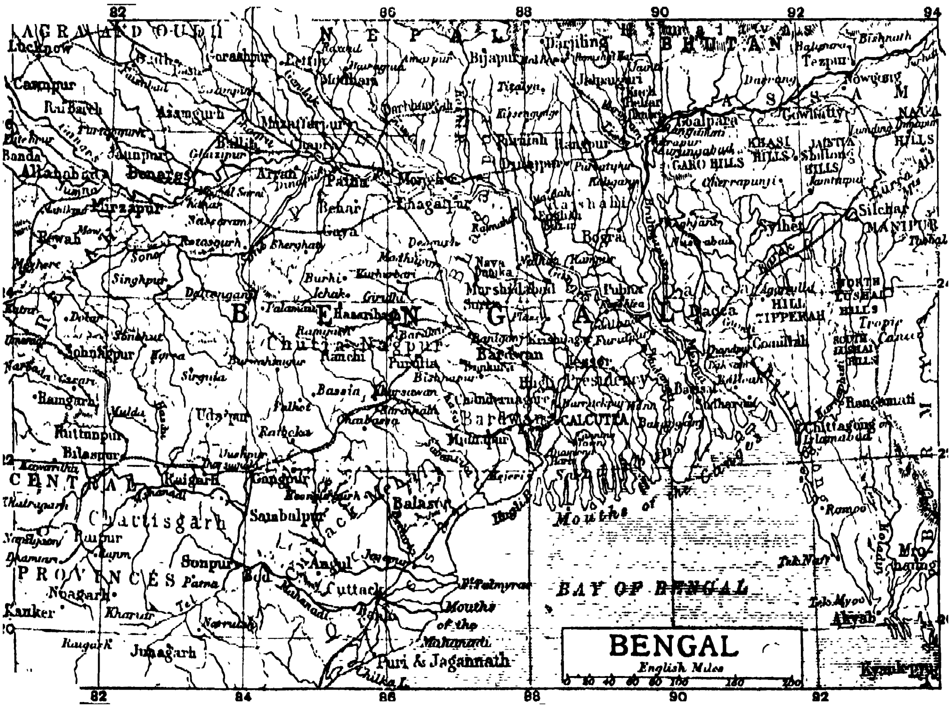
Bengal Lights, coloured fires used as signals and in pyrotechny. Potassium chlorate, antimony sulphide, and sulphur are the chief ingredients which enter into their composition. The grinding and mixing require the greatest care and skill, as the mixture is highly explosive. For these and other coloured fires, see Cooley's *Cyclopædia of Practical Receipts* (1892).

Bengal Presidency, the largest, the most populous, and the most wealthy of the many districts of the British Indian empire, is bounded on the N. by Nepal, Bhutan, and Assam; on the E. by Burma; on the S. by Burma, the Bay of Bengal, and the Madras Presidency; and on the W. by the Central Provinces, the feudatory state of Rewah, and the N.W. Provinces (United Provinces of Agra and Oudh). Out of an area of 189,837 sq. m., 156,260 is British territory. In addition to this, new land is being rapidly formed, by the action of large rivers, along the N. shore of the Bay of Bengal. This swampy, unhealthy jungle tract, filled with wild animals, is called the Sundarbans, and its area in 1900 was estimated at over 5,300 sq. m. The country is level, broken here and there by spurs from the mountain ranges, which hem it on the N. and E., and is richly watered. Two of the largest rivers in India—the Ganges from the N.W., and the Brahmaputra from the N.E.—traverse the presidency. From their confluence, about 150 m. from the coast, the waters spread themselves over Bengal proper, and enter the sea by innumerable mouths. There are two other important rivers—the Hugli, which joins the delta of the Ganges and the Brahmaputra; and the Mahanadi, in the S. of the Orissa division. The soil is alluvial, and the country is subject to periodic widespread floods and to occasional earthquakes. The coal mines at Ramganj, in the Burdwan district, are rapidly developing; in 1903 their output was over two million tons. Salt is obtained in Orissa and Midnapur. Forests cover an area of nearly 13,600 sq. m. Agricultural products are numerous; tea, rice, indigo, cinchona, poppy, wheat and other grains, and oil seeds are specially important. The chief manufactures are jute and silk, but the latter industry is declining under foreign competition. The Orissa, Midnapur, and Sôn canals not only irrigate over 1,100 sq. m., but form important waterways. As the outlet of extensive river highways, Bengal possesses three ports—Calcutta, Chittagong, and Orissa. The value of the sea-borne trade of the presidency in 1903 was over 62 millions sterling, about one-half being with the United Kingdom.

The territory under native rule comprises the states of Kuch Behar, Orissa, and Chota Nagpur, Hill Tipperah and Sikkim. The residence of the lieutenant-governor is at Barrackpur, about 15 m. N. of Calcutta. About one-half of the population are

Hindus, and worship under the various systems of that faith. The Mogul invasion resulted in the nominal conversion of a considerable percentage to the creed of Islam, and a large proportion of the inhabitants are the remains of races which had settled in the country anterior to the advent of Aryan conquerors. Pop. (1901) 3,916,383.

Bengazi, or BENGHAZI (anc. *Berenice*, after the wife of Ptolemy III.), seapt. and cap. of Barka, N. Africa; caravan terminus from Wadai and Wanjanga and Egypt; has good anchorage, but vessels drawing over six feet cannot enter the harbour. Exports camels, cattle, sheep, ostrich feathers, wool, grain, ivory, sponges, etc.; imports cotton and woollen goods, iron, wines, spirits, tobacco, etc. The total sea-borne trade now exceeds half a million sterling. The bulk of the trade is with Malta. Pop. 10,000.



Bengel, JOHANN ALBRECHT (1687-1752), Biblical critic, was born at Winnenden in Würtemberg, and studied at Tübingen, where for five years he acted as *repetent* or (theological) lecturer. In 1713 he became head of the preparatory theological institute at Denkendorf, where he remained for twenty-eight years. Bengel enriched exegetical scholarship by his *Gnomon Novi Testamenti*, which was published in 1742 (8th ed. 1890). He was something of a mystic, as witness his early sympathy with the Pietists, and his later incursions into the region of apocalyptic prophecy. See *Life* by Burk (1831-7; trans. 1837), and Nestle's *Bengel als Gelehrter* (1893).

Benger, ELIZABETH OGILVY (1778-1827), English author, born at Wells, Somerset. Her chief works are a poem *On the Slave Trade* (1809), and the *Memoirs* of Elizabeth Hamilton (1818), Anne Boleyn (1821), Mary Queen of Scots (1823), and of Elizabeth of Bohemia (1825).

Benguella, S. FELIPPE DE, chief tn. of the Benguella dist., Angola, Portuguese W. Africa, situated on a marshy plain. The trade has declined, but is still large, its annual value amounting to £816,000. Exports are india-rubber and wax. Pop. 3,000.

Benhadad, the name given in the Old Testament to three (or two) kings of Damascus—*i.e.* Syria. (1.) BENHADAD I., the ally of Asa of Judah against Baasha of Israel (1 Kings 15:18-22). (2.) His son and successor, BENHADAD (II.), the Dad-idri (*i.e.* Hadadezer) of the inscriptions, who was defeated by Shalmaneser II. of Assyria at Karkar in 853 B.C. This was the adversary of Ahab; he twice unsuccessfully besieged Jerusalem (1 Kings 20; 2 Kings 6 *f.*), and was slain by Hazael (2 Kings 8:7-15). (3.) BENHADAD III. (Mari) was the son of Hazael, and was thrice vanquished by Joash, king of Israel (2 Kings 13:25). Some—*e.g.* Cheyne—identify (1) and (2). See Kittel's *Hist. of the Hebrews*, vol. ii. (trans. by J. Taylor, 1895).

Benham, WILLIAM (1831), English theological writer, rector of St. Edmund's, Lombard Street, London, since 1882; was tutor in St. Mark's College, Chelsea (1857-64); professor of modern history, Queen's College, London (1864-73); hon. canon of Canterbury (1885); and Boyle lecturer in 1897. His works include, *A New Translation of Thomas à Kempis's 'Imitatio Christi'* (1874); *Cowper's Letters* (1883); *A Short Hist. of the Episcopal Church in America* (1884); *The Dict. of Religion* (1887); (with another), *Life of Archbishop Tait* (1891). He is the editor of the *Anc. and Mod. Library of Theological Literature*.

Beni, or PARO, riv. rising as the La Paz, formed by streams from the E. Cordillera of Bolivia, S. America; flows N. and N.E. through the rich metal region of Beni for 850 m. to join the Mamore, the two forming the main feeders of the Madeira.

Beni, the northernmost dep. of Bolivia, bordering upon Brazil, traversed by the Beni river, and by the Rio Mamore. Cap. Trinidad. Area, 100,580 sq. m. Pop. estimated (1900) 38,700.

Benicarlo, tn. and port on Mediterranean, prov. Castellon, Spain, 4½ m. by rail s. of Viaroz. Of its wine 40,000 pipes are exported yearly. Pop. (1900) 7,251.

Benicia, seapt. tn., and formerly cap. of Solano co., California, U.S.A.; 30 m. by rail N.E. of San Francisco, on Carquinez Strait; contains a United States arsenal and the workshops of the Pacific Mail Steamship Co.; has tanneries, cement works, packing houses, etc., and the episcopal college of St. Augustine. Pop. (1900) 2,751.

Beni-Hassan, vil. on r. bk. of Nile, Egypt, 15 m. S.E. of Minieh. In its neighbourhood, and overlooking the river, are hills with catacombs which are believed to have been the tombs of the people of the ancient Hermopolis. Pop. 1,300.

Beni-Israel, settlement of Jews in Bombay and other coast towns of India; said to owe its foundation to a band of Jews shipwrecked over a thousand years ago. Their ordinary language is Marathi, but some have a knowledge of Hebrew. The Kala, or Black Israels, are a lower class.

Benin, dist., tn., and riv. of W. Africa, in the British protectorate of S. Nigeria, all three between the river Niger and the E. boundary of the colony of Lagos. A British residency has been built at Benin city. On the river Benin (at Sapele) an annual trade is done to the value of £150,000 to £200,000. When the capital of the ancient kingdom of Benin was captured by the British, in 1897, they discovered a number of objects—bronze reliefs, carved ivory tusks, weapons, bells, etc.—which throw much light upon the archæology of that part of Africa. These were probably made in the 16th or 17th century. See *Geog. Jour.* 1893, pp. 122, etc.; Pitt Rivers's *Antique Works of Art from Benin* (1900); Read and Dalton's *Antiquities from the City of Benin* (1899); and H. Ling Roth's *Great Benin: its Customs, Art, and Horrors* (1903).

Benin, BIGHT OF, a division of the Gulf of Guinea.

Beni-Saf, seapt., dep. Oran, on N.W. coast of Algeria, 30 m. N. of Tlemsen; owes its importance to the rich iron mines of the neighbourhood; possesses a new harbour of 45 ac.; annual export, nearly half a million tons of ore. Pop. (1901) 6,751.

Beni-Suef. (1.) Province of Upper Egypt. Area, 501 sq. m.; pop. (1897) 314,454. (2.) Town, Upper Egypt, on r. bk. of Nile, 62 m. by rail S.W. of Cairo; chief town of province of same name; has manufactures of cotton; from it a line enters the Fayum district. Pop. (1897) 18,229.

Benjamin ('son of the right hand'), the youngest son of the patriarch Jacob, and the only full brother of Joseph. He was born near Ephrath—Rachel, his mother, dying at his birth (Gen. 35:18). See next article.

Benjamin, THE TRIBE OF. Recent Old Testament scholarship regards Benjamin not so much as a historical character as the 'eponymous' ancestor of the tribe of that name. Thus, from what is said in the foregoing article, we may conclude that Benjamin as a tribe was the last to be constituted (the 'youngest'), except Ephraim and Manasseh (*i.e.* Joseph); that it was closely related to these ('brother of Joseph'); and that it was founded only after the Israelite conquest of Canaan ('birth near Ephrath'). Its territory lay immediately to the north of Judah, and consisted of a rugged region, better fitted to produce warriors than farmers (see Gen. 49:27). The tribe did serviceable work in repelling the Philistines, and gave Israel its first king, Saul. At the rending of the kingdom it remained faithful to the Davidic dynasty, and after the exile joined Judah in the claim of being the only true inheritors of the promises. Despite such outbreaks of lawlessness as are recorded in Judges 19, Benjamin had a remarkable interest in religious things: witness the number of its sanctuaries, such as Anathoth, Ramah, Gibeon, Gilgal, Mizpeh, etc.; as also the fact that it produced the prophet Jeremiah and the apostle Paul. See G. A. Smith's *Hist. Geog. of Holy Land*, 290 *f.* (new ed. 1897).

Benjamin, JUDAH PHILIP (1811-84), American statesman and barrister, practised (1832) at the New Orleans bar. During the American civil war he was the principal supporter of Jefferson Davis, the Confederate president, being first (1861) secretary of war, and after 1862 secretary of state. His remarkable energy and efficiency caused him to be known as 'the brains of the Confederacy.' After the collapse of the Confederacy he was admitted to the English bar (1866), became Q.C. in 1872, and enjoyed a lucrative practice until his retirement in 1883. His work *On Sales* (1868) is a classic.

Benjamin OF TUDELA (d. 1173), a learned Israelite and rabbi, born in Tudela, Spain; visited Constantinople, Egypt, Assyria, Persia, and Chinese Tartary (1159-73). His itinerary was first published at Constantinople in 1543, under the title *Mazahoth* ('Excursions'). The best English edition is that by Asher, *The Itinerary of Rabbi Benjamin of Tudela* (2 vols. 1840).

Benjamin Tree. See BENZOIN.

Benkovac, tn., Dalmatia, Austria, 22 m. S.E. of Zara. Pop. (1900) 14,197.

Benkulen. See BENCOOLEN.

Ben Lawers, mt. (3,984 ft.) on Loch Tay, W. Perthshire, Scotland, 9 m. S.W. of Kenmore.

Ben Ledi, mt. (2,875 ft.) on Loch Lubnaig, Perthshire, Scotland, 4½ m. N.W. of Callander.

Ben Lomond, mt. (3,192 ft.) on E. side of Loch Lomond, in par. of Buchanan, Stirlingshire, Scotland; forms part of watershed between Forth and Clyde.

Ben Macdhui, mt. (4,296 ft.) in pars. of Braemar and Crathie, W. Aberdeenshire, Scotland, at junction of shires of Banff, Aberdeen, and Inverness. The second highest mountain in Scotland. It consists chiefly of red granite; rock crystals (cairngorms) are found.

Ben More, mt. (3,843 ft.), S.W. Perthshire, Scotland, 9 m. from head of Loch Lomond.

Benmore Head. See FAIR HEAD.

Benne-oil is obtained from the seeds of *Sesamum indicum*, an Indian plant belonging to a tropical order related to Scrophulariaceæ. The oil is used for salads, and as a substitute for olive oil. In India it is used for dressing wounds, and does not become rancid though kept for years. In Japan it is used in place of butter. It is also called gingili or gingelly, sesamum, til, and teel oil.

Bennett, JAMES GORDON (1800-72), American journalist, was born at Newmill, Banffshire, and emigrated to America in 1819. There he was for a time part owner of the *Pennsylvanian* newspaper of Philadelphia, and in 1835 originated the *New York Herald*.

Bennett, JAMES GORDON (1841), journalist and proprietor of the *New York Herald* (1872), fitted out (in conjunction with the *Daily Telegraph*) Stanley's expedition to Africa of 1874-8, and the *Jeannette* Polar Expedition (1879), and established the Mackay-Bennett Commercial Cable Co. in conjunction with John W. Mackay (1883). He inaugurated the publication in England of storm warnings sent from the United States, and is the donor of the cup annually competed for by the most skilful and daring automobilists of the world. See MOTOR CARS.

Bennett, JOHN HUGHES (1812-75), English physician and physiologist, studied at Edinburgh; elected to the chair of the institutes of medicine at the university (1848). Author of *Treatise on Cod-liver Oil as a Therapeutic Agent* (1841); *Leucocythæmia, or White Cell Blood* (1852); *Clinical Lectures* (1858; 5th ed. 1868), widely translated; and *The Pathology and Treatment of Pulmonary Tuberculosis* (1853; 2nd ed. 1868).

Bennett, Sir William Sterndale (1816-75), British composer and pianist, studied at the Royal Academy of Music, London, and at Leipzig. For some years (from 1856) he was professor of music at Cambridge; subsequently (1866) principal of the Royal Academy; was knighted in 1871. His compositions are full of grace and beauty, and his name stands in the front rank of British composers. His versatility was remarkable. Among the more noteworthy works were overtures to *Tempest* (1832), *Merry Wives of Windsor* (1833), and *Paradise and the Peri* (1867); *The May Queen* (1858), *The Hawthorn in the Glade* (1859), *The Woman of Samaria* (1867), *Ajax* (1872), *Genevieve* (1873), *The Maid of Orleans* (1873), *Cast thy Bread upon the Waters* (1874), *Remember now thy Creator* (1879), and *The Gentle Zephyr* (1886).

Ben Nevis, mt. (4,406 ft.), par. of Kilmallie, Inverness-shire, Scotland; overlooks Glen Nevis towards Fort William; highest peak in Great Britain, hence its choice as a station of the Scottish Meteorological Society (1881), and the site of a fully-equipped observatory in 1883. In consequence of the withdrawal of government and other grants, the observatory was closed in October 1904, and the instruments were removed to the low-level station at Fort William. The geological formation is gneiss and granite, overtopped by porphyritic greenstone.

Bennigsen, Levin August Theophil, Count (1745-1826), a Russian general, was a native of Brunswick who entered the Russian army in 1773. He was made a major-general by the Empress Catherine, and commanded at Eylau (1807), led the Russian centre at Borodino (1812), defeated Murat at Tarutino (1812), and (1813) shared in the famous victory of Leipzig.

Ben-nut Tree (*Moringa pterygosperma*) belongs to a small order of plants found in Arabia and E. Indies. The nearest British order is that of the maple. Its bark yields gum; and its seeds are the source of ben-oil, used by watchmakers, painters, and perfumers.

Benoit de Sainte-More, or de Sainte-Maure, French *trouvère* of the 12th century; at the request of Henry II. of England composed his great poem of 45,000 octosyllabic verses, *Chronique des Ducs de Normandie* (about 1180). It was edited by Francisque Michel, in 3 vols., in 1836 44. His *Roman de Troie*, running to over 30,000 verses, enjoyed great popularity in the middle ages. It was edited by M. A. Joly, in 2 vols., in 1870-1. To him are also attributed *Enéas*, a poem of 10,000 verses; and *Le Roman de Thèbes*, a poem of 15,000 verses. See G. de la Rue, in *Archæologia Britannica*, vol. xii. pp. 314-323 (1834); Littré, in *Journal des Savants* (1876); and Gaston Paris, in *Romania* (1876 and 1879).

Benoit, Peter Léonard Léopold (1834-1901), Belgian musical composer and critic; attempted, with little success, to form a distinctively Flemish movement in music, based upon the theories of Wagner and Liszt; was (1867) director of the conservatory of Antwerp; author of several operas (*e.g. Isa*, 1867), oratorios (*e.g. Lucifer*, 1866; *Oorlog*, 1873), cantatas, and ecclesiastical pieces.

Ben-Rhydding, vil. in W. Riding, Yorkshire, 9 m. N.W. of Bradford and 12 m. N.W. of Leeds, on N.E.R. It has a hydropathic establishment, built in 1846.

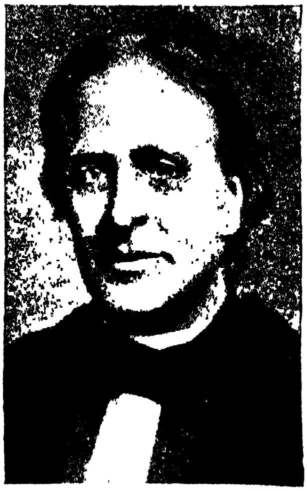
Bensberg, vil., prov. Rhineland, dist. Cologne, Prussia, 11 m. by rail E. of Cologne, with lead, zinc, and iron mines, and a school for cadets. Pop. (1900) 10,410.

Bensley, Thomas (d. 1835), a famous London printer, who produced some of the most sumptuous books during the 'bibliomania' which raged at the close of the 18th and the beginning of the 19th century. Among his chief works are a magnificent Bible, printed for Macklin the publisher (1800 15), and a series of works called the *Poets' Gallery*, illustrated by the first artists of the day. Some of his types were of that design of Roman now known as 'modern.'

Benson, Arthur Christopher (1862), English poet, second son of Archbishop Benson; since 1885 has been a master at Eton. His publications are: *Memoirs of Arthur Hamilton*, under pseudonym 'Christopher Carr' (1886); *Archbishop Laud* (1887); *Men of Might*, with H. F. Tatham (1890); *Poems* (1893); *Lyrics* (1895); *Essays* (1896); *Lord Vyet, and other Poems* (1897); *Fasti Etonenses* (1899); *Life of Archbishop Benson* (1899); *The Professor, and other Poems* (1900); *The Schoolmaster* (1902); *Tennyson* (1902); *Coronation Ode* (1902); *The Hill of Trouble* (1903).

Benson, Edward Frederick (1867), English novelist, third son of Archbishop Benson, worked at Athens for the British Archæological School (1892-5), and in Egypt for the Hellenic Society (1895). His works—*Dodo* (1893), *The Rubicon* (1894), *The Babe, B.A.* (1897), *Vintage* (1898), *Mammon and Co.* and *Princess Sophia* (1900), *The Luck of the Vails* (1901), *The Book of Months* (1903) show considerable satirical power.

Benson, Edward White (1829-96), Archbishop of Canterbury, born at Birmingham; master at Rugby, priest in 1856, and the first headmaster of Wellington College (1859-73). Examining chaplain to Bishop Wordsworth and Dr. Temple (1871), he became chancellor of Lincoln (1872), where he instituted a theological college. In 1877 he became bishop of Truro, and originated the cathedral, consecrated 1887. Appointed Archbishop of Canterbury (1882), he died suddenly in Hawarden church, Oct. 11, 1896. His *Life of Cyprian* (1897) and *The Apocalypse* (1900) are posthumous works. See *Life* by A. C. Benson (1899).



Archbishop Benson.
(*Photo by Messrs. Bassano.*)

Benson, Frank R. (1858), English actor. In 1884 he founded his famous Shakespearean and Old English Comedy Company, and in 1900 he produced, in London, *Henry V.*, *The Rivals*, *Twelfth Night*, *Antony and Cleopatra*, etc. He has been responsible for several of the Shakespearean festivals at Stratford-on-Avon. In 1886 he married Miss Constance Featherstonhaugh, one of his company, who has since been associated with him in the production of Shakespearean plays and Old English comedies.

Bent, James Theodore (1852-97), English author and traveller, born at Liverpool; graduated at Wadham College, Oxford (1875); travelled in the East (1877). In 1891 he proceeded to S. Africa, and explored the ruins of Zimbabwe, discovered by the American traveller Renders in 1871, which he pronounced to be of Sabean origin; and in 1893-4, in conjunction with his wife, daughter of R. W. Hall-Dare, he went to S. Arabia. His principal books are *The Ruined Cities of Mashonaland* (1892; 3rd ed. 1895), *The Sacred City of the Ethiopians* (1893; 2nd ed. 1896); and after his death his wife published *Southern Arabia* (1900).

Bent Grass. There are nearly a hundred species of *Agrostis*, or bent grass, of which only very few are of use to the farmer or gardener. They all flower in a loose, spreading panicle, and the little spikelets bear but one flower apiece. The silky bent grass, flyaway grass, tickle grass, or windward spiked grass (*Agrostis spica venti*, or *A. scabra*) is a common annual grass on poor English land. Another annual bent grass is the Spanish *A. nebulosa*, or cloud grass, which has a beautiful, light, feathery habit, and is well worth cultivating in gardens. *A. alba* (creeping bent grass), and its variety *A. vulgaris* (red-top), are perennial creeping grasses, which are generally taken to indicate a poor condition of pasture land; but they are sometimes very useful as prolonging the pasturing season. For this purpose, another variety of *A. alba* – *A. alba stolonifera* (fiorin)—is usually included in a mixture of seeds for permanent pasture. *A. canina* (Rhode Island bent grass) is another perennial grass of use for lawns, as it makes a dense sod. It differs from the other perennial bent grasses in that its spikelets are provided with awns.

Bentham, GEORGE (1800-84), English botanist, nephew of Jeremy Bentham, to whom he was for some time secretary, produced (1827) *Outlines of a New System of Logic*, containing the first clear statement of the doctrine of the quantification of the predicate—a discovery commonly attributed to Sir W. Hamilton. From 1832 he devoted himself exclusively to his favourite study of botany. He was president of the Linnæan Society (1863–74). His best-known work is his *Handbook to the British Flora* (1858); but his greatest achievement is his share, the major portion, of the epoch-making *Genera Plantarum* (3 vols. 1862–83) with Sir Joseph Hooker. Besides this, his *Labiatarum Genera et Species* (1833-6) and *Flora Australiensis* (5 vols. 1863-70), in conjunction with Ferdinand von Müller, were also important works.

Bentham, JEREMY (1748-1832), one of the most productive and influential of English writers on politics and jurisprudence. The son of a prosperous London attorney, he was sent to Westminster School, and subsequently to Queen's College, Oxford, and entered (1763) Lincoln's Inn. His first important work was *A Fragment on Government*, in 1776. A daring attack on the accepted theories so floridly expressed by Blackstone in the first volume of his *Commentaries*, it had a great and immediate success. Like all Bentham's works, it is distinguished by a reckless contempt for time-honoured formulæ. It has also qualities not often found in his later writings—*viz.* terseness and simplicity of expression. In the year 1789 Bentham published his *Introduction to the Principles of Morals and Legislation* (new ed. 1871), perhaps his most comprehensive work. It covers a wider ground than the *Fragment on Government*, for it expounds the principles by which, in his view, the whole conduct of private citizens and rulers alike should be guided. These principles are summed up in the famous word 'utility,' which coincided with the augmenting of pleasure and the diminishing of pain. Thus, 'the greatest good of the greatest number' should, according to Bentham, be the ruler's motto. In 1785 he visited Russia, to see his brother, Samuel Bentham, then engaged in the service of the Czar. From Russia he brought back his famous idea of a *Panopticon*, or model prison, which occupied him for many years. In 1792 he came into an easy fortune by the death of his father. On the outbreak of the French revolution he threw himself with enthusiasm into the voluntary work of advising the leaders of the revolutionists. When he visited Paris in 1823, he was received with the utmost honour. The reform of the poor law, the amplification of judicial procedure, the recasting of the law of evidence, were some of the more important subjects which occupied his long years of untiring industry at Ford Abbey, in Wiltshire, a charming country house to which he retired in 1814, and where he spent the remainder of his life. See Bowring's *The Works of Jeremy Bentham* (11 vols. 1843)—the last two contain materials for a biography (Clarendon Press); Dumont's *Introduction to the Principles of Morals and Legislation* (trans. Hildreth, 1840; new ed. 1896); F. C. Montague's *Fragment on Government* (1885); J. Hill Burton's *Benthamiana* (1843); and Rush's *Residence at the Court of London* (1872).

Bentham, SAMUEL (1757–1832), naval architect and inventor, born in London, brother of Jeremy Bentham: learned shipbuilding, travelled in Russia and Siberia, and became a lieut.-colonel in the Russian service. Returning to England (1795), he revolutionized shipbuilding and dockyard administration. In 1814 he removed to France, where he died.

Benthamia, a species of the Cornaceæ, whose flowers are generally white, more rarely yellow; bears fruit of a fleshy or juicy drupe, with one or two celled stones. *Benthamia fragifera* is a native of Nepaul.

Bentinck, WILLIAM (1649–1709), first Earl of Portland, was descended of good family in Holland. Throughout life the most trusted agent of William III. of England, he was employed in negotiations with the German princes previous to William's landing, and subsequently in negotiating the peace of Ryswick and the two partition treaties of 1698 and 1700. For his share in these last his impeachment was voted by the Commons (1701), but was not proceeded with. He was created Baron Cirencester, Viscount Woodstock, and Earl of Portland in 1689.

Bentinck, WILLIAM HENRY CAVENDISH (1738-1809), third Duke of Portland, twice prime minister; headed the recalcitrant Whigs who defeated the Shelburne administration after the death of Lord Rockingham; and became premier, with Fox and Lord North as secretaries of state (April to December 1783). He acted as home secretary under Pitt (1794-1801). In 1807 he again became premier, with Canning and Castlereagh as subordinates. Their quarrels brought about his resignation in 1809.

Bentinck, LORD WILLIAM CAVENDISH (1774-1839), governor-general of India, son of the third Duke of Portland, acted as governor of Madras (1803-7), saw service in the Peninsula under Moore, and commanded the British forces in Sicily (1811-14). He was governor of Bengal (1827). His governor-generalship of India (1827-35) was marked by financial and legal reforms, the abolition of suttee or widow-burning, the suppression of the Thugs, and by measures directed towards educating the natives and opening a larger share in the government of India to them. See Boulger's *Lord W. Bentinck* (1892).

Bentinck, WILLIAM GEORGE FREDERICK (1802-48), son of the fourth Duke of Portland, and commonly known as Lord George Bentinck. Though elected M.P. for King's Lynn in 1826, the greater part of his life was devoted to the turf, where he did much to raise the tone of racing circles. The exposure of the fraud practised in the Derby of 1844, which was won by a four-year-old called Maccabeus, entered falsely as Running Rein, was principally owing to his exertions. In 1845 he headed the Protectionist party in their opposition to and defeat of Sir Robert Peel, and retained the leadership of the party until 1847, when he retired. See Disraeli's *Lord George Bentinck: a Political Biography* (1851; 8th ed. 1872); J. Kent's *Racing Life of Lord G. Bentinck* (1892); J. Rice's *Hist. of the Brit. Turf* (1879).

Bentley, RICHARD (1662-1742), English scholar and divine, was a yeoman's son at Oulton, Yorkshire, and was educated at Wakefield grammar school and St. John's College, Cambridge. In 1682 headmaster of Spalding grammar school, he afterwards delivered, at Oxford, the Boyle lectures on the Evidences of Natural and Revealed Religion. In 1691 he published his exhaustive *Letter to Mill* on the Greek chronicler John Malelas, and in 1699 his famous *Dissertation on the Epistles of Phalaris.* Two years previously Bentley had appended to a second edition of Wotton's *Reflections on Ancient and Modern Learning* a few notes demonstrating the spuriousness of the reputed epistles. Atterbury and Smallridge had replied, and were aided by the powerful pen of Swift, in *The Battle of the Books.* Then Bentley published his *Dissertation,* proving that the epistles were forgeries of about the 14th century. In 1700 he was appointed master of Trinity College, Cambridge, and in 1717 regius professor of divinity. His life at Cambridge was one of unceasing warfare with the authorities; but although he was nominally deprived of his university degrees in 1718, and deposed from his mastership in 1734, he contrived to hold on to both until his death. In 1711 Bentley edited *Horace,* in 1726 *Terence,* and in 1732 *Paradise Lost.* In 1720 he propounded a scheme for printing an edition of the Greek New Testament, in which the received text should be corrected by a careful comparison with the Vulgate and all the oldest existing Greek MSS. But Bentley's principles of criticism met with opposition from his contemporaries, though they have since been adopted by Biblical scholars. After his death appeared his *Discursus on Latin Metres, Remarks upon a late Discourse of Free Thinking* (1743), and *Eight Sermons preached at the Hon. R. Boyle's Lectures* (1724), etc. See Bentley's *Life* by Bishop Monk (1833); *Correspondence,* edited by C. Wordsworth, bishop of Lincoln (1842); Dyce's unfinished edition of his works (3 vols. 1836-8); and R. C. Jebb's *Bentley,* in 'English Men of Letters' (1882).

Benton, THOMAS HART (1782-1858), American statesman, born at Hillsborough, N. Carolina; proceeded to St. Louis (1815), studied law, and was elected to the Senate, representing Missouri for thirty years (1820-50). He wrote *A Thirty Years' View* of the American government, from 1820 to 1850 (2 vols. 1856), and published *Abridgment of the Debates in Congress, 1789-1850* (15 vols. 1857). See Roosevelt's *T. H. Benton* (1887).

Benue, riv., W. Africa, rises in Adamawa, flows W. with a northerly curve, and enters the Niger from the left, nearly opposite Lokoja. Navigable about 600 m. (above Yola) for boats of 5 ft. draught. See *Proc. Roy. Geog. Soc.,* 1891, pp. 448-465 and 512.

Ben Venue, mt. (2,393 ft.), par. Aberfoyle, Perthshire, Scotland, 10 m. W. by S. of Callander; overlooks S. end of Loch Katrine, in the centre of the Trossachs. See Scott's *Lady of the Lake.*

Benvenuto, properly TISIO DA GAROFALO (1481-1559), Italian painter, last of the Ferrara school, called 'the miniature Raphael.' He assisted (1509) Raphael at the Vatican, then returned (1512) to Ferrara, and became partly blind. He adopted the Roman manner, sometimes producing great splendour of colouring. A gillyflower (*garofalo*) was often his signature. His chief works are at Ferrara, and in the London, Edinburgh, Dresden, Milan, Munich, and Berlin National Galleries. Private owners are the Duke of Buccleuch and Earl Northbrook. See S. Brinton's *Renaissance in Italian Art* (1903).

Benyowsky, MAURICE AUGUST, COUNT DE (1741-86), born at Verbova, Hungary; joined the Austrian army; was present at the battles of Lobositz (1756) and Prague (1757); went to Poland, joined the Polish Federation (1767), and being taken prisoner (1769) was sent to Kamchatka. Escaping, he reached France in 1772; and in an attempt to found a French colony in Madagascar (1774) he was made king by the natives (1776). In 1786 he fell in battle, leading his Malagasy followers against the French. See *Memoirs and Travels* (2 vols. 1790; new ed. 1893), whence Kotzebue derived the materials for his drama, *Die Verschwörung in Kamtschatka* (1791).

Benzaconine, an alkaloid formed by the partial hydrolysis of aconitine.

Benzaldehyde. See ALMONDS, OIL OF.

Benzene, or BENZOL (C_6H_6), is a hydrocarbon in which six carbon atoms are symmetrically arranged in a ring, one hydrogen atom being attached to each carbon atom. Benzene is obtained from coal tar, being separated in the first place by fractional distillation, which, however, does not yield a quite pure product. The commercial benzene sold as '90 per cent.,' '50 per cent.,' etc., points to the proportion that distils under 100° C.; and as pure benzene boils at 80° C., '90 per cent. benzene' contains about 70 per cent. of benzene. Benzene is a light (sp. gr. ·88), colourless, mobile liquid with a peculiar odour. It melts at 6° C., and is insoluble in water, but dissolves in alcohol, paraffins, and the like, and is itself a good solvent of fatty, resinous, and other substances that do not dissolve in water. It is very volatile, and burns in air with a smoky, luminous flame. Benzene is the parent substance of the aromatic series of organic compounds, yielding innumerable derivatives by the substitution of alkyl and other groups for the hydrogen atoms. The 'ring' of carbon atoms, of which its molecule is formed, is very stable, and, owing to its symmetrical arrangement, yields but one mono-substitution product of each kind, three isomeric di-substitution products, etc. Of the benzene derivatives, which are in general characterized by being better marked, crystallizing, etc., better, and being more reactive than the 'fatty' derivatives, nitro-benzene (obtained by the action of nitric acid on benzene) and aniline (obtained by the reduction of nitro-benzene) are among the more important. Benzene is used commercially as a solvent, and for the preparation of its derivatives, which are largely employed in the colour industry.

Benzine. See BENZOLINE.

Benzoic Acid (C_6H_5COOH) is an aromatic acid, occurring in gum benzoin, storax, Peru and Tolu balsams. It may be obtained from benzoin by sublimation, but is almost exclusively prepared from the toluene of coal tar by chlorination, followed by heating with milk of lime. Benzoic acid is a volatile crystalline solid, which, though not very soluble in cold water, readily dissolves if heated. Its vapours have a peculiar odour, which produces an irritating effect on the lungs. Benzoic acid forms a series of salts, the benzoates, which, like the acid, are employed in medicine. It acts as an antiseptic and expectorant, though the acid itself and its salts are antipyretic.

Benzoin, GUM BENZOIN, or GUM BENJAMIN, a balsam obtained from *Styrax benzoin,* a thick-stemmed tree found in Java and Sumatra. It is extracted from the trees, when they are six to eight years old, by incision with a knife; the resin exudes, and is allowed to remain till it hardens into reddish-brown brittle tears, which are subsequently scraped off. The gum has an agreeable odour; when heated it fuses and gives off white vapours of benzoic acid. It is principally used as incense, and in the preparation of fumigating pastilles. There are several officinal preparations in which benzoin is present, but the most important are the compound tincture of benzoin, friar's balsam, and benzoic acid, to which the characteristic effects are due. Externally all the benzoin preparations are stimulant and antiseptic, and friar's balsam in particular is a popular remedy for ulcers and wounds. Internally they are pungent, antiseptic stimulants, and are used for this purpose in diseases of the urinary organs, and as inhalations in phthisis and bronchitis.

Benzoline, or Benzine, is a mixture of the lower boiling paraffin hydrocarbons, and is known also as petroleum spirit or naphtha. It is obtained by the distillation of American or Russian petroleum, or of Scottish shale oil. There has been much confusion, due to the similarity of the name, of this product with benzene or benzol. Like benzene, it dissolves oils, waxes, and resins, and is a light, colourless liquid, with an ethereal odour and a low boiling-point. It is used as a solvent, as the source of the combustible vapour in explosion engines, and in some lamps; but it should be used with great care, because of the inflammability of its vapour.

Benzyl Chloride ($C_6H_5CH_2Cl$) is obtained by passing chlorine into boiling toluene. It is a pungent-smelling liquid, which is converted into benzyl alcohol on heating with water, and is used, like benzal chloride ($C_6H_5CHCl_2$) and benzo-trichloride ($C_6H_5CCl_3$), both produced in a similar way, in the colour industry.

Beograd. See Belgrade.

Beöthy, Zoltan (1848), Hungarian author, born at Komorn; professor (1882) of the fine arts at Budapest University. Since 1870 he has published several meritorious novels; a good *History of Hungarian Literature* (trans. German, 6th ed. 1891); a *History of Hungarian Prose* (trans. German, 2 vols. 1886), crowned by the Kisfaludy Society. He is a member of the Hungarian Academy.

Beowulf, a famous English epic. The poem is rich in the accurate and picturesque portrayal of the daily life of our early ancestors. Hygelac is the Chocilaicus of the *Gesta Regum Francorum* of Gregory of Tours; his historical raid, referred to four times in the poem, occurred between 512 and 520 A.D. Doubtless there was also a real Beowulf, but in the adventure with the dragon he has probably been made to usurp the place of the mythical Beowa found in several old genealogies. It is certain that we must allow for a long interval between 520 A.D. and the composition of the poem in its present form: for Beowulf is represented as reigning for fifty years; his fame had to become the common possession of the Teutonic peoples; the welding of the historical and mythical elements implies a considerable further lapse of time. On the other hand, a downward limit seems to be clearly given by the mention of the Merovingian king in line 2,921, for that dynasty ceased in 752 A.D. On the whole, the latter part of the 7th century would seem to be the likeliest date of composition. Opinion is trending strongly in favour of a single author, as against the *Liedertheorie* of Müllenhoff, who postulated six different authors. The scene of the poem is certainly Denmark and Sweden, and it is equally certain that the author was an Englishman. See text, edited by Zupitza (Early English Text Society, 1882), and by Wyatt (Cambridge Press, 2nd ed. 1898); translations by William Morris and Wyatt, and by Dr. Clark Hall (1895). See also T. Arnold's *Notes on Beowulf* (1898); Stopford A. Brooke's *Eng. Lit. to the Norman Conquest* (1898); Ten Brink's *Beowulf-Untersuchungen* (1888); Sarrazin's '*Beowulf-Studien*' (1888) and '*Neue Beowulf-Studien*' (in *Englische Studien*, xxiii.); Müllenhoff's *Beowulf-Untersuchungen* (1889).

Bequeath. Although, strictly speaking, one 'bequeaths' personal and 'devises' real estate, the former word is wide enough to carry real estate if distinctly applied to it.

Berabra, Nubian people living on both banks of the Nile from Assuan to Wadi Halfa, and scattered south in Kordofan, Dar Fur, and on the banks of the Blue and the White Nile. They number about 50,000, and are industrious agriculturists, and trustworthy. Some wrongly consider them descendants of the old Egyptians, for their speech and negroid features show that they came originally from Kordofan. Although they early adopted Christianity, they became Mohammedans in 1320. In 1810 they were subjugated by Mehemet Ali of Egypt.

Béranger, Pierre Jean de (1780-1857), the greatest of French song-writers, was born in Paris. Having settled in Paris, he devoted himself to literature, and conceived great poetic schemes while starving in a garret. In 1804 he appealed for assistance to Prince Lucien Bonaparte, who gave him £40 a year. In 1806 the poet Arnault secured Béranger a clerkship in the office of the Imperial University, which brought him in another £40 annually. By the year 1812 the poet had found his real vocation—that of a national song-writer. Such songs as the world-renowned *Petit Homme Gris* were succeeded in 1813 by the *Roi d'Yvetot*, which caused a perfect *furore*. In 1815 appeared *Chansons Morales et Autres*, including the patriotic pieces, *Les Enfants de la France*, *Le Cinq Mai*, and *Le Vieux Drapeau*, and songs full of biting sarcasm and bitter hostility to the priests and other like reactionaries (*e.g. Les Révérends Pères*, *Le Ventru*, *Paillasse*). The appearance of the second volume in 1821 led to Béranger being tried, and condemned to three months' imprisonment. This made him the popular idol, and he exercised more political influence than any man of his time. In 1825 Béranger published *Chansons Nouvelles*, and in 1828 *Chansons Inédites*, for which he was tried, fined 10,000 francs, and condemned to nine months' imprisonment in La Force. He was visited in his cell by Hugo, Dumas, Sainte-Beuve, and others. In 1857 appeared his fifth collection, *Dernières Chansons*. The royalists had on many occasions vainly tried to bribe him, and he also afterwards rejected offers by Napoleon III. In character he was disinterested, simple, and just. His songs were instinct with humanity, and overflowed with wit, humour, noble and true sentiment, and pathos. See his *Ma Biographie* (1857); Janin's *Béranger et son Temps* (1866); *One Hundred Songs*, trans. by W. Young (1847); *Œuvres Complètes* (3 vols. 1859-76); W. H. Pollock's *French Poets* (1879).

Berar. See Haidarabad.

Berat, or Bielagorad, tn., prov. Janina, Albania, Turkey, 30 m. N.E. of Avlona and 50 m. S.E. of Durazzo, near the site of the ancient Elyma; is the seat of a Greek archbishop. Two-thirds of the inhabitants are Greeks. Pop. 10,000.

Berber, tn., Nubia, Egypt, on r. bk. of Nile, 30 m. N. of its confluence with the Atbara, and nearly 200 m. N. of Khartum. Pop. 10,000.

Berbera, seapt. on G. of Aden, cap. of British Somaliland, 160 m. E.S.E. of Zeyla; has a good harbour. Annual fair lasts from October to April, when caravans with the produce of the interior crowd to town. At that period the population increases from 4,000 to between 20,000 and 30,000. It was occupied by Britain in 1875.

Berberidaceæ, an order of 135 species of plants, placed between the buttercup and laurel orders, and found in temperate regions of both hemispheres (except in Africa and Australia), also in tropical mountains such as the Himalayas. Common barberry (*Berberis vulgaris*) is the only native British species. Nearly fifty evergreen and twenty deciduous species have been introduced into Britain, most of them quite hardy. All the species of the genus

Berberis are shrubby. The flowers of the order are mostly yellow; the perianth leaves are usually in sets of threes, of which the inner have honey-glands like the petals of buttercups. The stamens are usually six; the pollen escapes from the anthers by valves, as in laurels. Common barberry, found in Europe, Asia, and N. America, is used in hedges, on account of its compact habit and its persistent spiny leaves; but the ordinary foliage leaves are deciduous. It also forms an ornamental bush, especially in autumn, when its graceful pendulous racemes of small yellow and scarlet berries produce a flame of colour. Its use as a hedge is restricted, however, by the attacks of a parasitic cup fungus (*Æcidium berberidis*), the spores of which are blown to fields of wheat, and cause 'rust of wheat,' which is a second stage of the fungus, known as *Puccinia graminis;* it may also attack other cereals and grasses. At the same time, the fungus can be propagated in the absence of barberry; for rust may develop after wintering, in the spore stage, on species of Gramineæ. There are five species of the genus Podophyllum; the best known is *Podophyllum peltatum*, the 'American mandrake' or 'May apple;' its rhizomes yield a resin which is a powerful biliary purgative. All the species are astringent. The bark of many species is used for tanning, and dyes are obtained from the roots.

Berbers: Kabyle Pottery, Kabyle Types, and Berber Houses.

Berbers, a people of Hamitic race ranging over N. Africa southwards to the Senegal, forming three-fifths of the population of Algeria, and a still larger proportion of the people of Morocco. Till the ingress of the Arabs in the 1st and 2nd centuries the Berbers had Mauritania for their exclusive habitat. The Moslem invasions of the 7th and 11th centuries drove them inland into the Atlas Mts., and imposed on them their religion, and in many places their language and usages. They have thus been largely assimilated to the kindred Arabs, from whom they can often be distinguished only by their somewhat coarser features and less finely shaped oval head. Blue eyes and light hair are prevalent in many parts of Morocco, Algeria, and the Sahara, whence the now widely-accepted view that the Berbers form the original stock of the European races. The term 'Afro-European' has been introduced to express this relation. Sharing the Arab's sense of personal dignity, the Berber, less fanatical, is more settled and more given to husbandry and manufacture. The Berbers, who are believed to represent the Tamahu of the Egyptian monuments, comprise four main divisions—the Kabyles of Algeria and Morocco, as far south as Fez; the Shellala (Shuluhs) of the upland Atlas valleys; the Haratin (Black) Berbers of the south Atlas slopes; and the Saharan Tuaregs. The Imazighen ('freemen,' 'nobles'), as the Berbers generally call themselves, number collectively perhaps 8,000,000. See Ibn Khaldun's *Hist. des Berbères* (1847-51); Rinn's *Les Origines Berbères* (1889); A. Wilkin's *Among the Berbers* (1900); E. Barclay's *Mountain Life in Algeria* (1881).

Berbice. (1.) River of British Guiana, 350 m. long, with a drainage area of 13,500 sq. m. Vessels drawing 7 ft. can ascend the river for 175 m. The bar has only 7 ft. of water on it at low-water springs. The Berbice enters the Atlantic N. of New Amsterdam. In 1836 Schomburgk discovered on its upper waters the beautiful Victoria regia. (2.) A division of British Guiana, drained by the river of the same name. It has fertile soil, and produces cocoa, vanilla, and tobacco. Chief town, Berbice or New Amsterdam. Pop. 50,000-60,000.

Berceo, GONZALO DE (fl. 1220-60), Spanish poet, one of the earliest and most prolific of sacred poets in the vernacular, but drawing his inspiration largely in form from the troubadour school of

Langue d'Oc, especially from Gautier de Coinci. His long narrative and devotional poems are written in the monotonous four-rhymed verse (*quaderna via*), the most remarkable being the *Vida de Santo Domingo de Silos*, *La Estoria de Sant Millan*, *Milagros de Nuestra Señora*, and *Vida de Santa Oria*. Berceo is considered the founder of modern Spanish verse. See Amador de los Rios's *Historia de la Literatura española* (1841), and Ticknor's *Hist. of Span. Lit.* (1849).

Berceuse ('cradle song'), a melody with a lulling, rocking accompaniment.

Berchem, suburb of Antwerp, Belgium. Pop. (1900) 19,962.

Berchem, or BERGHEM (1620-83), properly NICOLAAS (or CLAAS) PIETERSZ, Dutch painter, son of Pieter Claas, painter, was a pupil and follower of Weenix. He generally painted Italian scenery, though he lived in Holland. Pictures by him are in the Wallace collection, the National, Edinburgh, Dulwich, and most Continental galleries. See Havard's *Dutch School of Painting*.

Berchet, GIOVANNI (1783-1851), Italian poet, whose influence, both on the Italian romantic school and on the political ideas of his countrymen, was considerable. He was an exile from 1829 to 1848, and on his return home in the latter year was made Minister of Education in Milan. His works, among which are the *Profughi di Parga* (1824) and *Fantasie* (1829), were collected and prefaced with a biography by F. Cusani (1863). See, too, G. Bustelli's *Della Vita e degli Scritti di G. Berchet* (1841); M. Pasanisi's *G. Berchet* (1888); V. Imbriani's '*G. Berchet e il Romanticismo Italiano*,' in the *Nuova Antologia*, vol. viii. (1863).

Berchta, BERGDA, or BERTHA, a female being in European (chiefly Teutonic) tradition, whose fête-day occurs on or about Epiphany. She is described as a shaggy monster, with broad 'goose feet,' a long nose (or, according to some accounts, an *iron* nose), who walks round the house at night and tears bad boys to pieces. She rules over night-hags, enchantresses, elves, dwarfs, and the souls of unbaptized children. See Grimm's *Teutonic Mythology* (1879-88), Simrock's *Bertha die Spinnerin* (1853), and W. Müller's *Mythologie der deutschen Heldensage* (1886).

Berchtesgaden, tn., dist. Upper Bavaria, Bavaria, situated at an alt. of 1,875 ft., between the Untersberg and Watzmann, 29 m. by rail S. of Salzburg in Austria; a favourite summer resort. It produces large quantities of salt, and is famous for its wood-carving (crucifixes, etc.). Here are a royal (Bavarian) castle and a modern royal villa. Pop. (1900) 2,634.

Berck, or BERCK-SUR-MER, seaside resort, dep. Pas-de-Calais, France, 22 m. S. of Boulogne, with a sulphur spring and children's hospital belonging to the city of Paris. Pop. (1901) 7,799.

Berdichev, tn., Kiev gov., Russia, 115 m. by rail W.S.W. of Kiev; iron foundry, tobacco, ribbons, etc.; capital of the fanatical Hebrew sect of the Khasidim. Pop. (1897) 53,728.

Berdyansk, best harbour of the Sea of Azov, on N. side (much improved since 1896), cap. of a dist. in Taurida gov., Russia, 265 m. N.E. of Simpheropol, on the Bay of Berdyansk. The town was only founded in 1827, but it has progressed rapidly, and is a great centre of grain trade, to less extent of salt and coal. Large manufacture of reaping-machines. Pop. (1897) 27,279.

Bere. See BARLEY.

Berea. (1.) A suburb and park at Durban, or Port Natal, Natal, beautifully situated above the harbour. (2.) A magisterial district in Basutoland, containing the mission station of Berea, a few miles E. of Maseru.

Bereg, co. of Hungary, in the N., from the river Tisza (Theiss) to the Carpathians. It is full of forests, and iron and alum are mined. Area, 1,440 sq. m. Pop. (1900) 207,647, nearly one-half being Ruthenians and one ninth Germans, the rest Magyars. Chief town, Beregszasz.

Beregonium, a misprint for Ptolemy's *Rerigonium*, a town of the Novantæ, a tribe of Galloway, Scotland. Boece and Hollinshed place Beregonium in Lochaber, Argyllshire; and it has been identified with the vitrified 'fort of the sons of Uisnach.' See Dr. Angus Smith's *Loch Etive* (1879).

Beregszasz, tn. of Hungary, chief town of co. Bereg, 93 m. by rail S.E. of Kaschau. Pop. (1900) 9,609.

Berendt, GOTTLIEB (1836), German geologist, published in 1863 the first geological chart of Brandenburg, and became (1875) professor at Berlin University. Berendt specially investigated the geology of the N. German plain, and was one of the first exponents of the glacial theory. He has written *Geognostische Beschreibung der Umgegend Berlins* (1885), and *Die Theorie Darwins und die Geologie* (1870), in which he opposes the Darwinian theory.

Berengar I., king of Italy (d. 924), crowned king in 887, and emperor of the West in 915. His reign was marked by successive struggles with his own turbulent nobles, and with invading Saracens, Hungarians, and Burgundians. In 904 he took prisoner Louis, king of Lower Burgundy, and deprived him of his sight, but suffered a crushing defeat at the hands of Louis's successor, Rudolf, in 923. Berengar was assassinated at Verona in the following year.—BERENGAR II., son of Albert, Marquis of Ivrea, and grandson of Berengar I., was crowned king in 950. His rule was arbitrary, and in 961 he was deposed by Otto I., emperor of Germany, and sent to Bamberg, where he died in 966.

Berengaria (d. after 1230), queen of Richard I. of England, daughter of Sancho VI. of Navarre; was married by the king in Cyprus, whither his mother, Eleanor, had brought her, while on his way to the crusades (May 12, 1191). Leaving Acre in 1192, she proceeded to Rome and Poitou after her husband's capture. She rejoined him in 1195. After Richard's death she resided at Le Mans as countess. See Strickland's *Lives of the Queens of England* (new ed. 1851-2).

Berengarius OF TOURS (998-1088), theologian, born at Tours; became director of the cathedral school. Developing liberal views concerning transubstantiation, he was condemned by a Romish synod, and was imprisoned by Henry I. of France. Rescued by friends, in 1059 he reached Rome, where he retracted his views, but, returning to Tours, promulgated them anew. Persecuted by Pope Gregory VII. and Lanfranc of Canterbury, he retired to St. Côme, near Tours, where he spent the rest of his days. A selection from his works was published by Vischer in 1834. See Lessing's *Berengarius Turonensis* (1770).

Berenice (mod. *Sakayt-el-Kubla*), anc. seapt. on W. of Red Sea, Egypt, 20 m. S.W. of Cape Ras Benas; founded (225 B.C.) by Ptolemy II.; was once a very important trading centre. Numerous interesting sculptures and inscriptions have been found here.

Berenice, a Macedonian form of the Greek *Pherenice* ('bringer of victory'), was a name borne by several queens of the Ptolemies in Egypt, of whom the best known was the wife of Ptolemy III. (Euergetes, 247-222 B.C.). She dedicated her hair to the gods, to procure a safe return for her husband from an expedition to Syria, and it was said to have become the constellation *Coma Berenices* ('Berenice's hair'). She was put to death by her son, Ptolemy IV. (Philopator), when he succeeded to the throne. See Mahaffy's *The Ptolemies* (1896).

Berenson, BERNHARD (1865), historian and critic of Italian painting, born in Vilna, Russia. Among his works are *Venetian Painters of the Renaissance* (1894); *Florentine Painters of the Renaissance* (1897); *The Study and Criticism of Italian Art* (1901); *Lorenzo Lotto* (1903)—all in English.

Beresford, Sir John Poo (1766-1844), British admiral, a natural son of Lord de la Poer, first Marquis of Waterford. In 1795, as acting captain of the *Hussar*, on the N. American station, he engaged five French store ships, and captured two. As captain of the *Raison*, he captured, in 1797, a Spanish treasure ship near the Bahamas. In 1809 he was present, in the *Theseus*, at the action in Basque Road. In 1814 he reached the rank of rear-admiral, and was made a baronet; in 1819 K.C.B., and in 1838 an admiral. He represented various constituencies in Parliament between 1809 and 1835.

Lord Charles Beresford.

(*Photo by Dinham, Torquay.*)

Beresford, Lord Charles William De la Poer (b. 1846), British rear-admiral, a son of the fourth Marquis of Waterford; entered the navy in 1859, became a captain in 1882, and attained post rank in 1897. He commanded the *Condor* at the bombardment of Alexandria in 1882; commanded the naval brigade at the battles of Abu Klea, Abu Kru, and Metammah; and took the steamer *Safia* up the Nile to the rescue of Sir Charles Wilson's party. In 1875-76 he accompanied the Prince of Wales (Edward VII.) as naval A.D.C. to India. From 1874 to 1880 he represented Waterford in Parliament; from 1885 to 1889, Marylebone; from 1898 to 1900, York; and in 1902 he became M.P. for Woolwich. From 1886 to 1888 he was a lord of the Admiralty, resigning on the ground that his colleagues were not providing for the proper organization of the navy. In 1900 he was second in command in the Mediterranean. In 1903 he resigned his seat in Parliament on his appointment as admiral of the Channel Fleet. In 1905 he became commander-in-chief in the Mediterranean. He was associated with Mr. H. W. Wilson in the compilation of a *Life of Nelson* (1898). He has also visited and written about China—*The Break-up of China* (1899).

Beresford, William Carr, Viscount Beresford (1768-1854), British general, saw service at Toulon with Hood; in Corsica, Egypt, and the Cape (1805); and commanded the regular troops when Sir Home Popham seized Buenos Ayres in 1806. After these troops were captured, Beresford made his escape (1807), and served in the Peninsula under Moore. In 1809 he undertook the reorganization of the Portuguese army, helped to win the battle of Busaco (1810), commanded at the battle of Albuera (1811), and took part at Badajoz (1812), Salamanca (1812), and Toulouse (1814). He was made a baron in 1814, and a viscount in 1823. See J. W. Cole's *Peninsular Generals;* Napier's *Peninsular War.*

Berezin, Elias Nicolaievitch (1818-96), Russian Orientalist and traveller, began in 1842 a series of journeys in Asia Minor, Persia, Egypt, and afterwards (1848) in Siberia, for linguistical and ethnographical studies. From 1855 he was professor of the Turkish language at St. Petersburg University, director of the Oriental Numismatic Museum in St. Petersburg, editor of the Oriental part of the great Russian *Encyclopædia*, and published several important books in Russian. The only book in French is *Recherches sur les Dialectes Musulmans* (2 vols. 1848-53).

Berezina, riv. of Minsk gov., Russia, joins the Dnieper after a course of 340 m.; famous for the disastrous passage of the French Grand Army during its retreat (1812). The Berezina Canal unites the river with the W. Dvina.

Berezna, tn. of Chernigov gov., 24 m. E.N.E. of Chernigov city, cap. of a dist., with candle and brick manufactures. Pop. (1897) 10,790.

Berezov, dist. tn. of Tobolsk gov., Russia, 706 m. from Tobolsk, on the river Sosva. It trades in furs, mammoth ivory, cedar nuts, and salt and dried fish. It is one of the worst places to which political prisoners have been exiled. Pop. (1897) 1,073.

Berezovsk, vil., gov. Perm, Russia, on E. slope of Ural Mts., 15 m. N.E. of Ekaterinburg; has gold mines and washings, known since 1744.

Berg, a suburb of Stuttgart, Würtemberg, Germany, situated on the Neckar, with mineral springs, and seats (Rosenstein, Wilhelma, Villa in Berg) belonging to the royal family. There are iron works, woollen mills, and dye works. Pop. (1900) 5,691.

Berg, DUCHY OF, a former duchy of Germany, situated on the r. bk. of the Rhine, between Cologne and Koblenz, with an area of over 1,000 sq. m., and a pop. of over 250,000. It was created a duchy in 1101, and in 1423 became united with the duchy of Jülich (Juliers). In 1806 it was ceded to France, and Napoleon made it a grand-duchy under Joachim Murat. At the same time it was enlarged to an area of 6,700 sq. m., with a pop. of 900,000. Its capital was Düsseldorf. At the Congress of Vienna in 1815 it was ceded to Prussia.

Berga, tn., 52 m. N.W. of Barcelona, Spain. Pop. (1900) 5,465.

Bergaigne, ABEL (1838-88), French Orientalist and philologist, born at Vimy (dep. Pas-de-Calais). He was, in 1868, appointed reader in Sanskrit, and later director, at the *Ecole des Hautes Etudes* at Paris; afterwards became professor of Sanskrit and of comparative grammar at the Sorbonne. Among his numerous works are *Essai sur la Construction Grammaticale* (1873); *La Religion Védique d'après les Hymnes du Rig-Veda* (1878-83); *Les Inscriptions Sanscrites du Cambodge* (1882); *Chronologie de l'Ancien Royaume Khmêr* (1884); *Manuel pour étudier la Langue Sanscrite* (1884); *Etudes sur le Lexique du Rig-Veda* (1885); and several translations from the Sanskrit. After his death appeared *Manuel pour étudier le Sanscrit Védique* (1890), by him and V. Henry. See V. Henry's *L'Œuvre d'Abel Bergaigne* (1889).

Bergama, tn., Anatolia, Asia Minor, 50 m. N.W. of Smyrna; occupies site of ancient *Pergamos*. Pop. over 6,000.

Bergamo. (1.) Prov., N. Italy, partly in the Lombardy Plain and partly in the Dolomite Alps, with pastoral, agricultural, and manufacturing (silk, cloth, machinery) pursuits. The people are the stupid, cunning rustics of the Italian stage. Area, 1,092 sq. m. Pop. (1901) 457,983. (2.) Anc. *Bergomum*, tn. and episc. see of Italy, cap. of prov. Bergamo; stands at the foot of the Alps, 34 m. by rail N.E. of Milan, and consists of a mediæval old town crowning a hill 480 ft. above the new town. In the former, among other buildings, are the cathedral (begun in 1350), a 9th century church with the tomb of Donizetti, and the library of the Broletto (1354). The business quarters are in the new town, the chief industries being the manufacture of cottons, silks, cloth, hats, paper, and metal wares. Its churches and the Carrara Academy contain paintings by Lorenzo Lotto, Moroni, Romanino, and other artists of the Lombard school. Donizetti, Mai (the philologist), Lorenzo Lotto, the elder Palma, Moroni, Torquato Tasso, and Count Thurn and Taxis were either natives of Bergamo or were intimately connected with it. Pop. (1901) 46,861.

Bergamot, a variety of the sweet orange (*Citrus aurantium*, var. *bergamia*) due to cultivation. From it is extracted oil or essence of bergamot, used in perfumery. The orange is cultivated chiefly in Italy and France. (See De Candolle's *Origin of Cultivated Plants*, 1884.) Certain varieties of pear, whose flavour recalls that of bergamot, are called by this name.

Bergedorf, tn. in the German free state of Hamburg, on the Elbe, 10 m. by rail S.E. of Hamburg. Its market gardens supply Hamburg, and it also produces beer, leather, glass, and bricks. Pop. (1900) 10,250.

Bergen, the Flemish name of Mons in Belgium.

Bergen (formerly *Björgvin*), fortified tn. and bishop's see, on the Byfjord in Norway, 60° 24′ N. and 5° 18′ E., built on a peninsula separated from the mainland by the narrow Buddefjord. Long the chief port of Norway, it has latterly given way to Christiania. Its total trade amounts annually to over four millions sterling, the imports representing 72 per cent. of this. Of the exports fish are the principal commodity (£742,300 in 1900). The merchant fleet numbers over 350 vessels, with some 150,000 tons. Chief public buildings the cathedral and the ancient church of the Holy Cross. Here were born the poets Holberg (1684) and Welhaven (1807), the violinist Ole Bull (1810), and the musician Grieg (1843). The fish market is interesting; the fish are kept alive in tanks until sold. The harbour is protected against the north-west wind by a mole. Bergen is the chief tourist centre for Western Norway. Historically, Bergen is one of the most ancient and interesting towns in Norway. Founded by King Olaf Kyrre about 1070-75, it was an important trading-place in the 12th century, and attracted the N. German merchants. In 1181 a great naval battle was fought off the headland Nordnes, between Kings Sverre and Magnus. In 1198 the Clerical party of the Bagler besieged King Sverre in his fortress, and there were several battles fought here in the beginning of the 13th century between them and the popular party of the Birkebeiner. The first coronations of the Norwegian kings were held at Bergen, and some were buried there. From 1164 to 1271 several Rigsdags assembled at Bergen. From the middle of the 13th century the Hansa League made its influence felt at Bergen, and in 1343 erected its own factory, which survives in the Tyskebryggen. In 1665 Bergen was the scene of an engagement between the English fleet and the combined Dutch fleet and Norwegian garrison. See Nielsen's *Bergen fra de aeldste Tider* (1877); Jäger's *Bergen og Bergenserne* (1889); and the magnificently illustrated *De Tyske Kontor i Bergen* by Koren-Wiberg (1899-1900), and F. Bruns's *Die Lübecker Bergenfahrer* (1900). Pop. (1900) 72,179.

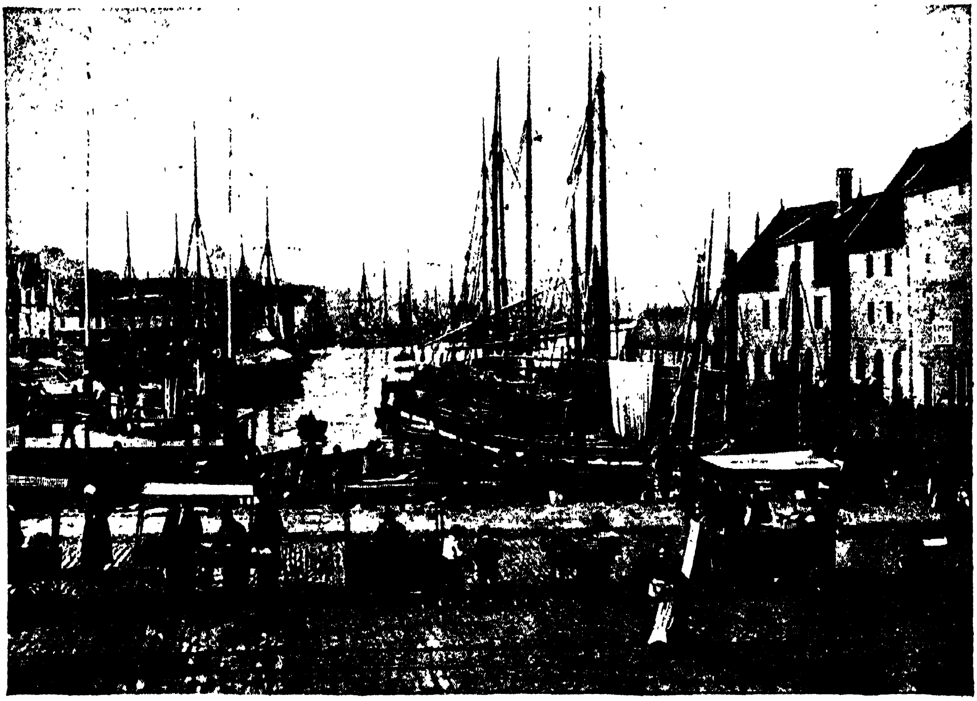
Bergen-op-Zoom, tn., prov. N. Brabant, Netherlands, near the head of the E. Scheldt. It was formerly a strong fortress, and resisted the Spaniards in 1581, 1588, 1605, and 1622, and the English in 1814, but succumbed to the French in 1747. Pottery and bricks are made. Pop. of commune (1899) 13,668.

Berger, ALFRED FREIHERR VON (1853), Austrian critic, born at Vienna; professor of philosophy at its university in 1894; director of the new Deutsches Schauspielhaus at Hamburg (1899). He has published *Dramaturgische Vorträge* (1894), *Studien u. Kritiken* (1900), and *Gesammelte Gedichte* (1891). See also his autobiographical *Im Vaterhaus* (1901).

Bergerac, tn., dep. Dordogne, France, on r. bk. of Dordogne R., 55 m. by rail E. of Bordeaux, is a flourishing industrial place. Besides flour mills, breweries, and paper mills, there are foundries, workshops for the making of railway plant, and chemical factories. The celebrated white wine Montbazillac is produced in the neighbourhood. Bergerac was English in 1450. Pop. (1901) 15,936.

Bergerac, SAVINIEN CYRANO DE (1619-55), French author, born at Bergerac; went to Paris, and served with distinction in the army (1639-41). Always of a turbulent disposition, he fought many duels, mostly in consequence of insulting or satirical references to his unusually large nose. The most famous productions of his pen were *Histoire Comique des Etats et Empires de la Lune* (1656), and a corresponding *Histoire Comique.... du Soleil* (1661), books written in a mocking spirit. Besides these he wrote a satire on Mazarin, a tragedy, *Agrippine* (1653), and one of the earliest French comedies of character in *Le Pédant Joué* (1654). Bergerac is the subject of a modern play by the French poet Rostand; the title rôle was first played (1897) by Coquelin, and by Sir Charles Wyndham at the Criterion Theatre, London. See *Œuvres Complètes* (1858; new ed. 1900). See *Life* by Brun (1893).

Bergh, JOHAN EDVARD (1828-80), Swedish landscape painter, born in Stockholm; the forerunner of the modern school. He studied at the Rhineland Academy in Paris, and in Geneva under Calame. His delicate landscapes are full of sentiment, and are painted with fresh, clear colour. His *View of Uri* is in the Berlin Academy. From 1861 he was professor in the Academy of Stockholm. His son, SVEN RICHARD (1856), is a good landscape and figure painter. See Muther's *History of Modern Painting* (1895-6).



Bergen: the Fish-Market Quay.
(Photo by Valentine.)

Berghaus, HEINRICH (1797-1884), German geographer, professor of mathematics at Berlin (1824-36), and afterwards director of the geographical school at Potsdam. The best known of a vast number of charts is his *Physikalischer Atlas* (1838-48; 2nd ed. 1850-52; 3rd ed. 1886). His nephew, HERMANN (1828-90), German cartographer, born at Herford in Westphalia, was employed from 1850 in Gotha, where he died. He prepared several maps for the atlases of Stieler and Sydow, and published several charts, as *General Map on Mercator's Projection* (1859; 2nd ed. 1869), the 11th edition of the *Chart of the World* (1886), *Physical Map of the Globe* (1874), *Mural Physical Map of Europe* (1875), *Map of the Alps* (1878), *Mural Physical Map of Africa* (1881); and undertook a new edition of the famous *Physikalischer Atlas* of his uncle, Heinrich Berghaus, which was published in Gotha (1866, etc.), and to which he contributed nearly a third of the maps.

Bergk, THEODOR (1812-81), German humanist, born at Leipzig; filled the chair of philology at Marburg (1842), Freiburg (1852), Halle (1857), and Bonn (1869). He is best known for his *Poetæ Lyrici Græci* (3 vols. 1843; 5th ed. 1900), and an incomplete *Geschichte der Griechischen Literatur* (1 vol. 1872), completed by Hinrichs and Peppmüller (3 vols. 1883-7). He also issued editions of Anacreon (1834), Aristophanes (1857), and Sophocles (1858).

Bergman, TORBERN OLOF (1735-84), distinguished Swedish chemist and mathematician. He studied at Upsala, where (1758) he became professor of physics, and subsequently of mineralogy and chemistry. He developed the theory of the determination of chemical processes by the various degrees of affinity between substances, which was corrected by Berthollet in his conclusion that the quantitative difference of the substances concerned is also a factor in such determination. Bergman's scientific papers appeared as *Opuscula Torberni Bergman, Physica, Chemica et Mineralia* (1779-81), and were issued in English (1784-5).

Bergues, tn., dep. Nord, France, 5 m. by canal S. of Dunkirk. The Hôtel de Ville, with remarkable belfry, was built in 1664. Trade in corn, cattle, and butter. Pop. (1901) 5,227.

Bergün (Romansch, *Bravuogn*), a finely-placed vil. and summer resort (alt. 1,335 ft.) in the Swiss canton of the Grisons, on the route over the Albula Pass. It is now 19½ m. by road from Thusis, and 30½ m. from Ponte, in the Upper Engadine. These distances, however, are shortened by the railway under the pass (opened in 1903).

Berg Wind, the name applied along the south coast of Cape Colony to strong, hot, dry northerly winds which belong to the same category as the *föhn* of Switzerland and the *chinook* of Canada. They are frequent during May and August, and usually last for twenty-four hours, but sometimes for forty-eight hours.

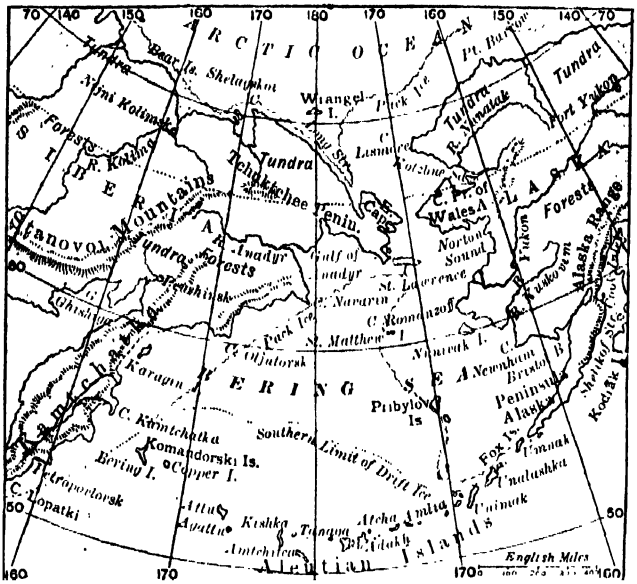
Berhampur. (1.) Municipal tn., Ganjam dist., Madras Presidency, India, 16 m. s.w. of Ganjam; is a cantonment for native troops, and has a considerable trade in sugar and silk. Pop. (1901) 25,729. (2.) Municipal tn., Murshidabad dist., Bengal Presidency, India, 10 m. s. of Murshidabad; scene of the outbreak of mutiny in 1857. Pop. (1901) 24,397.

Beriberi, a disease now recognized to be a form of peripheral neuritis, in which the characteristic symptoms are oppressive breathing, œdema, anæmia, paralytic weakness, and numbness in the lower extremities. It is often epidemic in China, Japan, Ceylon, India, Africa, the W. Indies, and Central and S. America. It has been brought to England by sailors, and has appeared among the crews of ships months after reaching port. Its cause is not yet understood, but the balance of evidence seems to point to its being a form of chronic poisoning probably due to unwholesome diet. The disease clings to particular districts and ships. There is no specific treatment, and recovery is generally spontaneous.

Bering, or BEHRING, VITUS (1680-1741), explorer, born at Horsens, Jutland. Taken (1706) into Russia's naval service, he so distinguished himself in the wars against Sweden that Peter the Great charged him (1725) with the conduct of an exploring expedition. Reaching Kamchatka, he determined (1728) that Asia was not, as supposed, joined to America. Later, in 1741, he traversed the Sea of Okhotsk and made the north coast of America, but died in Bering I. The account of the voyage (St. Petersburg, 1793) we owe to the survivor, Steller.

Bering (or BEHRING) **Sea and Strait** derive their names from Vitus Bering. They separate America from Asia, and are the most northerly division of the Pacific Ocean, from which they are demarcated by the Aleutian Is. On the N., Bering Sea communicates with the Arctic Ocean through Bering Strait, which is narrow, shallow, and bordered by bare, rocky shores. It receives the Yukon R. from Alaska, and the Anadyr from Siberia. From November to May Bering Sea is generally impassable, owing to fog and ice. A cold current flows from the Arctic Ocean through Bering Str.; a warm current runs through it from the Pacific. A proposal has been made to tunnel under the strait, or bridge it, and link up the Siberian Railway with the Canadian system. See De Windt's *Through the Goldfields of Alaska to Bering Strait* (1898).

Bering Sea Question, THE, was concerned with the right of Canadian fishermen to hunt, capture, and kill seals in the Bering Sea, and proved a fruitful source of difference, of irritation, and even of danger, for many years, between the governments of the United States, of Canada, and of Great Britain. Early in 1892 a treaty of arbitration was agreed to, and the final award of the majority of the arbitrators, who held their meetings in Paris, was delivered on Aug. 15, 1893. It decided that the United States had no exclusive rights of jurisdiction in the Bering Sea, and that they had no right of protection or property in the fur seals frequenting the islands when such seals were found outside the ordinary three-mile limit. The arbitrators further decided that a zone of sixty miles around Pribylov Islands, the property of the United States, should be established, within which the pursuit, capture, or killing of seals by the citizens of either of the governments should be entirely prohibited, and also that the period between May 1 and July 31 should be observed as a close season. A bill giving effect to the award was passed by the Imperial Parliament on Apr. 23, 1894, and a similar measure was approved by the American House of Representatives and the Senate. A sum of $425,000 was subsequently paid by the government of the United States to the Canadian government as compensation to the owners of the vessels that had been unlawfully seized.



Bering Sea.

Bériot, CHARLES AUGUSTE DE (1802-70), Belgian violinist, the husband (1836) of Malibran, the eminent vocalist; professor in the Conservatoire of Paris (1843), and of Brussels from 1843 until 1852. His compositions were numerous and popular.

Berislav, or BORISLAV, tn., Kherson gov., Russia, 40 m. E.N.E. of Kherson city, with a trade in corn, woods, and candles. Pop. 11,790.

Berja, tn., prov. Almeria, Spain, 31 m. w. of Almeria. Exports grapes, and has foundries, cotton mills, and candle works. Pop. (1900) 13,224.

Berkeley. (1.) Parish and mrkt. tn., Tewkesbury div., Gloucestershire, England, on the river Avon, with stn. 2 m. E. on M.R., 15 m. s.w. of Gloucester. Edward II. was murdered in Berkeley Castle in 1327. The Vale of Berkeley is famous for Gloucester cheese. Pop. of par. (1901) 6,277; tn. 744. (2.) City, Alameda co., California, U.S.A., on the shore of San Francisco Bay, and on the Southern Pacific Ry.; the seat of the state university. Pop. (1900) 13,214.

Berkeley, GEORGE (1685 1753), Irish metaphysician and philanthropist, born at Dysert, Kilkenny, and in 1700 entered Trinity College, Dublin. In 1707 he published his first works, *Arithmetica* and *Miscellanea Mathematica.* In 1709 he took orders. His *Essay towards a New Theory of Vision* (1709) argued that, at any rate, the immediate objects of sight are all mind-dependent appearances, which form what is practically a natural language whereby mankind are 'instructed and regulate their actions.' This essay was followed by the *Principles of Human Knowledge* (1710), in which he boldly represents as 'self-evident truth' that all those bodies which compose the mighty fabric of the world could have no real subsistence after the extinction of all percipient mind, nor active power after the extinction of all voluntary agency. By an unmetaphysical generation this was supposed to imply that the material world is only an idle dream, having no practical significance. To correct this misunderstanding Berkeley published *Three Dialogues between Hylas and Philonous* (1713), in which the questions at issue are discussed after the manner of Plato.

His next eight years were spent in England, France, and Italy. In 1713 he is found in London, introduced by his countrymen Swift and Steele to the brilliant society in which Addison and Pope were prominent. In 1714 he again visited France and Italy, as chaplain to the Earl of Peterborough, and lived in the latter country from 1716 till 1720.

Berkeley's return to England in 1720 was an era in his life. He found the country disturbed, economically and socially, by the South Sea catastrophe. The prevailing tone of morals shocked him, with its indifference to lofty ideals, and its selfish secularism, which had taken the place of the fanatical spirituality of the preceding century. He proposed a remedy in a fervid *Essay towards preventing the Ruin of Great Britain* (1721). Despairing of the Old World, and ready to look elsewhere for Utopia, he told his friend Lord Percival, in 1723, that he was determined to spend the rest of his life in Bermuda, at the head of an institution which might become a fountain of Christian civilization for America. To the carrying out of this project all his energies were now directed. In 1724 preferment came in the form of the deanery of Londonderry. Later in the same year he moved to London, where he spent the four following years collecting money for his enterprise, for which he proposed to surrender the deanery. His marvellous social charm and enthusiasm attracted Sir Robert Walpole, and a promise of £20,000 for Bermuda was voted by the House of Commons. In 1728 we find him, newly married, embarked, on his way to Bermuda, for Rhode Island, where he waited for three years for the promised endowment. He was in the end disappointed by Walpole, and in 1731 returned to London, where he published (1732) *Alciphron; or, The Minute Philosopher*, a book of dialogues on the philosophy of religion, pondered and prepared in the seclusion of Rhode Island. A supplementary tract on *Visual Language*, 'showing the immediate presence and providence of a deity,' appeared a year after *Alciphron*.

The year 1734 was another turning-point in Berkeley's life, when he became bishop of Cloyne, by the favour of Queen Caroline. The change found him on the eve of a controversy concerning *mysteries* in religion, suggested by a dialogue in *Alciphron*—its mysteries being fatal to its authority, according to certain freethinking mathematicians. The *Analyst* (1734) was Berkeley's rejoinder, in which he showed that even mathematics is as open as religion to the charge of ultimate mystery.

The social state of Ireland next engaged his attention. In the *Querist* (1735 7) he raised questions of political economy that anticipated David Hume and Adam Smith. Berkeley's philanthropic zeal found varied exercise. In 1739 the diocese of Cloyne was ravaged by famine and fever. His American experience reminded him of the marvellous medicinal properties of tar, and his own experiments served to expand the conception. It assimilated curiously with studies in Plato, the Neoplatonists, and the mystics, in which he had been immersed for years; an eccentric ingenuity connected the medicine with metaphysics; and tar, as a possible panacea, suggested the final interpretation of the universe. This train of thought found expression in *Siris* (1744), the most curious book in English metaphysics, and Berkeley's last word on philosophy. Its profound speculation was, however, obscured by the prolonged controversy to which its therapeutic doctrines gave rise. Indifferent health induced Berkeley in 1752 to remove from Cloyne to an academic home in Oxford, where he died in 1753. He was buried in the cathedral of Christ Church.

One need not look in Berkeley's works for an all-comprehensive system, as in Spinoza or Hegel. 'I had no inclination,' he tells his friend Johnson, 'to trouble the world with large volumes. What I have done was rather with a view to giving hints to thinking men who have leisure and curiosity to go to the bottom of things and pursue them in their own minds.'

The works of Berkeley first appeared in a collected form in 1784. About the middle of the 19th century Berkeley began to receive more sympathetic treatment in Britain from Ferrier and Collyns Simon; also, from a different point of view, in essays by Professor Campbell Fraser (1863-4); and in 1871 the University of Oxford published an annotated edition of the *Collected Works* (3 vols.) by Professor Fraser, along with a supplementary volume of *Life and Letters*. This was followed in 1874 by a volume of annotated *Selections* from Berkeley's philosophical works. See also *Berkeley*, Blackwood's 'Philosophical Classics,' by Professor Fraser (1881). Those works of Berkeley which had been published in his own lifetime appeared in 1898, with a biographical introduction by the Right Hon. A. J. Balfour. A second and revised complete edition of Berkeley's *Works* by Professor Fraser was published at Oxford, in 4 vols., in 1901.

Berkeley, SIR GEORGE CRANFIELD (1753-1818), British admiral, son of Augustus, fourth Earl of Berkeley, was in 1778 in the *Victory* in the action off Ushant. His captain's commission dated from 1780. At the relief of Gibraltar, in 1782, he was in command of the *Recovery* frigate, and at Lord Howe's victory in 1794 was wounded while in command of the *Marlborough*. In 1799 he was in command of a squadron blockading Brest, and in 1810 became an admiral in the British navy, and was also made lord high admiral of Portugal. He was M.P. for Gloucester (1781-1812).

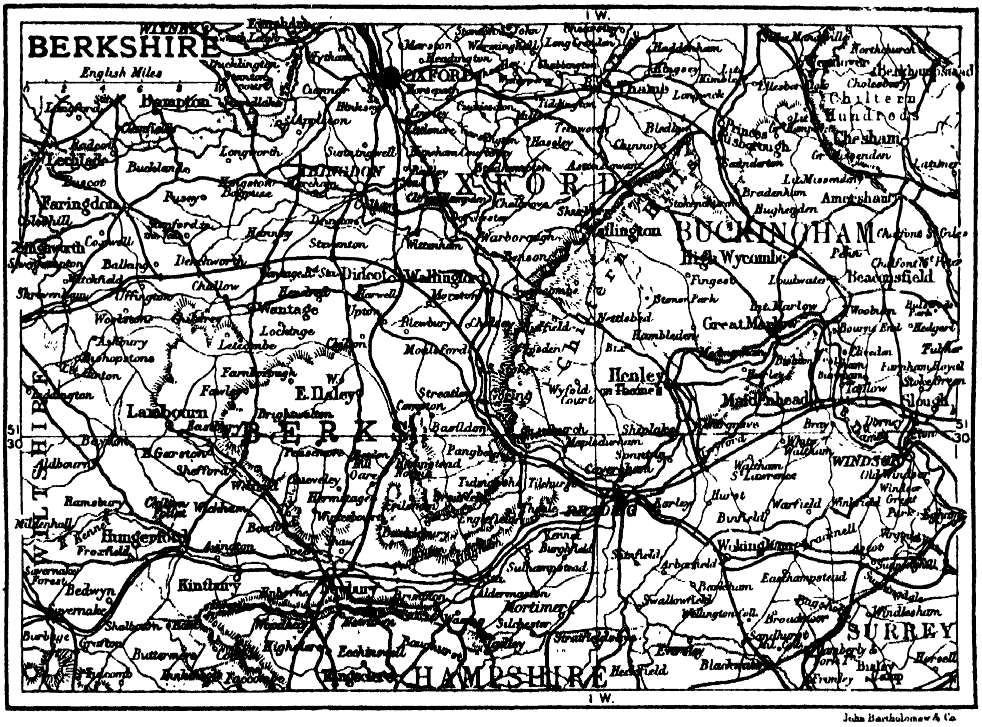
Berkeley, JAMES, THIRD EARL OF (1680-1736), British admiral, known in earlier life as Lord Dursley, was made a captain in 1701, and commanded the *Boyne* with great credit in Rooke's action off Malaga in 1704, and the *St. George* at the siege of Toulon. In 1717 he was appointed first commissioner of the Admiralty, and two years later was advanced to be admiral and commander-in-chief of the fleet and vice-admiral of England; K.G., 1718.

Berkeley, MILES JOSEPH (1803-89), English botanist, was rector of Sibbertoft in Leicestershire (1868-89); published many papers on the fungoid diseases of plants, and described the fungi in Sir W. Hooker's *British Flora* (1836); *Introduction to Cryptogamic Botany* (1857); *Outlines of British Fungology* (1860). He was editor of the *Jour. Roy. Hor. Soc.* (1866-77), and co-editor of the *Micrographic Dict.* (1883). See *Proc. Roy. Soc.* (1890), by Sir J. Hooker; and *Annals of Botany* (1897), by Sir W. T. Thiselton-Dyer.

Berkhamstead, or GREAT BERKHAMSTEAD, par. and mrkt. tn., Hertfordshire, England, 26 m. N.W. of London, 10 m. W. of St. Albans, on L. & N.W.R. Cowper the poet was born here in 1731. Straw-plaiting and carved and turned woodware. Pop. (1901) 5,219.

Berkovitza, tn., W. Bulgaria, on trib. of Ogost, 40 m. N.W. of Sofia. Pop. 6,000.

Berkshire, an inland county of England, lying S. of the river Thames and W. of Surrey; 48 m. long, 29 m. broad. It is styled the 'royal county' of England, because it contains Windsor Castle. The royal seats of Frogmore, Cumberland Lodge, and Cranbourn Lodge are also in this county. In the N.W. a low chalk ridge runs generally parallel to the Thames, and slopes S. to the 'Vale of the White Horse,' which is bounded on the S. by a continuation of the Chiltern Hills, locally known as the White Horse Hills. South of this range lies the valley of the Kennet, stretching E. to the Loddon. East of the Loddon the county is well wooded, and includes Windsor Great Park. The highest point is Inkpen Beacon (1,011 ft.), in the S.W. Agriculture and dairy-farming are the chief industries. Manufactures are limited, and chiefly centred in Reading, which has iron works, biscuit factories, and nurseries; whiting is made from the chalk at Kintbury. The county returns five members to Parliament, one for each of the three divisions—N. or Abingdon, S. or Newbury, E. or Wokingham; and one each for Reading and Windsor. It comprises one co. bor. (Reading), six munic. bors. (Abingdon, Maidenhead, Newbury, Wallingford, New Windsor, Wokingham). Chief tn. Reading. It was the scene of the struggles between Alfred and the Danes in the 9th century. It also played an important part in the civil wars from the reign of Stephen to the death of Charles I. Area, 462,224 ac. Pop. (1901) 254,931. See Cooper-King's *Hist. of Berkshire* (1887).

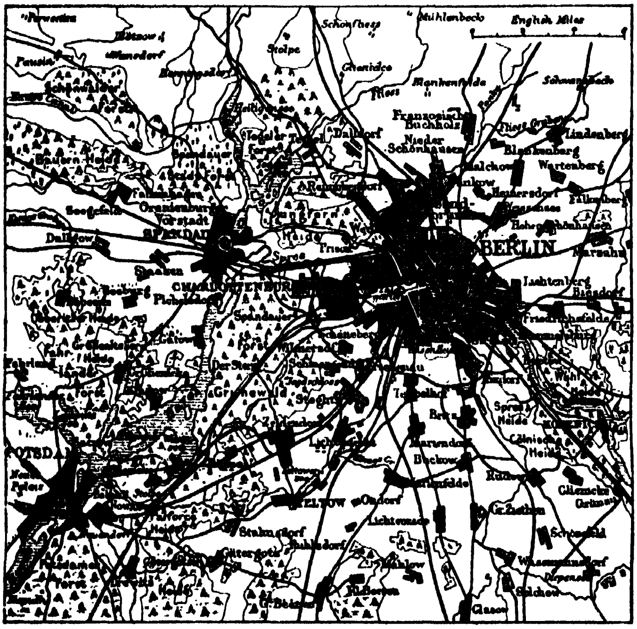


John Bartholomew & Co.

Berlad, cap. of Tutova co., Roumania, on river Berlad and the state railway Galatz-Jassy; important entrepôt for the corn trade to Galatz. Pop. (1899) 24,484.

Berlichingen, GOETZ or GOTTFRIED VON, 'of the Iron Hand' (1480-1562), born at Jaxthausen in Würtemberg, was a typical example of 'the baronial robbers of the Rhine—stern, bloody, and rapacious, but frank, generous, and, after their fashion, courteous.' He is the subject of Goethe's tragedy, translated by Scott in 1799. At the siege of Landshut (1505) he lost his right hand, and the artificial hand which he used in its place was the origin of the nickname. Fighting against the Swabian League, he made a heroic defence of Möckmühl, but was taken prisoner at Heilbronn (1519), and only released through the exertions of his friends, Georg von Frundsberg and Franz von Sickingen. In the Peasants' war of 1525 he headed a party of the revolted peasants, and after the dissolution of the Swabian League (1540) he took part with Charles V. (1542) against the Turks and Francis I. (1544). His autobiography, edited and published by Pistorius (1731; new ed. by Schönhuth 1886), furnished Goethe with materials for his drama. See Pallmann's *Der historische Götz von Berlichingen* (1894).

Berlin. (1.) Capital of Prussia and German empire, in prov. of Brandenburg, on the river Spree (affluent of Elbe), 84 m. by rail from Stettin and 178 m. from North Sea, within 25 hours' journey from London and 23½ from Paris. On an island in the centre of the city stands the royal palace, a foursquare pile built at different times between 1451 and the present day. Opposite it are the old (1824-8) and new (1843-55) museums, the national gallery, the cathedral (1894, etc.), with the Hohenzollern mausoleum, and the national monument to the Emperor William I. (1897). From this island stretches westwards the noblest street in Berlin, Unter den Linden ('under the lime trees'). The triumphal arch at the west end of the street, the Brandenburg Gate (a copy, made in 1789-93, of the Propylæa at Athens), forms the entrance to the large park (630 ac.) of the Thiergarten. In the E. is the magnificent avenue of the Siegesallee or Avenue of Victory, adorned (1898-1901) with thirty-two marble groups of the rulers of Prussia and Brandenburg. In the Unter den Linden are many splendid public edifices, among which may be mentioned the armoury (1695–1706), the opera-house, the royal library, the new town hall (1861–70), the university (with over 7,000 students), the palaces of William I. and the Empress Frederick, and the monument to Frederick the Great by Rauch (1851). In the N.E. of the Thiergarten stands the most imposing building of the city, the Imperial Diet or Parliament, erected from designs by Wallot, in 1884–94, at a cost of over £1,000,000. In the S.W. are the famous zoological gardens and Emperor William I. memorial church (1891–5). Near the N.W. is the royal palace of Bellevue. In Wilhelm Street are the Prussian parliament houses (1893–8), the post office (1871–98), and the handsome Anhalt railway station (1875–80). The churches of Berlin are mostly built of brick, the oldest being St. Mary and St. Nicholas. The educational, artistic, and scientific institutions of Berlin are numerous, and some of them are of more than German reputation—*e.g.* the observatory, seminary for Oriental languages, high schools for music, the fine arts, and veterinary science, the Academy of Sciences, Industrial Art Museum, Ethnological Museum, and Mining academy.



Berlin and Environs.

Berlin is probably the largest manufacturing centre in Germany, the industrial quarters lying to the N.E. and S.E. of the old town. The chief commodities produced are clothing, linen, hats, buttons, machinery, books, paper, porcelain, pottery, chemicals, and jewellery. A large trade is also carried on in corn, wines, spirits, and building materials. The river traffic both ways aggregates over ten million tons annually.

The city was originally a Wendish fishing village named Kölln. First known in the 12th century, it was granted municipal rights about 1240. In 1448 it was chosen as their place of residence by the Hohenzollern rulers of Brandenburg. It suffered very severely in the Thirty Years' war. In 1650 the Great Elector began the work of making it one of the finest cities in Europe—a work which was continued by Frederick I., Frederick William I. (who named it Berlin), Frederick the Great, and William II.

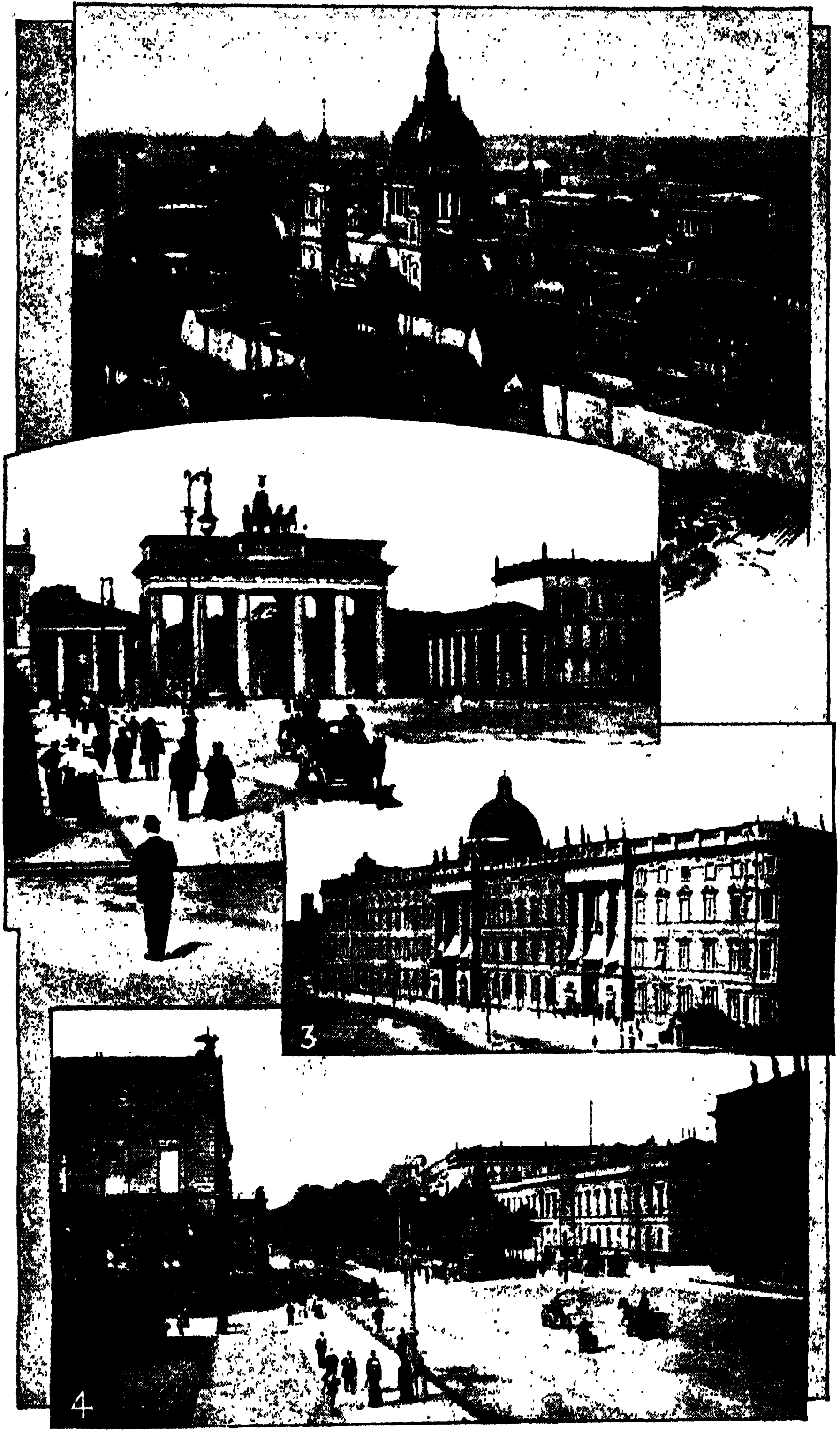
In 1878 the congress of European powers which regulated the affairs of the Balkan Peninsula, and in 1884–5 the Congo conference, sat at Berlin. Pop. (1900) of Berlin alone, 1,888,848; of 'larger Berlin,' 2,523,461, including suburbs and a garrison of over 20,000 men. See *Berlin und seine Bauten*, issued by the Architects' Association (1877); Ring's *Die Deutsche Kaiserstadt* (2 vols. 1883); and historical works by Fidicin (5 vols. 1837–42), Streckfuss (8 vols. 1863–9; new ed. 1900), Schwebel (1889); Ludwig Geiger's *Berlin, 1688–1840*, a history of the city's intellectual development (1893–5).

(2.) Town, cap. of Waterloo co., Ontario, Canada, 60 m. S.W. of Toronto. Pop. (1901) 9,747.

(3.) City of Coos co., New Hampshire, U.S.A., situated in the N. part of the state, on the Androscoggin R., and on two railways. It has a lumber industry and pulp manufactures. Pop. (1900) 8,886.

Berlin, CONGRESS OF (June 1878), a meeting of representatives of the European powers invited by Prince Bismarck to revise the Russo-Turkish treaty of San Stefano (1878). By it the independence of Roumania, Servia, and Montenegro was recognized. Bulgaria was enlarged, and became a self-governing Turkish tributary state, with an elected prince not a member of any reigning European dynasty. Eastern Roumelia received administrative autonomy and a Christian governor, but remained under the control of the Sultan. Greece was promised a modification of her frontier, which was carried out in 1881. Bosnia and Herzegovina were placed under the administrative control of Austria, while Roumania returned to Russia the Bessarabian territory taken from her by the treaty of Paris, receiving in return the Dobrudja. Ardahan, Kars, and Batum were ceded by the Porte to Russia. The British representatives at the congress were Lords Beaconsfield and Salisbury. Britain, by establishing herself in Cyprus, assumed virtual control of the eastern part of the Mediterranean.

Berlioz, HECTOR (1803–69), French musical composer, studied at the Paris Conservatoire, and won (1830) the Prix de Rome. On returning from Rome to Paris in 1832, he started concert tours in Europe, which established his reputation as a composer and musician of the first rank. Among his best-known works are his symphonies, *La Damnation de Faust* (1845), *Symphonie Fantastique*, *Roméo et Juliette* (1839), *Symphonie Funèbre*, and *Harold;* a sacred trilogy, *L'Enfance du Christ* (1854); the operas, *Les Troyens* (1866), *Benvenuto Cellini* (1838), and *Béatrice et Bénédict* (1862); the overtures, *Le Carnaval Romain* (1840), *King Lear* (1831), and *Waverley* (1828); a requiem, *Messe des Morts* (1837); and a celebrated *Te Deum*. Berlioz had a supreme command of orchestration, especially excelling in novel musical combinations and effects; and in this he was a worthy colleague of Wagner, whom in many respects he resembled as a composer. He wrote numerous books, including a *Traité d'instrumentation* (a standard work on the subject), *Voyage Musicale en Allemagne* (1844), *Soirées de l'Orchestre* (1853), *Les Grotesques*



Views in Berlin.

1. The Cathedral, and general view. 2. The Brandenburg Gate. 3. The Royal Palace. 4. Unter den Linden.

de la Musique (1859), and *Mémoires* (1870), the last of which was translated into English in 1884.

Bermejo, RIO, riv. in the N. of Argentina, S. America; flows S.E. and enters the Paraguay R. 35 m. from its confluence with the Parana. Total length, over 1,100 m.

Bermondsey, met. and parl. bor. and civic par. in the S.E. of London, England; chiefly noted for its tanneries, it is now a centre for the leather industry. Hat-making employs a great number of hands. For parliamentary purposes the borough is known as Southwark, and returns three members. Area, 1,500 ac. Pop. of parl. bor. (1901) 215,085; of met. bor. 130,760; of par. 82,483.

Bermuda Grass, or BAHAMA GRASS. See CYNODON.

Bermudas (formerly spelt Bermoothes—'the still-vexed Bermoothes,' *Tempest* i. 2—from Bermudez, their Spanish discoverer (1515); called also Somers Islands, from Sir George Somers, who was wrecked here in 1609), a group of small islands lying in the Atlantic, between the parallels of 32° and 33° N. lat., and about 600 m. from the coast of the United States. The islands are of coral formation, 360 in number, of which 20 are inhabited; but most of the land area is contained in the five islands of Hamilton or Bermuda (13 m. long), St. George, St. David, Somerset, and Ireland. The highest point is Sear's Hill (260 ft.). The climate is temperate, and of exceptional salubrity. The inhabitants, more than two-thirds of whom are negroes or coloured, are chiefly occupied in growing potatoes and onions for the New York market. Arrowroot and lilies are also cultivated. The chief town is Hamilton—pop. (1901) 2,246—which is connected with Halifax and Jamaica by telegraph. Ireland is (since 1869) a naval station, and has a dockyard and victualling yard. The exports of the Bermudas are of the annual value of about £100,000, while the imports are worth five times as much. In 1902, a floating dock, the largest in the world, was fixed here (from Sheerness). The islands are visited as a health resort, especially in the winter, by Americans. The group was colonized by the British in 1612. Area, 20 sq. m. Pop. (1901) 17,535. See Heilprin's *The Bermuda Islands* (1889); Newton's *Glimpses of Life in Bermuda and the Tropics* (1897).

Bermudez, state of Venezuela, extending from the Caribbean Sea to the Orinoco, and E. to the Punta de Paria and the delta of the Orinoco. Cap. Barcelona. Area, 32,243 sq. m. Pop. (1894) 322,518.

Bernadotte, French general who in 1810 became king of Sweden, and founded the dynasty now reigning in that country. See CHARLES XIV. of Sweden.

Bernalda, tn., prov. Potenza, Italy, 35 m. by rail W. by S. of Taranto; produces cotton and saffron. Pop. (1901) 7,121.

Bernard (fl. 865), traveller in Palestine, styled 'Sapiens,' quoted by William of Malmesbury. See Francisque Michel, *Bernard et ses Compagnons en Egypte et Terre Sainte* (1839); and Mabillon, in Migne's *Patrologie* (1857-66). A translation will be found in *Early Travels in Palestine* (Bohn's Antiq. Lib., 1847, etc.).

Bernard OF MORLAIX, French Benedictine monk of the 12th century, author of a dactylic poem, *De Contemptu Mundi*, in three books, each of 1,000 verses. Published in 1483 at Paris, it is well known through Neale's translation.

Bernard, ST., OF CLAIRVAUX (1090-1153), a notable theologian of the middle ages, came of a noble Burgundian family. After two years spent in the Cistercian monastery of Citeaux, in 1115 he became first abbot of the newly-founded monastery of Clairvaux, in Champagne. Bernard's saintly life and eloquence gave him an unexampled influence in Christendom, and he founded no fewer than 70 monasteries. Men of all ranks were drawn to him, and he became known as 'the mellifluous doctor.' In 1128 Bernard drew up, by request, the statutes of the Knights Templars, and it was owing to him that Innocent II. was recognized by the sovereigns of Europe. He was largely instrumental in securing the condemnation of Abelard at the Council of Sens (1140). Pope Eugenius III. was his disciple. When at the Council of Vezelay (1146) he moved the enthusiasm of France for the second crusade; and thousands of religious enthusiasts, fired by his eloquence, took up arms against the infidel. Bernard was canonized in 1173. The reformed Cistercians, an order instituted by him, are often called Bernardines. Many of his noble hymns (*e.g.* 'Jesus, the very thought of Thee') have been translated. Mabillon printed his works at Paris, in 6 vols. (1667-90); trans. by Eales, 2 vols. (1889). See Ratisbonne's *Histoire de Saint-Bernhard et de son Siècle* (1841); Morison's *Life and Times of St. Bernard* (1863); R. S. Storrs's *Bernard of Clairvaux: the Times, the Man, his Work* (1892); and Vacandard's *Vie de St. Bernard* (1895).

Bernard, CLAUDE (1813-78), French physiologist, born at St. Julien, near Villefranche; studied medicine at Paris; was appointed to the chair of general pathology there in 1855; was elected to the French Academy (1869), and became president of the Academy of Sciences and of the Biological Society (1867-78). On his death his eulogy was pronounced by Renan. He made many important discoveries, notably on the pancreatic juice, on the blood, the sympathetic nerves, and the saccharine function of the liver and its connection with the nervous system. Among his numerous works are *Leçons de Physiologie Expérimentale Appliquée à la Médecine* (1865); *Leçons de Pathologie Experimentale* (1871); *Leçons sur les Anesthesiques et sur l'Asphyxie* (1875); and *Leçons sur les Phénomènes de la Vie commune aux Animaux et aux Végétaux* (1879). See Malloizel's *L'Œuvre de Claude Bernard* (1881).

Bernard, MOUNTAGUE (1820-82), English lawyer and jurist, born in Gloucestershire, and appointed the first professor of international law at Oxford in 1859. He visited America in 1871, in connection with the treaty of Washington; and Geneva in 1872, on the question of the *Alabama* arbitration.

Bernard, WILLIAM BAYLE (1807-75), Anglo-American dramatist, the son of British parents, but born at Boston, Mass. From 1830 he produced plays and farces with great rapidity—114 in all. The best known are *Rip Van Winkle* (1832), *The Nervous Man* (1833), *The Man about Town* (1836), *His Last Legs* (1839). His last piece was *The Doge of Venice* (1867). In 1874 he published a biography of Samuel Lover.

Bernard-Beere, MRS. FANNY MARY (1859), English actress, was prepared for the stage by Hermann Vezin; made her début at the Opéra Comique, but shortly afterwards married Captain E. C. Dering, and retired into private life. After her husband's death, in 1876, she returned to the stage, appearing at St. James's Theatre, London, as Julia in *The Rivals*, and later as Lady Sneerwell and Emilia. In 1882 she appeared at the Globe in *Far from the Madding Crowd*, and the following year under the Bancrofts at the Haymarket, where her impersonation of Fédora in Sardou's play took the public by storm. While manager at the Opéra Comique she produced *As in a Looking-glass* in 1887, *Ariane* and *Masks and Faces* in 1888. Early in 1889 she appeared in *Still Waters Run Deep* at the Criterion, and later with Forbes Robertson at the Garrick in *La Tosca*. She has played in America (1892) and Australia, and during a second visit to New York appeared in *The Fringe of Society*. In 1897 she appeared at the Comedy Theatre in *A Wolf in Sheep's Clothing*.

Bernard (Great St.) Pass, the easiest pass over the Pennine Alps (8,111 ft.); leads from Martigny (in the Swiss canton of Valais) to the Italian valley of Aosta, above Ivrea. It was known to the Romans as 'Alpis Pœnina,' and as 'Mons Jovis' (Montjoux) because of the temple of Jupiter on the summit. A hospice existed there as early as the 9th century, and was refounded in the 11th century by St. Bernard of Menthon (d. 1081), archdeacon of Aosta (not to be confounded with St. Bernard of Clairvaux), whence its name. Since the 12th century the hospice has been served by Austin Canons Regular, who extend hospitality to travellers, and succour, with the help of the dogs that are called by St. Bernard's name, those who have succumbed to cold and fatigue. A carriage road was built a few years ago. Napoleon led his army across the pass in May 1800.

Bernard (Little St.) Pass (7,179 ft.) leads from the French valley of the Upper Isère (or Tarentaise) to the Italian valley of Aosta, and is traversed by a carriage road, completed about 1870. It was known to the Romans as 'Alpis Graia' (as it was the chief pass over the Graian Alps), and later as 'Mons Joveti' or Montjouvet (from an old temple of Jupiter, the name being in the diminutive to distinguish the pass from its neighbour, the Great St. Bernard).

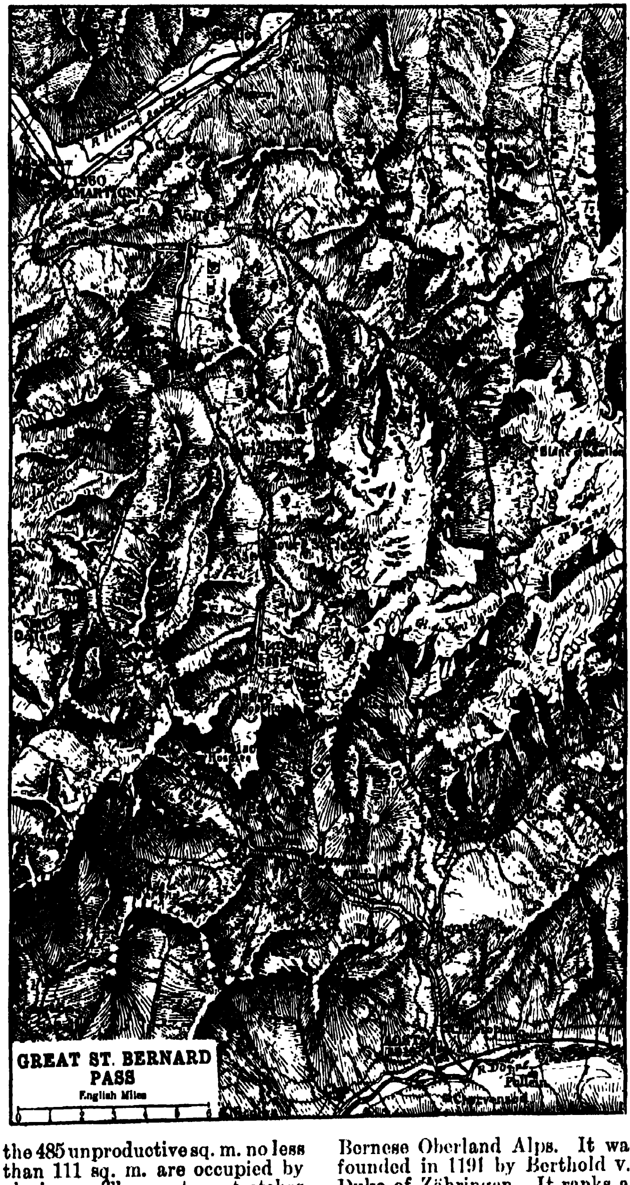
Bernauer, AGNES, a German lady, born in Augsburg, of plebeian descent; was secretly married in 1432 to Albert of Bavaria, the only son of Ernest, Duke of Bavaria. Thereupon Agnes was imprisoned by order of the duke, condemned as a witch, and drowned in the Danube, near Straubing, on Oct. 12, 1435. This tragic story was a fruitful subject for German dramatists and novelists, as in a tragedy by Fr. Hebbel (1855), and another (uncompleted) by Otto Ludwig (after 1852).

Bernay (anc. *Bernacum*), tn. in dep. of Eure, France, in valley of Charentonne, 26 m. w. of Evreux, is an important industrial place with a mineral spring. Its chief industries are cotton spinning and weaving. There is also an important market for cattle and corn. Pop. (1901) 8,159.

Bernays, LEWIS ADOLPHUS (1831), scientist, and clerk of the Queensland Legislature for over forty years. The founder of the Queensland Acclimatization Society, he has rendered valuable service to the advancement of economic botany. He has published *Cultural Industries for Queensland*, *The Olive and its Products*, etc.

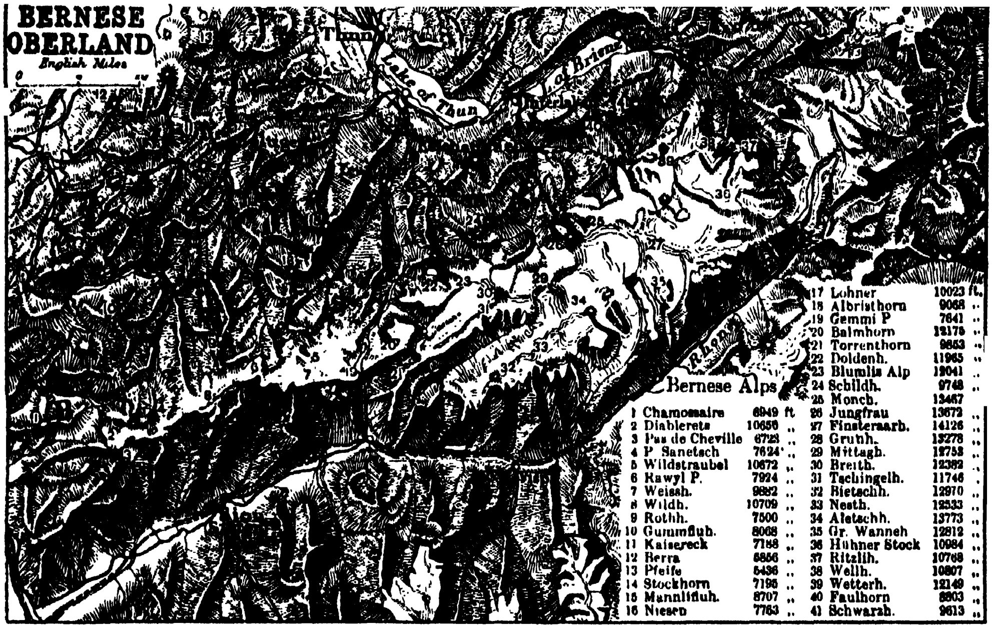
Bernburg, tn., duchy Anhalt, Germany, on both banks of the Saale, 44 m. by rail s. of Magdeburg, with iron works, and manufactures of machinery, sugar, and pottery. In the vicinity are the saline springs of Leopoldshall. Pop. (1900) 34,431.

Berne, or BERN. (1.) The most populous—(1900) 589,433—of the Swiss cantons, and the second in size; area, 2,657 sq. m., 2,172 sq. m. being productive. Of the 485 unproductive sq. m. no less than 111 sq. m. are occupied by glaciers. The canton stretches N.W. towards the German and French frontiers. The central portion is formed by the valley of the Aar, from its source to Büren, N.W. of Berne. The population is German-speaking and Protestant, except in the Bernese Jura, where it is French and Roman Catholic. The canton entered the Confederation in 1353. (2.) Capital of the above canton, and (since 1848) of the Swiss Confederation also. It is finely situated on a high bluff, washed on all sides but one by the Aar, flowing in a deep valley below, and commands a superb view of the snowy Bernese Oberland Alps. It was founded in 1191 by Berthold v., Duke of Zähringen. It ranks as the fourth town in Switzerland, coming after Zürich, Basel, and Geneva. The name seems really to be derived from 'bear,' and live bears have for centuries been kept in a pit outside the town. The chief mediæval buildings are the



15th century *Münster* or collegiate church (wrongly called a cathedral, as there never has been a bishop of Berne), the 15th century town hall, and some quaint watch-towers in the main street with its delightful arcades, its fountains and clock. The principal modern buildings are the Federal Houses of Parliament, the historical museum, and the national library. The university, founded in 1834, had, in 1901, 1,055 students. Berne is the seat of several international bureaus, as the International Telegraphic Union, opened Jan. 1, 1869; the International Postal Union, formed as the result of the postal congress held at Berne on Sept. 15, 1874, and ratified Oct. 9, 1874; the International Bureau for the Protection of Artistic and Literary Property, formed Jan. 1, 1888; and the International Transport, opened Jan. 1, 1893. Pop. (1900) 64,227 (mainly German-speaking and Protestant). See W. F. von Mülinen, *Berns Geschichte, 1191-1891* (1891); E. von Rodt, *Bernische Stadtgeschichte* (1886); E. von Wattenwyl, *Gesch. d. Stadt u. Landschaft Bern*—to 1400 (2 vols. 1867-72); J. L. Wurstemberger, *Gesch. d. alten Landschaft Bern* (2 vols. 1862); *Rechtsquellen d. Kant. Bern*, ed. by F. E. Welti, vol. i. (1902). (3.) Commune in the grand-duchy of Oldenburg, Germany, near the l. bk. of the Weser, 9 m. N.E. of Oldenburg; was formerly capital of the Stedinger Land. Pop. (1900) 3,385.

Berne Convention. See COPYRIGHT.



Berners, or BARNES, DAME JULIANA (fl. in the first half of the 15th century), by tradition daughter of Sir James Berners of Berners Roding, Essex, and prioress of Sopwell nunnery, near St. Albans. Of the treatises ascribed to her—*Hawkynge*, *Huntynge*, *Fysshynge*, *Lynage of Coote Armiris*, *Blasyng of Armys* (all of which, except *Fysshynge*, appeared in the *Boke of St. Albans* in 1486)—probably only that on *Huntynge* and a part of that on *Fysshynge* were written by her. A facsimile of the treatise on *Fysshynge* appeared in 1880, and of the *Boke of St. Albans* in 1881.

Berners, JOHN BOURCHIER, SECOND BARON (1467-1533), statesman and author, time of Henry VII. and Henry VIII. He assisted in suppressing Perkin Warbeck's rebellion (1497); accompanied Henry VIII. to Calais, and was present at the capture of Terouenne (1513); travelled with Princess Mary to France as chamberlain on her marriage to Louis XII. (1514); was chancellor of the exchequer (1516); accompanied Henry VIII. to the Field of the Cloth of Gold (1520); deputy of Calais from 1520 to 1533. He was the first English translator of Froissart's *Chronicles* (1523-5), San Pedro's *Castell of Love* (1540), and *Huon of Bordeaux* (1534). Under the title of *The Golden Boke of Marcus Aurelius* (1534), he wrote a French version of Guevara's *Relox de Principes o Marco Aurelio*. See Early English Text Society's reprint of *Huon of Burdeux* (1882-7), especially part iv.

Bernese Oberland Alps rise to the N. of the main chain, from which they are separated by the upper portion of the Rhone valley. In the narrower sense the Bernese Oberland Alps extend from the Grimsel Pass, on the N.E., to the Gemmi Pass, on the S.W. But the term is also used in a wider sense so as to comprise, on the N.E., the whole district between the Grimsel Pass and the Lake of Lucerne and Upper Reuss valley, thus including the Dammastock or Rhone Glacier region (11,920 ft.), the Titlis group (10,627 ft.), and the Uri Rothstock group (9,620 ft.); while to the S.W. of the Gemmi Pass the Oberland range is held to extend through the Wildstrubel (10,673 ft.) and the Wildhorn (10,709 ft.) to the Diablerets (10,650 ft.). The best-known tourist resorts on the N. slope are Thun, Interlaken, Meiringen, Lauterbrunnen, Mürren, Grindelwald, and Kandersteg. The principal summits of the Bernese Oberland are the Finsteraarhorn (14,026 ft.), the Aletschhorn (13,721 ft.), the Jungfrau (13,669 ft.), the Gross Schreckhorn (13,386 ft.), the Gross Viescherhorn (13,285 ft.), the Eiger (13,042 ft.), the Bietschhorn (12,970 ft.), and the Wetterhorn (12,166 ft.); besides the viewpoints of the Sparrhorn (9,928 ft.), the Schilthorn (9,754 ft.), the Eggishorn (9,626 ft.), the Faulhorn (8,803 ft.), and the Niesen (7,763 ft.). Among the more important passes may be mentioned the Lauithor (12,140 ft.), the Mönchjoch (11,680 ft.), the Jungfraujoch (11,385 ft.), the Strahlegg (10,995 ft.), the Petersgrat (10,516 ft.), the Tschingel Pass (9,265 ft.), the Lötschen Pass (8,842 ft.), the Gemmi (7,641 ft.), the Grimsel (7,100 ft.), the Little Scheidegg or Wengern Alp (6,772 ft.), and the Great Scheidegg (6,434 ft.). See vol. i. (1896) of the new edition of Gottlieb Studer's historical work, *Ueber Eis und Schnee;* Th. Wundt's *Die Jungfrau und das Berner Oberland* (1897); H. B. George's *The Oberland and its Glaciers* (1866). Of older works, Wyss's *Reise in das Berner Oberland* (1817) and Ober's *L'Oberland Bernois* (1854) are the best worth consulting.

Bernesque Poetry is that type which blends satire, wit, mockery, and serious thought, as in Byron's *Don Juan*, Paludan-Müller's *Adam Homo* (1841-9), Ibsen's *Peer Gynt* (1867), and the poetry of Francesco Berni (1497-1535), from whom the name is derived.

Bernhard, DUKE OF SAXE-WEIMAR (1604-39), a Protestant general in the Thirty Years' war, son of John, third Duke of Saxe-Weimar. After serving under Ernst von Mansfeld and Christian von Braunschweig, he entered the army of Christian IV. of Denmark (1625), and in 1630 joined Gustavus Adolphus. In the famous storming of Wallenstein's intrenched camp at Nuremberg (1632) he played an honourable part. On the fall of Gustavus at the battle of Lützen (1632) Bernhard took the command, completed the victory, and drove the Imperialists out of Saxony. In the following year he captured the strong imperialist city of Regensburg (Ratisbon)—an exploit which was, however, neutralized by his defeat at Nördlingen by Gallas (1634). Then making an agreement with Richelieu, although he was already in Swedish service, he defeated the Imperialists at Rheinfelden (1638), and finished up the campaign by the capture of the strong fortress of Breisach, which he intended to make the centre of an independent principality, when he was carried off by death. See Droysen's *Bernhard von Weimar* (1885).

Bernhardi, THEODOR VON (1802-87), German historian and diplomatist, born at Berlin, and after many travels settled in Germany about 1860. In 1865 he was appointed military attaché at Florence, and from 1867-71 was employed in diplomatic missions in Italy, Spain, and Portugal. Among his works are *Denkwürdigkeiten aus dem Leben des Russischen Generals Karl Friedrich von Toll* (2nd ed. 1865-6, 4 vols.), important for the history of the liberation wars; *Geschichte Russlands und der Europäischen Politik in den Jahren 1814-31* (1863-77, 3 vols.); *Friedrich der Grosse als Feldherr* (1881, 2 vols.).

Bernhardt, SARAH (christened ROSINE BERNARD), French actress, was born in Paris, of Jewish parents, Oct. 22, 1844. Entering the Paris Conservatoire in 1859, she made her début at the Théâtre Français in 1862 in Iphigénie, when she received special notice from the critic Francisque Sarcey. But her impetuous disposition led to trouble with a senior member of the company, and Sarah had to leave the Français. In 1867 she secured an engagement at the Odéon, and made her first hit there, in 1869, as Zanetto in Coppée's *Le Passant*. In 1872, as the Queen in *Ruy Blas*, she gained great success, and was warmly praised by Victor Hugo. Returning to the Français, she played in *Mademoiselle de Belle-Isle*, and as Phèdre, in 1874, was recognized as the successor of Rachel. Two other great successes of this period were Doña Sol in Victor Hugo's *Hernani*, and in *Dame aux Camélias* by Dumas the Younger. In 1880 she visited the United States, and the next nine years were a triumphal progress round the world. But Sarah became not so much an exponent of tragedy and comedy as an exploiter of herself. Her great parts, such as Fédora, Théodora, La Tosca, etc., were designed to exhibit one personality, and her style became exaggerated and coarse. Her appearance as Jeanne d'Arc at the Porte St. Martin (1890) marks the beginning of her career as manager in Paris. M. Coquelin *aîné* now joined her company, and appeared with her in *L'Amphitryon* and in Sudermann's *Magda*. Sarah's *Hamlet* (1899) was received with unanimous applause—the Danish prince was for the first time made intelligible to a French audience; and her impersonation of the title rôle in Rostand's *L'Aiglon* (1900) was a marvel of dramatic power. Sarah Bernhardt still retains her extraordinary vitality, her unique grace, and her famous *voix d'or*. She engages in painting and sculpture, and now directs a Parisian theatre of her own. See *Biography* by M. Jules Huret (Eng. trans. by E. A. Roper), and Mr. Archer in his *Theatrical World for 1893*.

Berni, FRANCESCO (1497-1536), Italian poet, travelled for some time with Ghiberti, whose secretary he had been, and in 1530 settled in Florence, where he gained the favour of the Medicis. His poems, mainly comic and burlesque, are unsurpassed for their wit, lightness, and elegance of form, notably his *Rime Burlesche* (1538). He recast in the same spirit Boiardo's epic, under the title of *Orlando Innamorato* (1541; new ed. 1827), which ranks next to Ariosto's *Orlando Furioso*. See Virgili's *Francesco Berni* (1882).

Bernicia, KINGDOM OF. Bernicia (for British *Bryneich*) was founded by Ida (547-559) during the period 500-580, when the Angles conquered the north-east of England. The kingdom extended from the Tees to Grangemouth, and divided with Strathclyde the whole south of Scotland. It was ultimately united to Deira under Ethelric, and with it became Northumbria.

Bernina Alps. See RHÆTIAN ALPS.

Bernina Pass (7,645 ft.) leads from Samaden, the cap. of the Upper Engadine (Switzerland), to the Italian Valtellina (valley of the Adda) at Tirano. It is now traversed by a carriage road, and has a hospice on the summit.

Bernini, GIOVANNI LORENZO (1598-1680), Italian architect, sculptor, and painter, designed a palace for Urban VIII., and the great colonnade of St. Peter's. Under Urban VIII., Innocent X., Alexander VII., and Clement X. he was superintendent of the building of St. Peter's and director of public works in Rome. See Leader Scott's *Sculpture: Renaissance and Modern* (1886).

Bernoulli, family of mathematicians, refugees from Antwerp and Alva, settled at Frankfort (1583), and afterwards at Basel, where all but Daniel were born. JAMES (1654-1705), versifier in Latin, French, and German, self-taught in geometry, published tables on dialling, a system of teaching mathematics to the blind, a treatise on comets (1680); visited England, where he knew Boyle; discussed the weight of the air (1683); and professed mathematics at the University of Basel (1687). From a hint of Leibniz he developed and made his own the differential calculus; solved the problem of the logarithmic spiral (1690)—'*Eadem mutata resurgo*' and the spiral were graven on his tombstone—of the isochronous curve, catenary, and of isoperimetrical figures (1696), as to which he quarrelled with his brother John; applied the calculus of probabilities to life and its accidents; and in his *Ars Conjectandi* (1713) prepared the way for Lagrange's calculus of variations. His collected works were published at Geneva (1744).—JOHN (1667-1748), brother of the above, professor of mathematics at Groningen (ten years), and his brother's successor at Basel, was a rival of Newton and Leibniz, and excelled in differential, integral, and especially exponential calculus. He sided with Descartes, as James did with Newton. He wrote on navigation, the planets, and the laws of motion. His works were published at Geneva (1742), his correspondence with Leibniz in 1745.—DANIEL

Sarah Bernhardt.

(Photo by Reutlinger, Paris.)

(1700-82), born at Groningen, 'son of John Bernoulli' (his signature and pride), published *Exercitationes Mathematicæ* (1724); professed mathematics at St. Petersburg (1725-32); wrote his treatise, *Hydrodynamica* (1738), the first on the subject, in which he advocated the Bernoulli system of propulsion for ships; professed, at different times, anatomy, physics, botany, and filled the chair of natural and of speculative philosophy at Basel. —Not so distinguished, but men of mark, were NICHOLAS (1687-1759), professor of mathematics at Padua; JOHN (1710-90), wrote on capstan, magnet, light; JOHN (1744-1807), astronomer-royal of Berlin at nineteen; JEROME (1715-1829), naturalist; JAMES (1759-89), professed physics at Basel, died at St. Petersburg; CHRISTOPHER (1782-1863), professed natural history at Basel.

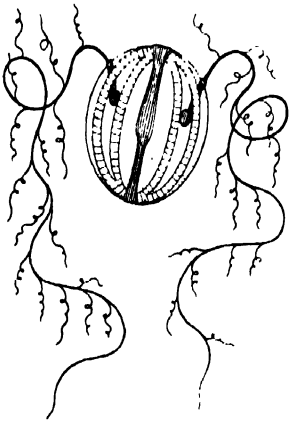
Bernstein, EDUARD (1850), German political writer and Social Democrat leader, born in Berlin; contributor to and editor of several socialistic publications. Lived in London (1888-1901); then he returned to Germany, and was elected to the Imperial Reichstag in 1902. He published *Gesellschaftliches und Privateigentum* (1891); *Die Kommunistischen und Demokratisch-Sozialistischen Bewegungen in England während des 17 Jahrhunderts* (1895); *Zur Geschichte und Theorie des Sozialismus* (1900). His book, *Die Voraussetzungen des Sozialismus und die Aufgaben der Sozialdemokratie* (1899), in which he advocated a more opportunist policy, gave rise to keen discussions among the German Socialist party.

Bernstorff, ALBRECHT, COUNT VON (1809-73), German diplomatist, was minister in Vienna (1848) and Naples (1852), and, with the exception of a short period as minister of foreign affairs (1861-62), was the Prussian ambassador to St. James's from 1854 until his death.

Bernstorff, ANDREAS PETER, COUNT (1735-97), Danish statesman. As minister of foreign affairs (1773), he concluded a defensive alliance with Russia directed against Sweden. He was induced by Russia in 1780 to join the armed neutrality compact; and his agreement with Britain five days previously, fixing the meaning of the phrase 'contraband,' was taken so ill by Russia that he had to resign. He returned to power in 1784, and during the revolutionary wars rigorously observed the non-intervention principle. See Eggers's *Denkwürdigkeiten aus dem Leben des Grafen A. P. von Bernstorff* (1800), and Holm's *Danmark-Norges udenrigske Historie 1791-1807* (1875).

Bernstorff, CHRISTIAN GUNTHER, COUNT (1769-1835), Danish diplomatist, son of Andreas Peter Bernstorff, was born at Copenhagen; became minister of foreign affairs (1797-1810), and plenipotentiary at the congress of Vienna (1814). Afterwards entering the Prussian service, he acted as foreign minister for that state from 1818 till his retirement in 1832.

Bernstorff, JOHANN HARTWIG ERNST, COUNT (1712-72), Danish statesman, son of the Hanoverian baron and minister, Joachim von Bernstorff. From 1733 to 1744 he was in the Danish diplomatic service, but was recalled in 1751 to succeed Schubin as minister of foreign affairs, a position he held for the next nineteen years, during which period he earned the reputation of one of the greatest of European statesmen. A war with Russia in 1762 was happily averted by the dethronement of Czar Peter III., and Bernstorff succeeded in adjusting satisfactorily the long outstanding Gottorp difficulty, whereby Denmark surrendered Oldenburg and Delmenhorst in exchange for Schleswig. Bernstorff, regarding Russian support as a necessary counterpoise to the hostile Franco-Swedish league, was successful in forming subsequently an alliance with Russia. He was styled by Frederick the Great the 'Oracle of Denmark.' See Vedel's *Den ældre Grev Bernstorff's Ministerium* (1882).



Beroë.

Beroë, a small marine organism belonging to the Ctenophora. It differs from its near allies in not possessing tentacles, and in having a wide, slit-like mouth. Locomotion is, as in the other members of the group, effected by eight bands of fused cilia, the *combs*, which break up the light and produce beautiful iridescence. Beroë is to be found abundantly near the surface of the sea during

Berœa. (1.) Now Verria, an ancient town in Macedonia, S.W. of Pella, and about 20 m. from the sea. It was unsuccessfully besieged by the Athenians (432 B.C.), but occupied by the Romans (168 B.C.). Paul preached there in the year 54 A.D. In 1375 it was captured by the Turks. (2.) The modern Aleppo, a town in Syria, near Antioch, enlarged by Seleucus Nicator, who gave it the name of Berœa. In Ezek. 27 : 18 it is mentioned as Helbon, from which its modern name Haleb (Aleppo is the Europeanized form) is derived.

Berœans, or BEREANS, a religious sect in Scotland, founded in 1773 by John Barclay.

Berosus (c. 330-250 B.C.), a priest of Belus at Babylon, who wrote a history of Babylon in the Greek language. Though it is lost, Josephus, Eusebius, and the Christian fathers have preserved a number of fragments, published by Scaliger in his *Opus de Emendatione Temporum* (1598), and also by Richter (1825). See Duncker's *Hist. of Antiq.* (1877), and Rawlinson's *Oriental Monarchies* (1862-76).

Berre, ETANG DE, salt-water basin (60 sq. m.) in dep. Bouches-du-Rhône, France, connected with the Mediterranean by Canal de Bouc (3 m. long). Fishing, salt-pans, and factories for chemical products. Important centre for fruit.

Berri, CHARLES FERDINAND, DUC DE (1778-1820), younger son of Charles X., was born at Versailles; fled (1789) to Italy at the revolution, and served with Condé against France. In 1801 he went to England, where he married an English lady, Miss Brown, whom he abandoned on his return to France in 1814. He married the Princess of Naples in 1816, and in 1820 was assassinated at the opera. See Chateaubriand's *Mémoires du Duc de Berri* (1820).

Berruguete, ALONZO (c. 1480-1561), Spanish sculptor, painter, and architect, born at Parades de Nava, near Valladolid. He studied in Florence (1503) under Michael Angelo, whom he accompanied to Rome in 1505. Returning to Spain (1520), he was appointed royal sculptor and painter to Charles V. He was the architect of Charles's unfinished palace at Granada, and also of the palace of the archbishop of Toledo at Alcala. His sculptures are numerous, and include his masterpiece, the archbishop's stall in the cathedral of Toledo, representing *The Transfiguration*, worked in marble. His last work was the tomb of Cardinal Tavera in St. John's, Toledo, in which town he died. Berruguete introduced the Italian *cinquecento* style into Spain.

Berry. See FRUIT.

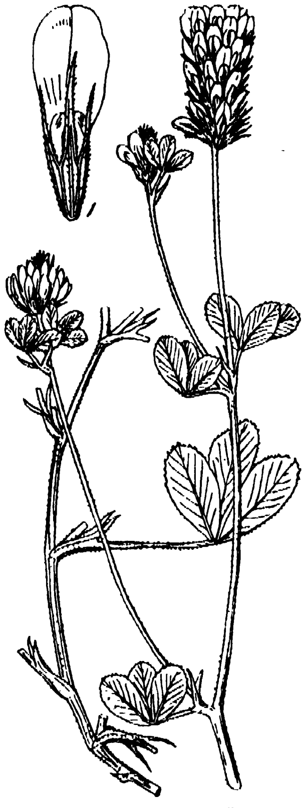
Berry, or BERRI, former prov. of France round Bourges, now corresponding approximately to the deps. of Cher and Indre. The inhabitants are called Berriots.

Berry, SIR EDWARD (1766–1831), British rear-admiral, son of a London merchant, served with Nelson in 1796, and was made a commander in that year. In the victory off Cape St. Vincent he led the boarding party in the capture of the *San Josef* and *San Nicolas*. He became a captain in 1797, and was flag-captain to Nelson at the battle of the Nile. On his way home with dispatches announcing the victory, he was taken prisoner in the *Leander*. He was nevertheless created a baronet. He was in command of the *Foudroyant* at the capture of the *Généreux* and *Guillaume Tell* in 1800. In the *Agamemnon* he took part in the battles of Trafalgar and San Domingo. In 1815 he was given a K.C.B., and attained flag rank in 1821.

Berry, MARY (1763–1852), English authoress, born in Yorkshire, where, and at Chiswick, her early years were spent. In the winter of 1788 she made the acquaintance of Horace Walpole, then almost seventy years of age, who bequeathed to her and to her sister Agnes £4,000 each and his MSS. An edition of *The Works of Horace Walpole* (1798) was edited by her (ostensibly by her brother). Among other works Mary Berry published *England and France: a Comparative View of the Social Condition of both Countries* (1844). See her *Journals and Correspondence* (2nd ed. 1866), and Lord Houghton's *Monograph*.

Berryer, PIERRE ANTOINE (1790–1868), French lawyer and politician, born in Paris. Along with his father, Pierre Nicolas Berryer (1757–1841), who was also a lawyer, he defended Marshal Ney. Among his other great political defences are those of Lamennais (1826), Chateaubriand (1833), Prince Louis Napoleon (1840), and Montalembert (1858). Berryer was a great and eloquent speaker, with a sympathetic appearance, a pleasant voice, a brilliant imagination, and high intelligence. Although a fervent royalist and Catholic, he held liberal views. He was elected a deputy in 1829, and from that year down to 1852, when he retired into private life, was uninterruptedly a deputy, and one of the leaders of the Legitimist party. In 1855 he was elected a member of the Academy. His works were published under the titles *Discours Parlementaires* (5 vols. 1872–4) and *Plaidoyers* (4 vols. 1875–8). See Lecanuet's *Berryer: sa Vie et ses Œuvres* (1893).

Bersaglieri (It. 'marksmen'), the sharpshooters of the Italian army, a brave and picturesque body of men, conspicuous by their plumed hats. They were organized in 1836, and played a great part in the long struggle for Italian unity. There are about 15,000 under arms, and 31,000 on unlimited leave. The Bersaglieri militia numbers some 56,000.



Berseem, or Egyptian Clover.
1. Single flower.

Berseem (*Trifolium alexandrinum*), Egyptian clover, allied to the ordinary red clover; a leguminous annual, the principal green fodder plant of Lower Egypt. It is the first crop planted after reclaiming alkali or salt lands, and is largely used to feed work-horses, cattle, camels, and donkeys. It forms a suitable food for milch cows, producing finely-flavoured butter.

Berserks, or BERSERKR (the Norse plural), warriors who figure in the ancient sagas, subject to savage, animal-like frenzies, in which they bit their shields, bellowed and howled, and rushed like mad dogs among their foes, striking terrible blows with their weapons, regardless of their own defence. Of a certain band of Berserks, twelve brothers, it is said that 'it was their custom to go ashore and wrestle with large stones or trees; otherwise they would have slain their friends in their rage' (*Hervarar Saga*, ch. ix.). The Berserks are also described as 'shape-changers,' taking on the shape as well as the ferocity of brutes. This, again, connects them with *werewolves*. Among numerous references to Berserks may be noted those in Du Chaillu's *Viking Age*, vol. ii. ch. xxvi. (1889), the *Story of the Ere-Dwellers* (trans. William Morris and Magnusson, 1892), and Green's *Story of Egil Skallagrimsson* (1893).

Bert, PAUL (1833–86), French politician and physician, born at Auxerre; studied law and medicine, becoming professor of natural sciences at Bordeaux (1866), and afterwards professor of physiology at Paris (1869). He was appointed prefect of the north in 1870, and minister of public instruction under Gambetta's ministry (1881). In 1886 he was made governor of Tongking and Annam, but died at Hanoi soon after his arrival. He published *Discours Parlementaires* (1881) and other works. One of the ablest pupils of Claude Bernard, he made many important physiological researches with the aid of vivisection. See Berillon's *L'Œuvre Scientifique de Paul Bert* (1887).

Bertani, AGOSTINO (1812–86), Italian medical man, revolutionist and politician; was implicated in the revolution of 1848, and in 1859 joined Garibaldi's force as surgeon. He became Garibaldi's lieutenant, organized the Sicilian expeditions, and later became his chief's secretary. During his parliamentary career, which lasted from 1861 until his death, he became leader of the extreme Left. His *Scritti e Discorsi* were edited by Mario (1890). See *Life* by the same (1888).

Bertha, BERCTA, or ADILBERGA, the name of several famous women. (1.) BERTHA (d. before 616), daughter of Haribert, king of the Franks, who married Æthelbert, king of Kent (c. 560); came to England with Lindhard, bishop of Senlis, and introduced Christianity at Canterbury. (2.) The daughter of Burkhard, duke of Alemannia, and wife of Rudolf II. (937), king of Upper Burgundy. (3.) BERTHA, *alias* Agatha, the betrothed of Hereward. (4.) BERTHA (d. 783), called 'Bertha with the big foot' (*au grand pied*), because one of her feet was larger than the other; daughter of Charibert, Count of Laon. She married Pippin the Short, and was mother of Charlemagne. This last Bertha is so much identified with the traditional Berchta that it is impossible to separate fact from fable in the poems and legends in which she is introduced.

Berthelot, PIERRE EUGÈNE MARCELLIN (1827), French chemist and statesman, born in Paris; appointed professor in the School of Pharmacy (1860), and in the Collège de France (1865); inspector-general of higher education (1876), minister of education (1886-7), and of foreign affairs (1895). Berthelot, whose researches have been directed especially to organic chemistry, has published memoirs on explosives, polyatomic alcohols, and on thermo-chemistry. His studies in the synthesis of organic substances have been of great importance in the advance of the science, as well as in the improvement of industrial processes. He has been equally industrious with his pen, having written, among other works, *Traité Elémentaire de Chimie Organique* (1872; 4th ed. 1898), *Sur la Force de la Poudre et des Matières Explosives* (1872; 3rd ed. 1883), *La Synthèse Chimique* (1875; 8th ed. 1897), *Traité Pratique de Calorimétrie Chimique, fondée sur la Thermo-chimie* (1879), *Thermo-chimie* (1897), and *Les Carbures d'Hydrogène* (1901). He has also published books on the alchemists (1885 and 1888), and on mediæval chemistry (1893).

Berthier, LOUIS ALEXANDRE (1753-1815), French marshal, born at Versailles, began his military career as an officer of Louis XV., and fought under Lafayette in America (1778-82). He took a leading part in all Napoleon's great campaigns, and was created a marshal of France by Napoleon in 1804, Prince of Neuchâtel in 1806, and Prince of Wagram in 1809. On Napoleon's return from Elba, Berthier, who had made his peace with Louis XVIII., retired to Bamberg, where he committed suicide. See his *Mémoires* (1827).

Berthold von Regensburg (*c.* 1220-72), one of the most famous German popular preachers of the middle ages, who frequently officiated in Alsace, Switzerland, Austria, Hungary, Poland, and Italy. Wherever he preached he was received with enthusiasm. His sermons are written in language full of graphic imagery and intense realism. Luxury he strenuously opposed, and did much to accelerate the decline of Middle High German poetry by his condemnation of the elegant world of chivalry. He may be regarded as the forerunner of Luther in attacking the clergy for the sale of indulgences, and for the excessive pilgrimages of the time. His *Sermons* (2 vols.) have been edited by Pfeiffer and Strobl (1862 and 1880). See J. Paul's *Berthold von Regensburg und das bürgerliche Leben seiner Zeit* (1896).

Berthollet, CLAUDE LOUIS, COUNT (1748-1822), French chemist, born at Talloire, in Savoy; studied at Turin, and received in 1794 a professorship in Paris. He was sent in 1796 to Italy, to make a selection from the art treasures extorted by Napoleon, and accompanied the latter in 1799 to Egypt. Elected to the Academy of Sciences in 1781, Berthollet was an ardent reformer of chemical nomenclature; he was the first to analyze ammonia, discovered chlorate of potash and fulminating silver, and studied the properties of chlorine. He also introduced and applied the principle of chemical equilibrium. He was created senator and count by Bonaparte, and was raised to the peerage by Louis XVIII. His published works include monographs on chemical nomenclature (with Lavoisier, 1787), dyeing (1805), bleaching with chlorine (1795), the laws of chemical affinity (1801), and *Essai de Statique Chimique* (1803).

Bertholletia. See BRAZIL NUT.

Berthon, EDWARD LYON (1813-99), Anglican clergyman, but noted chiefly for his inventions, among which are the two-bladed marine propeller, 'Berthon's marine log,' and the very useful 'Berthon' collapsible boats and canoes, made of canvas on wooden frames, which can be opened out and got ready for sea in a few seconds, and which, although at first adversely reported on, are now extensively used as well in the navy as in the merchant service. They are manufactured at Romsey, Hants. Berthon was born in London, and held the livings, successively, of Fareham and Romsey. See his *Retrospect of Eight Decades* (1899).

Berthoud. See BURGDORF.

Bertie, PEREGRINE, LORD WILLOUGHBY D'ERESBY (1555-1601), English military commander, son of Richard Bertie and Catherine, baroness of Willoughby d'Eresby; was born at Lower Wesel, Cleves, naturalized in England (1559), and succeeded to his mother's title (1580). He was present at the relief of Grave in Brabant, and was made governor of Bergen-op-Zoom. In 1586 he captured a large Spanish convoy bound for Antwerp, assisted in the surprise of the city of Axel (1586), and shortly afterwards routed the Spanish at Zutphen. He succeeded Leicester in the command of the English forces in the Low Countries. In Sept. 1589 he was sent with 4,000 men to assist Henry of Navarre at Dieppe, and took a prominent part in the capture of Vendôme, Mons, Alençon, and Falaise. From 1598 till his death he was English governor of Berwick-on-Tweed. See the account of Bertie in *Five Generations of a Loyal House*, by Lady Georgina Bertie (1845); and *Memoir*, ed. by Parry (1838).

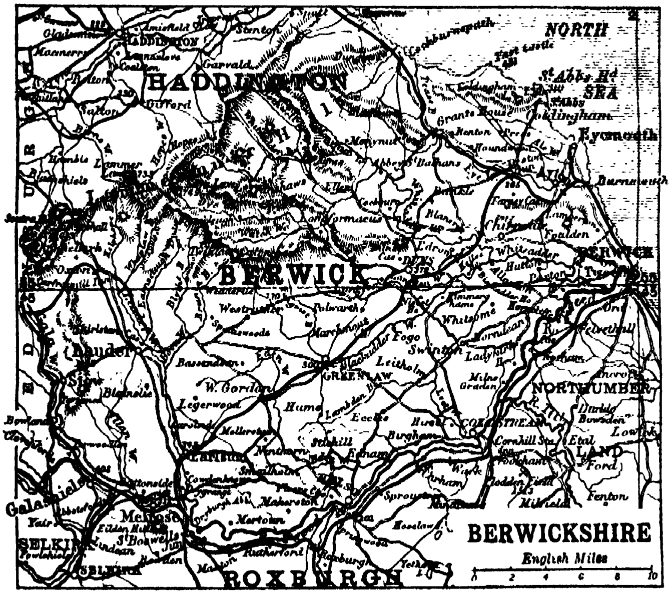
Bertillon System OF ANTHROPOMETRY, a scientific method, devised by M. Alphonse Bertillon (born at Paris in 1853), for the identification of criminals. Certain measurements are taken from every convicted person, and these physical records of prisoners are kept on cards, any one of which can readily be found by an elaborate system of classification. The measurements are taken on the left side of the subject, as these are less liable to alteration than are those on the right side. The determination of the convict's height is taken always at the same hour, because the stature may be as much as half an inch greater after a night's sleep than it is in the evening. The colour of the iris of the eye, and the characteristic lines made by the print of the finger, are also recorded. The following measurements are made: the length and width of head; the length of the left foot, and of the middle and little fingers of the left hand; the stature of the whole body, as well as the length of its upper and lower portions; the span of the outstretched arms; the length and breadth of the left ear, and the length of the left arm. The system has been employed at Paris since 1880. See the inventor's system in *Identification Anthropométrique* (2nd ed. 1893).

Bertin, LOUIS FRANÇOIS (1766-1841), called *l'Ainé* to distinguish him from a brother of the same name; was born in Paris; edited during the revolution *L'Eclair* (which was suppressed in 1798 by the Directory), and in 1800 began to conduct the powerful *Journal des Débats* (founded 1789). Bertin was sent to Elba by Bonaparte in 1801, but resumed his work in Paris in 1804 with the *Journal de l'Empire*, and, after the restoration of the Bourbons, with the *Débats*.

Bertin, LOUIS MARIE ARMAND (1801-54), son of the above, served as secretary to Chateaubriand in London after the restoration, and assisted his father on the *Journal des Débats* from 1820, being chief editor after 1841. The paper was directed by his brother Edward (1797-1871) after Louis's death.

Bertrand, HENRI GRATIEN, COUNT (1773-1844), French general, born at Châteauroux; served under Napoleon in Egypt, Austria, and Russia, distinguishing himself at Austerlitz, Grossbeeren, Leipzig, and Waterloo; was created count and governor of Illyria (1809), and shared in Napoleon's banishment to St. Helena, remaining there. His posthumous work, *Campagnes d'Égypte et de Syrie, Memoires pour servir à l'Histoire de Napoléon, dictés par lui-même à Sainte Hélène*, was published in 1847.

Bertran de Born, Provençal troubadour, was born about 1140 in the viscounty of Limoges (diocese of Périgueux). He was of noble family, and in 1169 joined the barons of Limoges, Poitou, and Périgord in their endeavours to throw off Richard Cœur de Lion's yoke (1182-3). About 1196 he became a monk in the Cistercian abbey of Dalon, where he died about 1215. According to Dante, who places him in his *Inferno* among the sowers of discord (canto xxviii.), Bertran was 'the great singer of arms' (*De Vulg. El.*, ii. 2). His poems, forty-five of which have come down to us, are mostly *sirventescs* in support of the barons and Henry of England, and against Richard Cœur de Lion and his ally. They are rough and often unpolished, but highly effective and picturesque. Tender without being sentimental are the love-songs. The poems have been edited by Stimming (1879 and 1892) and by Thomas (1888). See the biographies in these works; and also H. C. Barlow's *The Young King and Bertran de Born* (1862); Laurens's *Le Tyrtée du Moyen Age, ou Hist. de Bertran de Born* (2nd ed. 1875); Clédat, *Du Rôle Historique de Bertran de Born* (1879).



Beruni, or Al-Beruni (d. 440), Arabian historian, who wrote the famous *Chronology of Ancient Nations* (Eng. trans. 1879), contributions to the history of India and of Khwarizm (Khiva).

Bervic, Charles Clément (1756-1822), French engraver, born at Paris; studied under J. G. Wille, and is best known by his portrait of Louis xiv., although his *chef-d'œuvre* is his engraving of the Laocoon. See Le Blanc's *Manuel de l'Amateur d'Estampes* (1854-89).

Bervie, or Inverbervie, par. and roy. bur., at mouth of Bervie Water, in Kincardineshire, Scotland, on N.B.R., 13½ m. N.E. of Montrose. Flax and woollen mills on Bervie Water. It is one of the five Montrose burghs which return a member to Parliament. Pop. of par. (1901) 2,523; of tn., etc. 1,207.

Berwick, a British first-class cruiser (9,800 tons), built at Glasgow (1903); named after the city and county of Berwick-upon-Tweed. The name, which dates in the navy from 1679, is associated with the battle of Beachy Head (1690), the battle of Barfleur (1692), the battle of Vigo (1702), the capture of Gibraltar and the battle of Malaga (1704), Mathews's action off Toulon (1744), the capture of the *Orphée* (1758), Keppel's action off Ushant (1778), battle of Dogger Bank (1781), operations at Toulon (1793), destruction of the *Amazone* (1811), and reduction of Gaeta (1815).

Berwick, James Fitz-James, Duke of, (1670-1734), was the natural son of James ii. and Arabella Churchill, sister of the Duke of Marlborough. He was educated in France, and learned the art of war under Duke Charles of Lorraine against the Turks (1686-7). Created a duke in 1687, he fought in Ireland in 1689, and in the following year was wounded at the battle of the Boyne. He accompanied James to France, served Louis xiv. in Flanders, and in 1706 was created a marshal of France and sent into Spain, where, by the victory of Almanza (1707), he firmly seated Philip v. on the throne. He was made a grandee of Spain and Duke of Liria. In 1709 the duke conducted a skilful defensive campaign in Dauphiny, in 1714 he captured Barcelona, and in 1716 he was appointed commandant of Guienne. After some years of inactivity, he was called in 1733 to superintend the operations on the Rhine. At the siege of Philipsburg in June 1734 he was killed by a cannon-ball. Berwick was a man of high personal character and of superior military talents, and he was warmly eulogized by Bolingbroke and Montesquieu. See Berwick's *Mémoires*, written by himself, and completed by Abbé Hook (1778); and C. P. Wilson's *Duke of Berwick, Marshal of France* (1883).

Berwick-on-Tweed, port, par., roy. and munic. bor., mrkt. tn., England, at the mouth of the Tweed. Berwick, with Spittal and Tweedmouth, forms a county, of which the area is 8 sq. m. The town is still surrounded by the old ramparts, and many of the buildings are ancient. It is connected with Spittal and Tweedmouth by a bridge (1609-34) of fifteen arches, and a railway viaduct, Royal Border Bridge (1850), designed by Robert Stephenson. It possesses a fair harbour, with docks built 1873-6. The chief industries are fishing, iron-founding, shipbuilding, and agricultural implement making. Authentic records of Berwick date back to the 12th century. It was involved in much of the Border warfare, the siege by the English in 1296 being especially memorable. It was by an Act of Parliament (1885) included in England. Pop. (1901) 13,437. See J. Scott's *Hist. of the Town and Guild of Berwick-upon-Tweed* (1888).

Berwickshire, the most S.E. co. of Scotland, bounded on the N. by Haddingtonshire, N.E. and E. by the German Ocean, S.E. by Berwick-upon-Tweed, Northumberland, and Roxburghshire, W. by Roxburghshire and Edinburghshire. Area, 457 sq. m., or 292,577 ac. Greatest length, 29 m.; greatest breadth, 21 m. Pop. (1901) 30,824. The county town is Duns. Towards the south the land is in general low and flat, but rises gradually in the north. The coast is bold and rocky, and the few harbours are much exposed. The chief mountain range is the Lammermuir; the highest peak, Seenes Law (1,683 ft.). The principal rivers are the Tweed—which forms the boundary for 21 m.—and its tributaries. The minerals include sandstone (cream or yellowish gray, and red), extensively worked for building purposes. Berwickshire is famed for its scientific and productive farming; cattle and sheep are reared. The manufactures include woollen, linen, and paper. The fisheries are very valuable. Lauder is the only royal burgh; Duns, Eyemouth, and Coldstream are police burghs. Ruins of monastic houses are at Dryburgh, Abbey St. Bathans, and of old castles at Lauder, Cockburnspath, Leitholm, Hutton, and Eccles. Berwickshire, which was originally known as Merse (*i.e.* a march), down to 1020 formed part of the kingdom of Northumbria, but in that year it was bestowed by Malcolm II. on the Earl of Northumberland and Dunbar. Again restored to the crown, it was given by King Edgar to his brother David. See F. H. Groome's *A Short Border History* (1887); G. Henderson's *Popular Rhymes, Sayings, etc., of the County of Berwick* (1856); J. Robson's *Churches and Churchyards of Berwickshire* (1893).

Beryl, a silicate of aluminium and beryllium, which crystallizes in long, six-sided prisms. It is usually green, and the more transparent and finely-coloured varieties are known as emerald and aquamarine. Common beryl is of little value, and is found mostly in granite and other crystalline rocks. It has a somewhat greater hardness than quartz (7·5), and is often yellowish green, semi-opaque, and of a dull lustre.

Beryllium (Be), also known as Glucinum (Gl; 9·1), a rare metallic element occurring in beryl and other silicates. It is prepared from its chloride by displacement by sodium, and is steel-coloured, hard, and crystalline. It is not easily oxydized directly, though it forms an oxide, BeO, and a series of salts with a sweetish taste.

Beryx, a genus of fossil fishes resembling the perch, and belonging chiefly to the Cretaceous system. It is common in the chalk of S.E. England, where it is known to the quarrymen as John Dory.

Berzelius, Jons Jakob, Baron (1779–1848), celebrated Swedish chemist, was born in E. Gotland; studied chemistry and medicine at Upsala. Graduating in 1804, he became professor of chemistry at Stockholm (1815), and was secretary of the Stockholm Academy of Sciences (1818–48). He discovered selenium, thorium, and cerium; isolated silicon and other elements; but his chief work was in the determination of the combining proportions and atomic weights of the elements by an improved analytical method. He introduced a system of symbols which are the basis of those used to-day, and was a pioneer in organic chemistry. He wrote *Text-book of Chemistry* (3 vols. 1808–48), translated into various languages; also *Annual Reports on the Progress of Physics, Chemistry, and Mineralogy* (27 vols. 1821–48).

Berzold, Wilhelm von (1837), German meteorologist; studied at Munich and Göttingen; was a professor at Munich, and in 1885 went to Berlin as professor of meteorology and director of the Meteorological Institute. He has published *Die Farbenlehre im Hinblick auf Kunst und Kunstgewerbe* (1874), *Die Kälterückfälle im Mai* (1883), *Zündende Blitze im Konigreich Bayern* (1884), etc.

Bes, an Egyptian god, probably of foreign origin, who became more prominent after the 20th dynasty. He is represented as a grotesque figure, clad in a panther hide, and with a large crown of feathers on his head. Bes is the god of art, of song and dance. He was also worshipped in Cyprus and Phœnicia.

Besançon (anc. *Vesontio, Besontium*), tn., dep. Doubs, France, on peninsula on l. bk. of Doubs, 203 m. S.E. of Paris; is a fortress of the first class. It is the headquarters of the 7th Army Corps. There are an academy with faculties of law, medicine, and science; an observatory, and a good library. It is also the seat of an archbishopric. The town contains some Roman remains, a triumphal arch (167 A.D.), and an amphitheatre. The cathedral of St. Jean dates from the 11th century. Besançon is an important manufacturing centre for watchmaking. There are also flour mills, workshops for railway plant, and distilleries. The Doubs is used as a canal between the Rhone and the Rhine. Important under Roman rule, Besançon was created a free town in the 12th century. Birthplace of Cardinal Granvelle and Victor Hugo. Pop. (1901) 55,362.

Besant, Mrs. Annie, *née* Wood (1847), theosophist, was married in 1867 to the Rev. Frank Besant, vicar of Sibsey, Lincolnshire, from whom she legally separated in 1873. She co-operated with Chas. Bradlaugh in the 'seventies and 'eighties in his freethought and radical movement, and was coeditor with him of the *National Reformer*. She has also played a prominent part in labour and socialist agitations. In 1889 she became a disciple of the theosophist Madame Blavatsky. From 1887 to 1890 she was a member of the London School Board. She has written *Reincarnation* and *Seven Principles of Man* (1892), *Death and After* (1893), *Man and his Bodies* (1896), *Four Great Religions* (1897), *Evolution of Life and Form* (1898), *Dharma* (1899), *Avatâras* (1900); besides editing the *Theosophical Review*, in collaboration with Mr. Mead. She published her biography, *Through Storm to Peace*, in 1893.

Besant, Sir Walter (1836–1901), English novelist and author, was born at Portsmouth; became (1861) senior professor in the Royal College of Mauritius (the 'Palmiste Island' described in more than one of his novels). In consequence of ill-health he returned to England in 1868, and began to publish novels written in conjunction with his friend James Rice—*e.g.* *Ready-money Mortiboy* (1871), *The Golden Butterfly* (1876), *The Monks of Thelema* (1878), *The Chaplain of the Fleet* (1881), etc. Rice died in 1882, and after that date Besant went on writing alone, his most successful novels being *All Sorts and Conditions of Men* (1882), *All in a Garden Fair* (1883), *Dorothy Forster* (1884), *The World went very well then* (1887), *Armorel of Lyonnesse* (1890), *Beyond the Dreams of Avarice* (1894), etc. His novel *All Sorts and Conditions of Men*, considered 'utopian' in theory, led to the erection of the People's Palace (1887) in the East End of London. Besant worked in other fields besides that of fiction. In 1873 he wrote *The French Humorists, from the 12th to the 19th Century*. For a time he acted as secretary to the Palestine Exploration Fund, and, in conjunction with Professor E. H. Palmer, wrote a *History of Jerusalem* (4th ed. 1899). In 1883 he published a sympathetic memoir of Palmer, after the latter's tragic death. He edited the series of books of biography entitled *The New Plutarch*, and, with W. H. Pollock, he wrote *The Charm* and other drawing-room plays, and successfully adapted Banville's *Gringoire*. Besant's other works were as follows: *Rabelais*, for the 'Ancient and Foreign Classics Series;' *Coligny; Whittington; The Eulogy of Richard Jefferies; Captain Cook*, in the 'English Men of Action Series;' and *The Story of King Alfred*. The last years of his life were devoted to the preparation of a modern Stowe's *Survey of London*, in the course of which he published preliminary volumes on S. London (1901), Westminster (1902), and E. London (1902). Besant was founder (1884) and first president of the Incorporated Society of Authors, and he also edited *The Author*, a journal published in the interests of literary men. He was knighted in 1895. Besant's novels reveal an extensive knowledge of London life in its humble aspects, and are eminently readable from their excellent blending of humour and pathos, with frequent reminiscences of Dickens's work. He had an unequalled knowledge of London, and only a few weeks before his death he wrote the historical article on London for this work. See his *Autobiography* (1902).

Besika Bay, on N.W. coast of Asia Minor, opposite island of Tenedos, S. of the Dardanelles; was a station of the British navy during the Crimean war, and again in 1877-8.

Sir Walter Besant.
(Photo by Elliot & Fry.)

Beskid or Bieskid Mountains, a range of the Carpathians, linking together the W. Carpathians and the E. Carpathians. They form the frontier between Austrian Silesia and Galicia on the one side and Hungary on the other. The principal peaks are Babia Gora (5,650 ft.), Smrk (4,400 ft.), and Lissa Hora (4,360 ft.). They are crossed by the Jablunka Pass (1,970 ft.), through which runs the Budapest-Breslau Ry.

Beskow, Bernhard von, Baron (1796-1868), Swedish author, a determined opponent of the Swedish new romanticists; held minor offices at court, and was director of the Royal Theatre (1831-2). His best works are the dissertations and biographies (1860-6, 1870) published by the Academy, whose secretary he was from 1834 to his death—notably his noble and eloquent panegyric of Gustavus III., *Gustaf III. som Konung och Människa.* His most meritorious poems were *Karl XII.* (1819) and *Sveriges Anor* (1824), and his best tragedy *Thorkel Knutsson* (1830). See Rydqvist's *Bernhard von Beskow.*

Besnard, Paul Albert (1849), French painter, was educated at the Ecole des Beaux Arts, and gained the Grand Prix de Rome (1874). In 1884 his sincere and lifelike portraits attracted attention, and his delicate, luminous frescoes in the School of Pharmacy confirmed his reputation. His decorative work in the Hôtel de Ville, the *mairie* of St. Germain l'Auxerrois, and the New Sorbonne, and his brilliant, daring easel paintings, have strongly influenced contemporary art. His wife (Charlotte Dubray) is a sculptor of talent. See Rose Kingsley's *History of French Art* (1899).

Bessarabia, gov. in extreme S.W. of European Russia, between the Black Sea and the Dniester, Pruth, and Danube. The high ground is richly wooded, and the valleys are very productive. Wine-making is an important industry, especially in the Dniester valley. The exports are chiefly cereals, wine, and fruits; the imports timber and manufactured goods. Bessarabia became a Turkish possession in 1503. Russia annexed it in 1812. A small portion, handed over to Moldavia in 1856, was restored to Russia in 1878. Akkerman and Ismail were famous Turkish fortresses. Cap. Kishinev. Area, 17,619 sq. m. Pop. (1897) 1,933,436.

Bessarion, Johannes (1403-72), Greek cardinal, was born at Trebizond. Appointed archbishop of Nicæa by John VII. (Palæologus) in 1437, he accompanied him next year to the Council of Ferrara, and was created a cardinal by Pope Eugenius IV. in 1439. He died at Ravenna, on returning from an embassy to Louis XI. He was one of the small band who revived the study of Greek in Italy, and so initiated the humanistic movement in Europe. His works are collected in Migne's *Patrologia Græca*, vol. clxi. (1866). See Vast's *Le Cardinal Bessarion* (1879), and W. von Goethe's *Studien über... Kardinals Bessarion* (1871).

Bessèges, tn., dep. Gard, France, on Céze R., 34 m. N. of Nîmes; is the centre of a coal district. Silver, copper, lead, and gold mining, iron works and a glass factory. Pop. (1901) 9,040.

Bessel, Friedrich Wilhelm (1784-1846), Prussian astronomer, born at Minden. In 1810 he was appointed director of the new Königsberg observatory, and professor of astronomy at Königsberg University. His most notable achievements were the discovery of the parallax of the fixed star 61 Cygni, and his great *Fundamenta Astronomiæ* (1818), a reduction of Bradley's Greenwich observations of fifty years before, with continuations in 1830 and 1841-2. In the field of astronomical mathematics he also greatly distinguished himself. He embodied the results of many years of labour in *Astronomische Beobachtungen* (1815-44). His collected *Abhandlungen* were published in 1876. See Herschel's *F. W. Bessel* and Durège's *Life* (1861).

Bessels, EMIL (1847-88), Arctic explorer, born in Heidelberg; studied natural science and medicine. In 1869 he undertook his first Arctic expedition to the eastern part of the sea between Spitzbergen and Novaya Zemlya and Gillis Land. In 1871 Bessels was entrusted by the United States government with the leadership of the scientific staff of the polar expedition under Charles Francis Hall. The expedition (1871-3), in the *Polaris*, reached lat. 82° 26′; but unfortunately the ship was wrecked, and all the collections were lost. Bessels wrote *Report on the Scientific Results of the 'Polaris' Expedition* (1876), and *Die Amerikanische Nordpolexpedizion* (1878).

Bessemer, SIR HENRY (1813-98), English metallurgist and inventor, was born at Charlton, Hertfordshire. His process of the manufacture of steel, which revolutionized that industry over the whole world, was put forward in 1856. He also patented inventions for die-casting, railway signalling, bronze-painting, and preventing sea-sickness—this last being an adjustable cabin which should always preserve a horizontal floor, though when put to the test in 1875-6 it failed to answer. Bessemer was knighted in 1879.

Bessemer Process. See STEEL.

Bessières, JEAN BAPTISTE (1768-1813), Duke of Istria (1809) and marshal of France (1804), was born at Preissac (Lot), and served as a private soldier under Louis XVI. Attracting the attention of Napoleon, he became one of his most trusted lieutenants, and served brilliantly in Egypt and at Marengo, where his cavalry charge decided the day; and again at Austerlitz, Jena, Eylau, and in the Spanish and Russian campaigns. He was killed at the battle of Lützen.

Bessonov, PETER ALEXEIEVITCH (1828-98), Russian philologist, born in Moscow; professor of Slav literature at the University of Cracow since 1879. He published important works on the language and literature of the Bulgarians and Servians, and also the first great critical collection of popular songs (folklore) of those peoples—the Bulgarian collection under the title *Bolgarskiya Pésni* (1855), and the Servian under the title of *Lazarica* (1857). He also edited a collection of Russian popular songs.

Bessus, satrap of Bactria under Darius III., whom he seized soon after the battle of Gaugamela in 331 B.C., and carried him off; but being pursued by Alexander, he murdered Darius. He was soon betrayed to Alexander, who had him executed (328 B.C.).

Best, GEORGE (d. 1584?), author of an account (1578) of his companion Martin Frobisher's three voyages of discovery (1576-8), in which he attempted to find the North-West Passage. The work was republished by the Hakluyt Society in 1867.

Best, WILLIAM THOMAS (1826-97), English organist, born at Carlisle. He held his first appointment as organist when fourteen years of age. Subsequently he filled important posts in Liverpool (1840), London (1852), and Liverpool (1854). Best did much to familiarize the public with the organ works of Bach, and besides making numerous arrangements for the instrument, he published several important educational works on organ playing—*e.g.* *The Modern School for the Organ* (1853), and *The Art of Organ Playing* (1870).

Bestiality. Any one committing this offence is liable to be kept in penal servitude for life (24 and 25 Vict. c. 100, s. 64).

Bestiary (Fr. *bestiaire*), a popular series of mediæval books, consisting of descriptions of animals which are afterwards treated as allegorical types of the spiritual life. These bestiaries (or *physiologi*, as they were first called) were the product of the allegorizing tendencies of the early Christians applied to the natural history of the elder Pliny. The foundation of the class is the unpublished Greek *Physiologus*, which must date back before the 4th century, as Epiphanius refers to it in his controversy with Origen. The oldest translation into a European language is the 8th century Anglo-Saxon version of the *Panther*, the *Whale*, and the *Partridge* found in the Exeter Book (edited for the Early English Text Society by Mr. Israel Gollancz). The Old High German version dates from before the 11th century. Philippe de Thaun produced in the 12th century his French *Livres des Créatures* and *Le Bestiaire* (printed in T. Wright's 'Popular Treatises on Science,' 1841). A Middle English 13th century version will be found, along with the Latin text of Bishop Theobald, in Morris's *An Old English Miscellany* (Early English Text Society, 1872). See also T. Wright's *Reliquiæ Antiquæ* (1841-3).

Besuki (Du. *Besoeki*), residency of Java, Dutch E. Indies, the easternmost in the island, with an area of 3,922 sq. m. and a pop. (1896) of 758,919.

Beta. See BEET.

Betanzos (anc. *Brigantium Flavium*), tn., prov. Corunna, Spain, 14 m. E.S.E. from Corunna, on railway to Lugo and Madrid, with excellent fishery. Pop. (1900) 8,948.

Betelgeux (*a* Orionis), a red star of the first magnitude, but slightly variable.

Betel Leaf, or BETEL PEPPER (*Piper betle*), of the order Piperaceæ, is cultivated in India and the Malayan archipelago. It is a climbing plant, and the leaf is chewed with the betel nut.

Betel Nut Palm, or PINANG (*Areca catechu*), is a native of the Malay Peninsula. The fibrous fruit, about the size of a hen's egg, contains a hard seed or nut as large as a filbert. The natives cut the nut into slices, add lime to them, roll them up in a betel-pepper leaf, and chew them. This habit, which is common to all Indian and Malayan races, colours the mouth and lips red, and blackens but preserves the teeth, and gives a pleasant odour to the breath. A kind of catechu is extracted from the nuts. The palm is cultivated, and the nuts are exported.

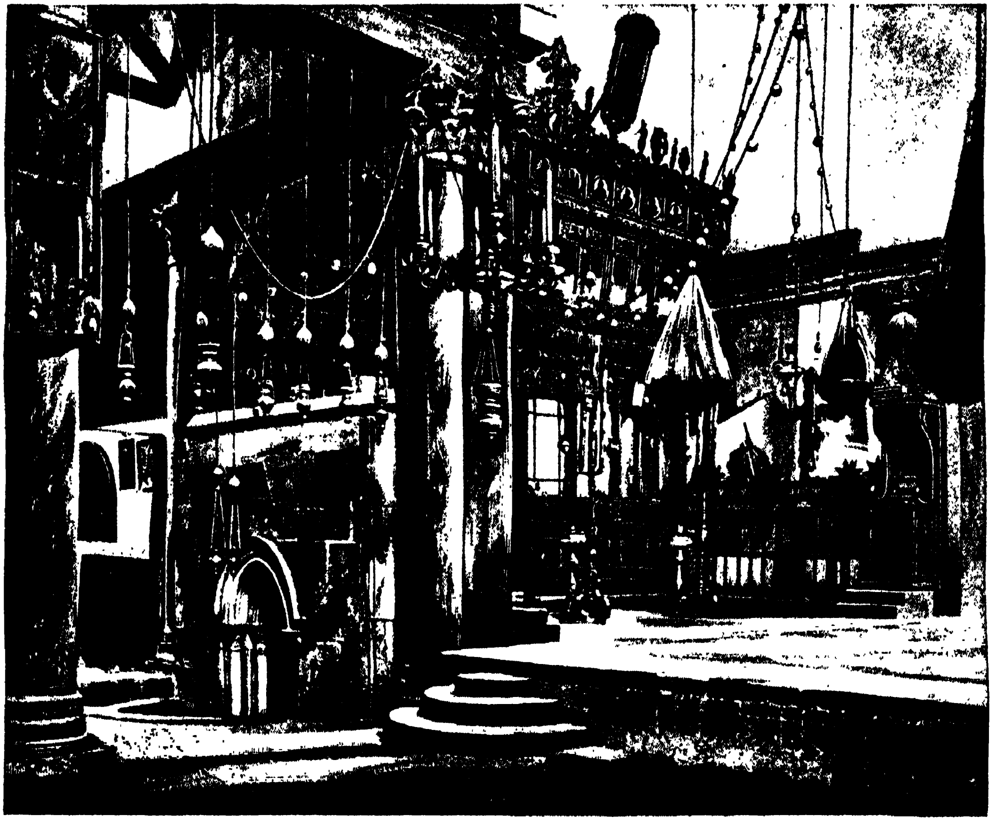
Betham-Edwards, MATILDA BARBARA (1836), English novelist and poet, has published *The White House by the Sea* (1855), *John and I* (1862), *Doctor Jacob* (1864), *Kitty* (1869), *A Dream of Millions* (1891), *A Storm-rent Sky* (1898), *A Suffolk Courtship* (1900), etc.; *Poems* (1885), *The Roof of France; or, Travels in Lozère* (1889), *France of To-day* (1892-4). She also edited Arthur Young's *Travels in France* (1889). See her *Reminiscences* (1898) and *Anglo-French Reminiscences* (1899).

Bethany. (1.) Village on S.E. slope of Mount of Olives, Palestine, 2 m. S.E. of Jerusalem, and on the highway from Jerusalem to Jericho. Its modern name is El-Azariyeh. It has a lofty tower, part of a convent founded in the 12th century for Benedictine nuns; underneath is a vault, reputed to have been the tomb of Lazarus. The place is frequently mentioned in the gospels as the home of Martha and Mary and their brother Lazarus (Matt. 21:17; Mark 11:1; John 11:18-44). The ascension of Christ took place here (Luke 24:50, 51). (2.) Town, Natal, 35 m. S.W. of Ladysmith. (3.) Town, Great Namaqualand, German S.W. Africa, 150 m. W. of Angra Pequeña. (4.) Town, Transvaal Colony, 20 m. W.N.W. of Pretoria.

Bethel ('house of God'), vil., 12 m. N. of Jerusalem, Palestine; its earlier name was Luz, and its modern name is Beitin. It stands 2,880 ft. high, on a stony ridge. Abraham pitched his tent in the neighbourhood, and built an altar (Gen. 12:8). It was the scene of Jacob's vision (Gen. 28:19). In the time of the judges it became a sacred place (Judges 1:22), and in the time of Rehoboam was an idolatrous centre (1 Kings 12:28).

Bethesda ('house of the stream'). (1.) In Palestine a pool with five porches (John 5 : 2). The site is doubtful. (2.) Town, Carnarvonshire, Wales, 4½ m. S.E. of Bangor, on L. & N.W.R.; is entirely dependent on the great Penrhyn slate quarries; the scene of great labour disputes (1896), renewed in July 1901, after the quarries had been closed for many months, and continued until 1903. Pop. (1901) 5,281.

Beth-horon, two villages 12 m. N.W. of Jerusalem, Palestine, commanding an important pass on the frontier between Benjamin and Ephraim; scene of victory of Joshua over the Amorites (Josh. 10 : 10). Another battle was gained here by Judas Maccabæus over the Syrians in B.C. 166. The modern name is Beit-Ur.



Bethlehem: Entrance to the Church of the Nativity.

Bethlehem. (1.) Village, 5 m. S. of Jerusalem, Palestine; was the birthplace of King David, and afterwards of Christ (Matt. 2: 1-6). Its modern name is Beit-Lahm, and it is now a thriving town with a population of over 8,000 Christians. The Church of the Nativity stands at E. end of town, on the reputed site of the manger, and is probably the oldest Christian church in the world. The town has been sacred to Christians from the earliest times. The crusaders made the safety of its inhabitants their special care prior to the capture of Jerusalem in 1099. (2.) Post bor. on l. bk. of Lehigh R., Northampton co., Pennsylvania, U.S.A., 55 m. N. of Philadelphia, and the terminal station of the N. Pennsylvania Ry. It is of Moravian origin, dating from 1741. It is connected by a bridge across the river with S. Bethlehem, the seat of the Lehigh University. There are iron furnaces, rolling mills, zinc works, etc., in the neighbourhood. Pop. (1901) 7,293, or including S. Bethlehem, 17,064. (3.) District and vil., healthily situated (alt. 5,400 ft.), in Orange River Colony, 105 m. W. of Ladysmith.

Bethlehemites, a name assumed by several orders in the Catholic Church. Of these one was established in England, with a monastery at Cambridge (1257); another, founded in 1459, to resist the advance of the Ottoman power; and a third arose in America (c. 1665), with the special purposes of teaching in schools and nursing the sick, but became extinct in 1845. This name has also been given to the disciples of John Huss, who preached in the Bethlehem Church at Prague.

Bethlen, GABOR—*i.e.* GABRIEL—(1580-1629), Transylvanian prince, of a celebrated Hungarian family. At one time the supporter of Gabriel Bathori, Prince of Transylvania, he took advantage of his fall to ingratiate himself with the Turks, by whose aid he was elected to the throne in 1613. He invaded Austria in 1619 in support of the Bohemians, and was crowned king of Hungary in 1621. Owing, however, to the antagonism aroused by his alliance with the Turks, he was obliged to relinquish the throne to Ferdinand II. of Austria, but he remained Prince of Transylvania till his death. See Gindely's *Bethlen Gabor u. sein Hof* (1890).

Bethnal Green, met. and parl. bor. and civ. par. of London; a populous district in the East End. Area, 760 ac. The museum in Cambridge Road, a branch of the Kensington Museum, was opened in 1872. Bethnal Green returns two members to Parliament. Pop. (1901) parl. bor. 129,727; met. bor. and civ. par. 129,680.

Bethphage, a vil. of Palestine, on Mount Olivet (Matt. 21:1; Mark 11:1; Luke 19:29), apparently near Bethany. The site is unknown.

Bethsaida, a vil. of Palestine, E. of R. Jordan, near its entrance into Sea of Galilee; was the scene of Christ's miracle of the feeding of the five thousand (Luke 9:10-17). Another village, supposed to have stood to the W. of Jordan, on the N. shore of the lake, was the native place of Philip, Peter, and Andrew (Mark 6:45).

Beth-shemesh ('house of the sun'). (1.) Was a city of N. Judah, Palestine, between Kirjath-jearim and Timnah; town of the Levites (Josh. 21:16), and afterwards regarded as the chief city in Dan; scene of the capture of Amaziah, king of Judah, by Jehoash, king of Israel (2 Kings 14:11); now the ruined village of Ain Shems, in the valley of Sorek. (2.) A 'fenced city' of Naphtali, in Upper Galilee (Josh. 19:38). (3.) A city of Issachar (Josh. 19:22). (4.) Temple of On, Lower Egypt (Jer. 43:13).

Bethulie, dist. and vil. in the Orange River Colony. The village is 110 m. by rail S. of Bloemfontein.

Béthune, tn., dep. Pas-de-Calais, France, 25 m. by rail E.S.E. of Lille, with which it communicates by canal. Numerous rich coal mines are found in the vicinity. The chief industries are sugar-making, distilling, and linen-weaving; and a trade in corn, cattle, and horses is carried on. Its celebrated belfry was erected in 1388. Pop. (1901) 12,404.

Bethune, EDWARD CECIL, colonel, began his military career in 1875. He received his captaincy in February 1884, and was promoted lieutenant-colonel in 1900. Bethune served in the Afghan war of 1878-80, and was present in the operations around Cabul (Dec. 1879), for which he received the medal with clasp. He served through the Boer war of 1881, also that of 1899-1902, in which he raised and commanded Bethune's Mounted Rifles (1899-1900), better known, perhaps, as 'Bethune's Horse.'

Betony Wood (*Stachys betonica*) belongs to the order Labiatæ. Its reddish-purple flowers are conspicuous by the roadsides and in woods during July and August in many parts of England, but it is seldom seen in Scotland and Ireland. The leaves are from one to four inches long; their deep, rounded teeth are characteristic.

Betsiboka, riv., Madagascar, rises N. of Antananarivo, flows N. and N.W. for 200 m. to the Bombetoke Bay, Mozambique Channel, and receives the Ikopa. In the rainy season there is a navigable waterway from Majunga to the mines of Mevatanana, on the Ikopa, 148 m.

Betsileo, a negro people living in the mountainous part of Madagascar. They were subjugated by the Hovas (whom they resemble in many of their customs) at the beginning of the 19th century, and now occupy a fertile region with a healthy climate (3,750 ft. alt.), and are good agriculturists. They number about 300,000. Principal tn. Fianarantsoa.

Bettelheim, ANTON (1851), Austrian man of letters, born at Vienna; worked as a journalist (1881-6); has distinguished himself as biographer and literary critic—writing lives of Anzengruber (1891; 2nd ed. 1897) and Marie von Ebner-Eschenbach (1900); editing an excellent biographical series called *Führende Geister*, afterwards *Geisteshelden* (from 1890 onwards), and *Biographisches Jahrbuch* (1898 onwards). His essays were collected as *Die Zukunft unsers Volkstheaters* (1892), *Deutsche u. Franzosen* (1895), and *Acta Diurna* (1899).

Betterment, in United States Federal law, is the increase in the value of landed property through some scheme of public improvement, or from other indirect causes, such increase of value being subject to a graduated tax. Fortuitous increase of value of this kind has been defined as 'unearned increment.' Efforts have been made in Great Britain to raise a new source of revenue by taxing this unearned increment. A Land Values Assessment and Rating Bill passed its second reading in 1904, but was dropped. Opponents of the measure plead that the correlative principle of 'worsement'—*i.e.* depreciation of value due to public action or indirect causes—should be considered.

Betterton, THOMAS (?1635-1710), English actor, dramatist, and theatrical manager, was born at Westminster. He appeared at the Cockpit Theatre about 1659-61. A visit made to Paris at the command of Charles II. brought him under the influence of Molière, with the ultimate effect of transforming the producing and staging of plays in England. Betterton was an admirable actor, and his character ranked high in a dissolute age. He was buried in Westminster Abbey. Of the seven plays attributed to him, some are adaptations from the French or from the older dramatists, but all of them are poor in quality. See Colly Cibber's *Apology for my own Life* (new ed. 1888); R. W. Lowe's *Life of Betterton* (1891).

Bettia, tn., Champaran dist., Bengal Presidency, India. Pop. (1901) 24,696.

Bettinelli, SAVERIO (1718-1808), Italian writer, was born at Mantua. A Jesuit, he was successively teacher of rhetoric at Venice (1748), of history and literature at Parma (1751), and of eloquence at Modena. He was the author of many tragedies and poems, but he is best known in Italian literature as the writer of an elaborate treatise on *Il Risorgimento d'Italia negli Studii, nelle Arte e ne' Costumi dopo il Mille* (1775). In 1801 an edition of his collected *Opere* was published in 24 vols. See Napione's *Vita* (1819), and Tipaldo's *Biografia degli Italiani Illustri* (10 vols. 1834-45).

Betting. Although it is possible to wager upon every known contingency, betting is practised most in connection with the turf; and we shall confine ourselves to that subject. At the end of the 19th century the practice of backing horses had developed to an enormous extent; but among the richer and more cultured classes wagering of every kind had greatly decreased since the 'fifties. At that period immense sums changed hands on the turf, Mr. James Merry and Sir Joseph Hawley being among the most fortunate winners. The eccentric Lord Glasgow was said to have laid Lord George Bentinck £90,000 to £30,000 against a certain horse; the Marquis of Exeter would put many thousands upon his own horses; the Marquis of Hastings lost considerably over £100,000 when Hermit won the Derby, and Captain Machell netted £63,000. But since that time the bulk of the money has come to flow from the pockets of humbler classes.

By the Betting Acts, 1853 and 1874, which apply to Scotland as well as to England, it is enacted that no house, office, room, or other place shall be used for the purpose of the owner or occupier betting with persons resorting thereto. It has been held that a stool, an umbrella, a tree, but not an enclosure at a racecourse, is a place. The 'resorting' must be physical—*i.e.* not by letter or telegram. The penalty for infringement is a fine of £100, or six months' imprisonment. Any person receiving money on condition of paying a bet is liable to a fine of £50. Money so paid may be recovered. Advertisements and circulars relating to betting-houses are forbidden. An appeal lies to quarter sessions. A betting-house is declared to be a common nuisance, and may be treated as a common gaming-house under the Gaming Act, 1845.

A bet *per se* is not illegal; but if the backer deposit his stake-money with the layer in advance, the transaction is contrary to the statute. Cockburn's Act of 1853, and Anderson's Act, which extended the principle to Scotland in 1874, drove those bookmakers who wished to deal with the ready-money public to Boulogne, and later to Holland. It was recently attempted by the Anti-Gambling League to make these acts applicable to the bookmaker who betted to ready money in the ring; and the action Hawke *v.* Dunn went through every stage known to the law, until at length the pursuer, defeated on a technical point, retired from the field.

It is not to be supposed that the bookmaker always wins. Still, provided he 'bet to figures,' he possesses an advantage which brings him out uppermost in the long run. Supposing there are three horses in a race, and all hold equal chances, each will have one chance in three, or, in other words, there will be one chance in its favour and two against it—*i.e.* the odds against it would be 2 to 1. Let us suppose the actual chances possessed by three are in the ratios of three, two, and one. The just odds will then be calculated as follows:—A has a chance (three) exactly equal to that of the other two put together (two and one). Therefore its chances of success or defeat are even. B has two chances of winning, against four possessed by its rivals (three and one), so that the odds against it are 4 to 2 or 2 to 1. C has only one chance against the five held by the others conjointly (three and two), so that the odds against it are 5 to 1. The proper odds would therefore be: Evens A, 2 to 1 against B, 5 to 1 against C. But the bookmaker who would offer such prices as these has not yet left home. These are more like the ordinary ring prices: Evens A, 6 to 4 B, 75 to 20 C. Represented in another way, the chances of A, B, and C, as we have estimated them, are ½, ⅓, and ⅙ of the whole chance of winning, and added together they make an exact unit. At the odds laid by the bookmakers, they are credited with chances amounting to ½, ⅖, and ⅕, which, added together, make 1⅒; and this odd tenth is the bookmaker's profit. It often happens that only two or three horses are backed, no matter how large the field; and should one of the three win, the bookmaker will be fortunate if he 'gets out.' On the other hand, it may happen that, in a field of three or four, each is favourite in turn; and here the professional reaps a large harvest. Given a good connection and sufficient capital, bookmaking is a very lucrative profession; but bad debts are many, and often large.

The object of the man who backs the field against all comers is to lay the same amount against every horse at the relative odds. Thus, with the betting 5 to 4 against A, 2 to 1 against B, 4 to 1 against C, and 100 to 12 against D, he would, if making a £1,000 book, like to lay £1,000 to £800 A, £1,000 to £500 B, £1,000 to £250 C, and £1,000 to £120 D. And if he were to lay against no more horses, his would be what is called a one-eyed book, involving a certain loss in the event of the victory of A, the favourite. And the maker of one-eyed books would not last long. But this extreme case is given to show plainly that there is more profit for the layer when an outsider wins than when a favourite is successful. It often happens that, through inability to lay enough money against the other runners to 'straighten' his book, the maker is what is called 'bad against' the favourite, or some other horse well backed —in other words, that he has 'overlaid' his book against that particular horse. There are then two courses open to the defender of the field: he may accept the odds against that horse from some other bookmaker—a system technically known as 'backing it in'—or he may face the situation, and trust to luck. Again, some layers frequently make a book for some particular horse in which they may be more or less interested—*i.e.*, while laying against the rest according to the first principles of bookmaking, betting as little as possible against that one, in order to keep it. But these are methods seldom employed by the fielder, who has found out that the straightest way to success is to bet to figures. 'You cannot be backer and layer at the same time,' is a maxim of the ring.

Post betting, as the name implies, takes place on the scene of action, and begins as soon as the numbers of the starters have been displayed in the frame set apart for that purpose. 'Ante-post' betting refers to wagers made before the day of the race—it may be twelve months or more in advance. But this form of betting has long been on the decline, since so many well-backed horses are 'scratched' before the day of the race; and the Derby, Cesarewitch, and Cambridgeshire are the only races upon which much 'ante-post' wagering now takes place. For nearly thirty years 'P.P.'—*i.e.* 'play or pay'—betting was, according to the written rules, the exception, the cases in which bets were to be P.P. being specifically enumerated; that is to say, it was understood that, save in certain races, the bet was off (void) if the horse selected by the backer did not start. He was allowed a run for his money. In 1886, however, the committee of Tattersall's (now amalgamated with that of the Newmarket Rooms, Tattersall's being but seldom resorted to for betting purposes, though the old room is still kept open) ordained that all bets should be P.P., with four exceptions—(1) when the nominator of the horse dies before the decision of the race; (2) when the race is postponed, or its conditions altered, after the bet is made; (3) bets on matches; (4) bets made, after the running numbers are put in the frame, about a horse which is not subsequently under the starter's orders.

But towards the latter end of the century a new form of betting was introduced which has quite revolutionized the old system—that is, 'starting price' or 'S.P.' betting. Most people are unable to attend race meetings, save, perhaps, one or two yearly; but they can none the less bet upon them to the fullest extent. The layer contracts to lay the exact price as quoted in a certain sporting paper, the backer, as a matter of course, getting a run for his money. In the early days of this system considerable rivalry existed between the two leading racing papers, and the starting prices given in the *Sporting Life* used to differ somewhat from those in the *Sportsman;* but now the prices given are practically the same. A reporter for each newspaper is told off to get the price, using his own observation, and being perhaps allowed to peruse the betting book of one of the magnates of the ring; and this price is subsequently wired all over the country. Most S.P. layers decline to accept more than £10 for one horse less than half an hour before the time fixed for the race, the reason being obvious. Should the layer receive a large amount, he would, in order to insure himself, have to 'cover at the post'—*i.e.* wire to back the horse in the ring. But some S.P. mongers take no thought for covering, their method being simply a gamble; for, as it is impossible to tell what the starting price will be until after the race has been run, so is it impossible to make certain of winning over any one of the possible results. Hence S.P. betting can be by no means a safe business to pursue.

The chief rock ahead of the bookmaker is the statute familiarly known as the Gambling Act. A customer who is lacking in conscience has only to plead this act in a court of law to get absolved from all betting liabilities.

The *paris-mutuels* or 'mutual bets' system of wagering, introduced into France about 1865, and carried to England three or four years later, has never commended itself to British authorities. A self-registering machine was introduced on British racecourses by a Spaniard named Oller some time in the 'sixties, and became so popular that more than one British bookmaker adopted the system, when outside betting was permitted by the authorities. The 'Parry,' as it was familiarly called, was perfectly fair to the backer. It was impossible for any one to cheat; and the money taken over the losing horses, less 10 per cent. deducted from the gross takings, went to pay the backers of the winner. It was very simple; and as they frequently obtained better odds on the winner than would have been offered them in the ring, punters patronized the apparatus freely. But after a year or two the law stopped the 'Parry.' The system is still used in Australia, India, and France, but the machine has disappeared. In France there are *paris-mutuels bureaux*, where the units are different sums—from 10 francs to 100 francs and over—and the backer invests his cash on the number of the horse he may select. After the race a statement of the value of each winning bet, calculated on a unit of 10 francs, is placed on a board visible to all the operators. Backers of successful horses, both winners and placed horses, can thus easily calculate their winnings, which are obtainable from a *bureau* corresponding to that whence the voucher was issued. In France the percentage deducted from the gross sum invested is divided between the race fund and the poor; but in the British colonies, where the system is called the 'Totalizator,' the race funds get it all. See Stutfield's *Tattersall's Rules of Betting* (1888), E. Spencer's *Great Game* (1900), and A. E. T. Watson's *The Turf* (1898).

Betto, Bernardo di. See Pinturicchio.

Bettws-y-Coed, par., vil., and tourist resort, Carnarvonshire, Wales, on the L. & N.W.R., 3 m. s. of Llanrwst; beautifully situated among pine-clad hills, at the junction of the Llugwy with the Conway. The Swallow Falls, Fairy Glen, and Miner's Bridge are much visited by tourists. It was a favourite haunt of David Cox, and is an excellent centre for fishing, and for exploring the Snowdon district. Pop. (1901) 881.

Betty, William Henry West (1791-1874), a precocious boy actor, known as the 'Young Roscius,' was born at Shrewsbury. He first appeared at Belfast in 1803, and till 1806 played in London and the provinces. He retired from the stage in 1807 with a large fortune. He reappeared in 1812-24, without success. See his Autobiographical *Life of Young Roscius* (1804).

Betul, a hilly dist. in Central Provs., India; forms the w. section of the great Satpura plateau. It was once the centre of the ancient Gond kingdom of Kherla. Coal is found. Area, 3,826 sq. m. Pop. (1901) 285,363.

Betula. See Birch.

Betulaceæ, in botany, an order of seventy-five species, chiefly in north temperate regions; closely related to Cupuliferæ; includes the birch and alder.

Betwa, riv., rising in the Vindhya Mts., Bhopal, Central India Agency; flows N.E. through Bundelkhand, and joins the Jumna on the r. bk. near Hamirpur, after a course of nearly 400 m.

Beulé, Charles Ernest (1826-74), French politician and archæologist, became professor of rhetoric at Moulins, and in 1849, while teaching at the archæological school of Athens, he discovered the propylæa of the Acropolis. Appointed professor of archæology at the Bibliothèque Nationale of Paris in 1854, his prolific literary activity was interrupted in 1858-9 to pursue investigations on the site of Carthage. Entering the National Assembly as an Orleanist in 1871, he held the portfolio of the interior under MacMahon in 1873. He published *L'Acropole d'Athènes* (1854); *Etudes sur le Peloponnèse* (1855); *Les Monnaies d'Athènes* (1858); *L'Architecture au Siècle de Pisistrate* (1860); *Phidias, Drame antique* (1863); *Causeries sur l'Art* (1867); *Histoire de l'Art grec avant Périclès* (1868); *Le Sang de Germanicus*, and other works. See Ideville's *Monsieur Beulé, Souvenirs Personnels* (1874).

Beust, Friedrich Ferdinand, Count von (1809-86), German and Austrian statesman, was born at Dresden. He entered (1831) the Saxon diplomatic service, and became minister of foreign affairs in 1849. He defended the rights of the smaller German states against the aggressions of Austria and Prussia; but in 1866, after the defeat of the former power, he was obliged to resign office. On the invitation of the Emperor Francis Joseph, he became minister of foreign affairs for Austria, and at once began a complete reorganization of the Austrian empire. In 1867 he became president of the ministry and chancellor of the empire. He succeeded in conciliating Hungary, and secured the emperor's coronation as king of Hungary at Pesth, and carried out many reforms. He resigned office after the proclamation of the German empire in 1871, and was subsequently appointed ambassador to Britain (1871), and to Paris (1878). Beust's *Memoirs* have been translated into English, with an introduction by Baron Henry de Worms (1887).

Beuthen, tn., prov. Silesia, Prussia, 120 m. by rail S.E. of Breslau, and only 2½ m. from the Polish frontier; stands in the middle of the Upper Silesian coal, iron, and zinc industries. Pop. (1880) 22,811; (1900) 51,404.

Beveland. (1.) North, isl., prov. Zeeland, Netherlands; lies N. of Walcheren and S. Beveland, and is washed on the N. by the E. Scheldt. It is 12 m. long by 4 m. broad. (2.) South, isl., prov. Zeeland, Netherlands; lies between the E. and W. Scheldt, behind the island of Walcheren. It is 25 m. long by 5 to 6 m. wide, and is bisected by the S. Beveland Canal, made in 1866. In 1530 and 1532 it was overwhelmed by the sea, but has since been entirely reclaimed. Its chief town is Goes, or Ter Goes.

Beveren, tn., prov. E. Flanders, Belgium, 6 m. W. of Antwerp; manufactures lace. Pop. (1900) 9,252.

Beveridge, William (1637-1708), bishop of St. Asaph; vicar of Ealing (1661), St. Peter's, Cornhill (1672), archdeacon of Colchester (1681), prebendary of Canterbury (1684), bishop of St. Asaph (1704). His *Synodicon* (1672), a collection of the apostolic canons and decrees of the councils, is a work of great erudition; but he is chiefly read in his devotional *Private Thoughts* (1709). See edition of works by T. Hartwell Horne (1824), or in the Anglo-Catholic Library (1842-6), each with a biographical notice.

Beverland, Adrian (1654-1712), Dutch scholar and friend of Isaac Vossius, was born in Middelburg, Zeeland; took the degree of doctor of laws, but devoted himself to literature; visited Oxford in 1672, and wrote his famous treatises, *Peccatum Originale* (1678) and *De Stolatæ Virginitatis Jure* (1680). He was imprisoned for the former, and the latter caused his name to be struck from the rolls of Leyden University. He then came to England, where he died.

Beverley, par. and munic. bor., E. Riding of Yorkshire, England, 8 m. N.W. of Hull. The twin-towered church of St. John (Beverley minster) is one of the finest ecclesiastical buildings in England, the 14th century 'Percy shrine' being of exquisite design and workmanship. The other parish church is that of St. Mary's. Beverley is the seat of a suffragan bishop. Tanning, brewing, iron-founding, and agricultural implement making. Pop. (1901) 13,185.

Beverly, city, Essex co., Massachusetts, U.S.A., on the N. coast of Massachusetts Bay, about 20 m. from Boston, is a fashionable summer resort. Manufactures shoes. Pop. (1900) 13,884.

Bévezíers, Battle of. See Beachy Head, Battle of.

Bevis of Hampton, or the French *Beuve d'Hanstone*, was the name of one of the oldest Italian romances of chivalry, popular in mediæval England. Included in the Carlovingian cycle of romances, the subject is an old French story, written in *ottava rima* in the beginning of the 14th century, published in 1489, and printed by Vérard as a French prose romance in 1500. An English poetical version of the story was edited by Dr. E. Kölbing for the Early English Text Society (1885).

Wood-Engraving by Bewick: the Yellowhammer.

Bewcastle, par. and vil., Cumberland, England, 10 m. N.E. of Brampton. In the churchyard stands a cross with runic inscription, 14 ft. high, supposed to date from the 7th century.

Bewdley, par. and munic. bor., Worcestershire, England, on riv. Severn, 3 m. S.W. of Kidderminster. Manufactures combs and ironware; tanning and making of ropes and bricks. Pop. (1901) 2,866.

Bewick, Thomas (1753-1828), English wood-engraver, who revived the art, first attracting notice in 1775, and brought it to a perfection which it had never previously attained. Among his best works were the illustrations to a *General History of Quadrupeds* (1790), *History of British Birds* (1809), *Æsop's Fables* (1818), and blocks for editions of the poets printed by Bulmer of the Shakespeare Press. His woodcuts are much prized by collectors. In 1870 an edition of over two thousand *Bewick Woodblocks* was issued by Reeve. See *Memoir of T. Bewick, by himself* (1862), and *Lives* by Thomson (1882), Dobson (1884), and Rosin (1888); Jackson and Chatto's *Hist. of Wood-engraving* (1861), Linton's *Hints on Wood-engraving* (1879), and Hamerton's *Graphic Arts* (1882).

Bex (pron. *Bé*), small tn., canton Vaud, in the Rhone valley, Switzerland, 5 m. by rail S.E. of Aigle; starting-point of the electric line to Gryon and Villars. Pop. (1900) 4,561.

Bexhill, or Bexhill-on-Sea, coast par. and wat.-pl., E. Sussex, England, 5 m. S.W. of Hastings; 7,999 ac.; a *kursaal* of the continental type. Pop. (1901) 12,210.

Beyerlein, Franz Adam (1871), German dramatist and novelist, born at Meissen; wrote two of the greatest successes of the year 1903, the play *Zapfenstreich* and the novel *Jena und Sedan*. Both deal with military life, and both are written in the naturalistic spirit, and show considerable talent. Besides these, Beyerlein has written the plays *Dämon Othello* (1895) and *Das Siegesfest* (1896), and the novel *Das graue Leben* (1902).

Beyle, Marie Henri (1783-1842), French author, known under the pseudonym of 'Stendhal' (from Stendal, the home of Winckelmann, whom he greatly admired), was born at Grenoble, and served in the army during the Napoleonic invasions of Italy and Russia. From 1830 to 1833 he was French consul at Trieste, which post he exchanged for a similar one at Civita Vecchia (1833-41). In 1831 his greatest novel, *Le Rouge et le Noir*, appeared; and in 1839 *La Chartreuse de Parme* brought him additional fame. Among his other works are *L'Histoire de la Peinture en Italie* (1817) and *De l'Amour* (1822). He also attracted notice by *Shakespeare et Racine* (1823), a manifesto in favour of romanticism. His writing is brilliant, morbid, and cynical; but the plots of his novels are weak, displaying a constant straining after effect which is never realized. Prosper Mérimée is regarded as his pupil. Two excellent accounts of Beyle and his literary career have been written — Paton's *Henry Beyle* (1874) and Rod's *Stendhal* (1892). See also Sainte-Beuve's *Causeries du Lundi*, Maurice Hewlet's introduction to *La Chartreuse de Parme* (1902), Chuquet's *Stendhal-Beyle* (1902), and Stryienski's *Comment a vécu Stendhal?* (1900).

Beypur, seapt. near mouth of Beypur R., Malabar dist., Madras, W. coast, India, 7 m. S.E. of Calicut; station on railway across India from Madras. Pop. 6,700.

Beyrich, Heinrich Ernst (1815-96), German geologist and palæontologist, born at Berlin, where he became (1856) professor of geology and palæontology at the university, and (1873) director of the geological department. He published the geological chart of Germany, due in great part to his labours. Among his principal works are *Untersuchungen über Trilobiten* (2 vols. 1846); *Konchylien des Norddeutschen Tertiärgebirges* (1853-7); *Ueber einige Cephalopoden aus dem Muschelkalk der Alpen* (1867).

Beyrout. See Beirut.

Beyschlag, Wilibald (1823-1900), German evangelical writer, and professor of theology at Halle (1860-1900). He has published numerous works, including *Die Christologie des Neuen Testaments* (1866), *Das Leben Jesu* (3rd ed. 1893), *Neutestamentliche Theologie* (1891-2; trans. 1896), *Der Brief des Jakobus* (6th ed. 1897), *Der Altkatholizismus* (3rd ed. 1883), and *Aus meinem Leben* (1896-9).

Beza, Theodore, or De Bèze (1519-1605), Genevan reformer, was born at Vezelay. In 1548 his religious convictions became so strong that, on recovering from a severe illness, he felt compelled to join Calvin at Geneva. Earlier in the same year appeared his *Poëmata Juvenilia*, the publication of which he afterwards deeply regretted. For about ten years he was professor of Greek at Lausanne; but returning to Geneva in 1558, he was appointed professor of theology and president of the college. While at Lausanne he published (1550) a drama, *Abraham's Sacrifice*. The consummate tact with which he conducted negotiations on behalf of the oppressed Vaudois, or Waldenses, in 1557 and 1558, led to his appointment as representative of the Protestants at the conference of Poissy (1561). Detained in Paris by the religious wars, he became the most trusted adviser of the reformed leaders. In 1563 he returned to Geneva, and on Calvin's death, in the following year, was appointed his successor. In 1562 the French government permitted the publication of the Huguenot Psalter, most of which was written by Beza. To him also the Huguenots owed the final revision of their Bible. He presented Cambridge University with the uncial New Testament MS. known as the Codex Bezæ. (See BIBLE.) His best-known works are his edition of the Greek Testament (1565), his *Histoire Ecclésiastique des Eglises Réformées du Royaume de France* (1580; new ed. 1883), and his translation of the New Testament into Latin (1556). See H. M. Baird's *Life of Beza* (1899), and bibliography there.

Bezant, in heraldry, one of the charges called roundels; is a small disk of gold. On the Continent it may be either gold or silver.

Bezant of Manuel I. (1143-1180).

Bezants, the coins of the Byzantine empire, but specially the gold bezant (*bizancium, nummus aureus* or *solidus aureus*), struck between 395 and 1453, and varying in value between ten shillings and twenty shillings for the gold piece, and between one and two shillings for the silver. The *dinar* of the caliphate was called by the crusaders the 'Saracen bezant,' and this latter coin gradually displaced the Greek bezant. For centuries the bezant was used as the basis of all transactions between the East and the West, but it eventually gave way before the Venetian ducat.

Bezdan, tn., co. Bacs-Bodrog, Hungary, near the r. bk. of the Danube, where the Franzen or Bacser Canal (from the Theiss) enters the river; 11 m. N.W. of Zombor. Pop. (1900) 7,980.

Béziers, tn., dep. Hérault, France, beautifully situated on the slope of a hill overlooking the fertile valley of the Orb, and on the Canal du Midi, 50 m. by rail S.W. of Montpellier. There are remains of a Roman amphitheatre. Largely a commercial town, Béziers has an important market for wines, fruit, and cattle. The crusade against the Albigenses resulted, in 1209, in the wholesale massacre of the inhabitants. Pop. (1901) 52,310.

Bézique, a card game in which the name *bézique* is applied to the occurrence in one hand of the knave of diamonds and queen of spades, may be played by two, three, or four persons, with two, three, or four packs of cards from which have been removed cards with from two to six pips; the remaining cards rank in this order—ace, ten, king, queen, knave, nine, eight, seven. If two are playing, eight cards are dealt to each, thus leaving forty-eight to form what is called 'stock,' the top card of which is turned up for trumps. It is laid at the side of the stock, of which it is the last or bottom card. The non-dealer leads, the dealer follows, not necessarily in the same suit. If he play a higher card of the suit led, or trumps, he secures the lead. In the case of a tie the leader wins. After every trick the players each draw a card from the stock, the winner of the trick taking the top one, his opponent the next. Thus they continue to play and draw alternately until the stock is exhausted. After that point the second player must follow suit when possible, and take the trick when he can. The first to score 1,000 points wins the game. If his opponent has not scored 500, the game counts double.

The objects of the play are (1) to promote in the hand certain combinations of cards to which, on being declared, different scores attach; (2) to win aces and tens; and (3) to win the so-called last trick—so named not because it is the last trick of the hand, but because it is the trick just before the drawing of the last cards from the stock. Combinations of cards are declared by the winner of a trick before he draws from the stock, the cards (one of which must not have been declared before) being placed face upwards upon the table, where they remain still part of the hand and still playable, as though they had not been declared. A player is not obliged to declare, though he may win a trick and hold scoring combinations. More than one declaration may succeed one trick. The combinations, on being declared, count as follows:—Class 1. Marriage (king and queen of any suit), 20; royal marriage (king and queen of trump suit), 40; sequence of five highest trumps (ace, ten, king, queen, and knave), 250. Class 2. Bézique (queen of spades and knave of diamonds), 40; double bézique (all the bézique cards), 500. Class 3. Any four aces, 100; any four kings, 80; any four queens, 60; any four knaves, 40. Each ace and ten won in tricks counts 10. The last trick counts 10. In turning trumps, the dealer scores 10 if he turn the seven; either player scores 10 for exchanging from the hand a seven of trumps for a turned trump not a seven, and 10 for declaring the second seven of trumps, which is simply shown on being declared, and not put on the table.

Though more than one declaration may be made to one trick, no card of one combination may form part of another declared after the same trick. For instance, four knaves and a marriage may be declared after the same trick, but king and queen of spades and knave of diamonds cannot be declared together to score marriage and bézique. The player must first declare one combination, say bézique; and when he comes to declare after another trick, he can score marriage by declaring the king. A declaration cannot be made of cards that have already all been declared. If a sequence in trumps is declared, marriage of the king and queen on the table cannot be declared. To score both is only possible by declaring marriage first, and, after winning another trick, adding the remaining sequence cards. A card once declared can be declared again only in combinations of a different class. The winner of the last trick has the privilege of declaring anything in his hand under the general regulations affecting declaring, and after that further declarations cease. To him also falls the remaining unturned card of the stock, the loser taking the turn-up card, or the seven that may have been exchanged for it. The cards on the table that have been declared but not played are now taken up, and the last eight tricks are played under different rules. The winner of the last trick leads, and the other player *must* follow suit if possible; if not possible, he *must* win the trick by trumping if he can. The tricks now won are valuable only for the aces and tens they may contain. If a player revokes in the course of these tricks, or does not win when able, the last eight tricks are forfeited to his opponent.

The lead in bézique is considered a disadvantage; therefore players are cautioned against winning tricks, unless they wish (1) to declare, (2) to make an ace or ten of the suit led, (3) or to win an ace or ten that has been led. Except in trumps, sevens, eights, and nines are valueless; knaves, too, unless they are bézique and trump knaves, are of little account. The rule in difficulties is to lead an ace or a ten in preference to a king or a queen. Generally, in trying for aces players sacrifice some other score, and are pretty sure to lose some of the aces after declaring them. Other forms of bézique are Polish or open bézique, in which the game is 2,000 up; and grand bézique, where four packs are used, the game being 3,000 up. See Camden's *Standard Rules of Bézique* (1889), and M. Berkeley's *Bézique and Cribbage* (1890).

Bezoar, a morbid concretion occasionally found in the stomach and intestines of ruminants (*e.g.* antelopes, vicuña, llama, chamois, wild goat, and domestic cattle), formed by lime or magnesium phosphate adhering to some foreign substance, or by a portion of undigested food. The 'Oriental bezoar stone,' as it is termed, sometimes consists of a ball entirely of hair or vegetable fibre. These hair balls are frequently found in the stomachs of British cattle, their origin being ascribed to the common habit of a cow licking the hide of its calf or of another cow. In the East it was believed that the bezoar was an antidote for poison. Lionel Wafer, in his *Voyage and Description of the Isthmus of America* (1699), says that out of the stomach of a llama he took thirteen bezoar stones, some resembling coral, some round, and all green at first, though afterwards they turned of an ash colour.

Bezwada, tn., Krishna dist., Madras Presidency, India; of some commercial importance since the introduction of the railway. Has rock-cut Buddhist temples. Pop. (1901) 24,224.

Bhabua, tn., Shahabad dist., Bengal, India, 45 m. S.E. of Benares. Pop. (1901) 5,650.

Bhagalpur. (**1.**) Division of Bengal, India. Area, 20,511 sq. m. Pop. (1901) 8,723,318. (**2.**) District (area, 4,226 sq. m.) in above; is bisected by the Ganges. Indigo is the chief product. Pop. (1901) 2,088,953. (**3.**) Chief tn. of the above dist.; is situated on the r. bk. of the Ganges, 112 m. S.E. of Patna. Contains interesting Mohammedan shrines. Pop. (1901) 75,760.

Bhagavad Gita ('The Song of the Blessed One') is the work of an unknown author, and the date of its inclusion in the *Mahabharata*, of which it forms part of book vi., is also unknown. The song inculcates that remarkable development of Hinduism called *bhakti*, the doctrine of faith. The poem has at all times exercised a powerful influence on the hearts and minds of the worshippers of Vishnu. Attempts have been made to identify the Krishna of the poem with Christ, and to ascribe the striking resemblance of many of its verses with those of Holy Writ to the influence on Hinduism of early Christians and Jews a theory combated by the late Kasinath T. Telang of Bombay in his scholarly treatise on the *Bhagavad Gita* in vol. viii. (1898) of Max Müller's *Sacred Books of the East*. It has also been translated into English by Davies (1882) and Sir Edwin Arnold, *The Song Celestial* (1885).

Bhagavatapurana. See PURANAS.

Bhagirathi. (**1.**) Branch of the Ganges, in Bengal, India; passes through the Murshidabad dist., joins the Jalangi, becoming the Hugli. (**2.**) River in Garhwal state, India; joins the Alaknanda at Deoprayag, and forms the Ganges.

Bhainsror, tn. and fort in Udaipur dist., Rajputana, India, 120 m. S.E. of Ajmere; has vast ruins of ancient temples to Siva.

Bhamo, tn. on l. bk. of Irawadi, 40 m. W. of Chinese frontier, and over 200 m. by rail and river N.E. of Mandalay, Upper Burma. It is an important caravan centre between China and Burma, and marks the limit of navigation on the Irawadi. Pop. (1901) 9,134.

Bhandara, tn., Bhandara dist., Central Provinces, India, on the Wainganga R. Pop. (1901) 14,023.

Bhang, BANG, or BANGUE, the Indian name for the dried leaves of the hemp plant (*Cannabis indica*); strongly narcotic, and used either with or without tobacco or opium for smoking. An infusion gives the drink *hashish*, which produces a peculiar delirium, and catalepsy. A sweetmeat called *majun* is also made with the leaves. The drug is used in medicine as an anodyne, hypnotic, and antispasmodic.

Bhanpura, walled tn., 60 m. S. of Kotah, Indore state, Central India. Pop. about 20,000.

Bhartpur, or BHURTPORE, cap. of the feudatory state of the same name, in Rajputana, India. In 1805, the British, under Lord Lake, made four unsuccessful attempts to capture the fort, which was stormed by Lord Combermere in 1827. Pop. (1901) 43,601. The state has an area of 1,982 sq. m., and a pop. in 1901 of 626,665.

Bhartrihari, a Hindu poet who is believed to have flourished in the 1st century. He is the reputed author of the *Three Centuries* (*Satakas*) of Sanskrit apophthegms upon love, wise conduct of life, youth, and old age. The best edition of his writings is that edited by K. T. Telang, in the 'Bombay Sanskrit Series;' and there are translations by C. H. Tawney (1877) and B. H. Wortham (1886).

Bhatgaon, tn., Nepal, India, 10 m. E. of Khatmandu.

Bhatkal, seapt. in N. Kanara, Bombay Presidency, 80 m. N.W. of Mangalore, India. From the 14th to the 16th century was a flourishing trade centre. Pop. (1901) 6,964.

Bhatnair, now called HANUMANGARH, tn. and fort in the north of Bikanir state, Rajputana. The fort was captured by Tamerlane in 1398, and afterwards by George Thomas, the Irish adventurer. In 1807 it was taken by the rajah of Bikanir.

Bhau Daji (1822-74), a physician and antiquarian, born in Manjare, Sawantwari state, Bombay, India. He first taught in the Elphinstone Institution, Bombay, after which he took up medicine, and became assistant professor at Grant Medical College, Bombay, and from 1851 practised with great success in Bombay. He executed valuable research work in leprosy while studying the old Sanskrit drugs. The values of the ancient Sanskrit numerals were determined by him.

Bhaunaghar, or BHAVANAGAR, chief tn. and port of the state of the same name, Kathiawar peninsula, Bombay, India. Exports cotton. Pop. (1901) 56,442. The state has an area of 2,860 sq. m., and a pop. of about half a million.

Bhavabhuti, a celebrated Indian dramatist of the 7th and 8th centuries, who, with Kalidasa and Harsha, completes the great dramatic trio. Three of his plays have reached us—*viz.* the *Malati-madhava*, *Maha-vira-carita*, and *Uttara-rama-carita*; the history of Rama forming the subject of the two latter. The first has been translated by H. H. Wilson in *Theatre of the Hindus* (3rd ed. 1871), the second by J. Pickford (1871), and the third by C. H. Tawney (1874).

Bhavishyapurana. See PURANAS.

Bhel. See BAEL and ÆGLE.

Bhera, munic. tn., Shahpur dist., Punjab, India, 80 m. S. of Rawal Pindi. Pop. (1901) 18,680.

Bhils, an aboriginal tribe who inhabit the hilly tracts of the Vindhya range, Central India, and the jungles of Khandesh dist., Bombay Presidency; a primitive, dark, sturdy race of hunters. Their territory is traversed by the Narbada, which they regard with the utmost veneration and fear. Of a low civilization, they are improving under British rule, and are remarkable for their truthfulness and fidelity. They number nearly 1¾ millions. See Rowney's *Wild Tribes of India* (1882).

Bhilsa, tn., Bhopal, Central India, 26 m. N.E. of Bhopal. Grows coarse tobacco, and is noted for its Buddhist topes. The Great Tope at Sanchi is to the S.W. of Bhilsa.

Bhiwandi, tn., Tanna dist., Bombay Presidency, India, 30 m. N.E. of Bombay. Pop. (1901) 10,354.

Bhiwani, tn., Hissar dist., Punjab, India, 70 m. N.W. of Delhi. Commercial centre, with an important trade in sugar, salt, pepper, and metals. Pop. (1901) 35,917.

Bhopal, chief tn. of the feudatory state (area, 6,874 sq. m.) of the same name, Central India, 105 m. N.E. of Indore. The Bhopal dynasty was founded at the beginning of the 18th century by Dost Mohammed, an Afghan in the service of Aurungzebe. Pop. (1901) 77,023. Pop. of state, about 1,000,000.

Bhor, a feudatory state, Bombay Presidency, India; cap. Bhor, with a pop. (1901) of 4,178. Area, 1,491 sq. m. Pop. (1901) 137,268.

Bhotan. See BHUTAN.

Bhownagree, SIR MANCHERJEE MERWANJEE (1851), son of a Parsee merchant; born at Bombay, and educated at Elphinstone College and Bombay University. He became sub-editor of the *Statesman* newspaper (1871), and in 1881 came to England to study law, and was called to the bar at Lincoln's Inn (1885). He assisted (1887-91) the maharaja of Bhaunagar to establish a constitutional administration, and to reorganize the judicial and police departments. Returning to London (1891), he entered Parliament as Conservative member for Bethnal Green, N.E., London (1895). He was knighted in 1897. His works include *Hist. of the Constitution of the E. I. Company* (1871); Gujerati translation of Queen Victoria's *Life in the Highlands*.

Bhuj, cap. of feudatory state of Kutch, Bombay Presidency, India, 180 m. S.E. of Haidarabad. Pop. (1901) 26,362.

Bhurtpore. See BHARTPUR.

Bhusawal, tn., Khandesh dist., Bombay Presidency, India, 115 m. S. of Indore. The Great Indian Peninsula Ry. has large works here. Pop. (1901) 16,363.

Bhutan, or BHOTAN, an independent state in the E. Himalayas, bounded on the N. by Tibet, on the E. by Assam, on the S. by Bengal, and on the W. by Sikkim. Length from E. to W., 160 m.; breadth, 90 m. The country is traversed by lofty mountains. The elephant, bear, wild boar, and rhinoceros are found in its forests. Manufactures: coarse woollen and cotton goods, and tanned buffalo leather. Buddhism of a very simple form is the prevailing faith. The government of Bhutan resembles that of Tibet, the supreme authority being divided between the Deb Raja, or the secular head, and the Dharm Raja, or the spiritual head of the state. The Bhutanese are a hardy and industrious race, but poor and oppressed. Polyandry and polygamy are common. The chief towns are Punakha, the winter capital, a place of great natural strength, and Tasichozong, the summer capital. See G. Sandberg's *Bhutan* (1898).

Bhuvaneswar, the temple city of Siva, in Puri dist., Bengal Presidency, India; was the capital of the Kesari or Lion dynasty of Orissa (500-1104 A.D.); contains the ruins of five or six hundred shrines.

Biafra, BIGHT OF, large and deeply-indented bay on the W. coast of Africa, between the mouth of the Niger and Cape Lopez (400 m.). It receives the Niger, Old Calabar (Cross and Calabar), Rio del Rey, Kamerun, Sanaga, Campo, Gabun, and other rivers. Fernando Po, Prince's, and St. Thomas are the principal islands.

Biala. (**1.**) Town on W. border of Galicia, Austria, with cloth and other manufactures. Pop. (1900) 8,265. (**2.**) BIALA, or BYELA, tn. of Polish gov. of Siedlce, Russia, 50 m. by rail E.S.E. of Siedlce; hemp growing, cattle-rearing, and tanneries. Pop. (1897) 13,123.

Biana, tn., Bharatpur state, Rajputana, India, 50 m. S.W. of Agra; one of the oldest towns in India. Biana is a sacred spot to the Mohammedans. Pop. (1901) 6,867.

Biancavilla, tn., prov. Catania, Sicily, on the S.W. slope of Mt. Etna, 19 m. N.W. of Catania. It was colonized by Albanians in 1480. Pop. (1901) 13,409.

Bianchini, FRANCESCO (1662-1729), Italian astronomer, remembered chiefly for his tracing of the meridian. He founded the Academy of the Alethophili ('lovers of truth') in 1686, and was chosen by Pope Alexander VIII. secretary of the committee for the reformation of the calendar. A native of Verona; the Latin form of his name was Bianchinius. Author of an *Istoria Universale* (1697).

Bianco, or BIANCHO, ANDREA, Italian cartographer, born at Venice early in the 15th century. He left a collection of hydrographical charts, in one of which, dated 1436, two islands are placed to the west of the Azores, and named Antillia and Man Santaxio. This has been regarded as indicating a knowledge of the Americas prior to Columbus's voyages.

Biard, FRANÇOIS (1798-1882), French painter, born at Lyons. His subjects were derived from travels in various lands, as Syria and Egypt (1833), Gold Coast of Africa, Greenland and Spitzbergen (1839), Brazil (1858), etc. He excels in comic and burlesque situations, as *Les Saltimbanques*, *Après un Bal Masque*, *Un Concert de Famille*. Of his Greenland sketches the best known is *A Struggle with Bears*, now in the municipal gallery of Leipzig.

Biarritz (Basque, 'the two rocks'), winter and summer seaside resort, dep. Basses-Pyrénées, France, 493 m. S.W. of Paris and 16 m. from Spanish frontier; on Bay of Biscay. The climate is mild, and free from extremes; and the beach, divided by two rocks into three parts, is especially fine. The castle, built by Empress Eugénie, was burnt down in 1886. Napoleon III. and his family did much to make the place famous. There is a casino, with saline baths. Pop. (1901) 12,812.

Bias (*c.* 550 B.C.), of Priene, in Ionia, was famous as one of the Seven Wise Men of Greece.

Bib, POUT, or BRASSY (*Gadus luscus*), a small fish, allied to the haddock, found in the North Sea and the Arctic Ocean. During life the body is banded. The bib rarely exceeds five pounds in weight.

Biban-el-Moluk, valley, Upper Egypt, near ruins of Thebes; contains tombs of ancient kings (18th, 19th, and 20th dynasties).

Bibbiena, CARDINAL (1470-1520), Italian prelate and comic writer, whose real name was Bernardo Dovizi, but who was generally called Bibbiena, from his birthplace. He was made cardinal (1513) by Leo X., whose secretary he had long been, and was a great patron of art and learning. He is the author of what is generally regarded as the earliest regular Italian comedy, the *Calandria*, which, though not acted till 1513 and not printed till 1521 (at Siena), appears to have been written about 1490. It is based on the *Menaechmi* of Plautus, and borrows numerous traits from Boccaccio's Calandrino. Though remarkable for indecency even in that age of loose morals, it is still prized by reason of its natural dialogue, sparkling wit, and admirable prose. See A. Moretti's '*B. Dovizi e la Calandria*,' in the *Nuova Antologia* for June 15, 1882.

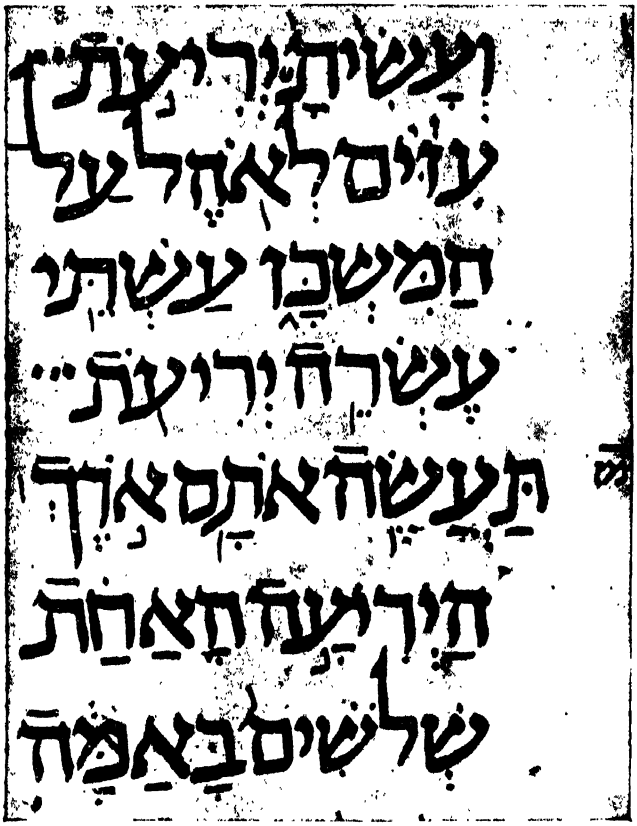
Bibby Steamship Line, one of the oldest steamship lines trading between England and India, founded nearly a century ago by John Bibby. The present fleet consists of seven steamers, aggregating 40,526 tons, running between Liverpool and Colombo and Rangoon.

Biberach, tn., Würtemberg, Germany, in the Donau circle, 23 m. S.S.W. of Ulm; has iron, toy, and other industries. Close by Moreau defeated the Austrians in 1796; and in 1800 the latter were again defeated by the French. Pop. (1900) 8,390.

Bibescu, PRINCE DIMITRIE. See STIRBEY, BARBO.

Bibiri. See GREENHEART.

Bible. *Language and Text of Old Testament.*—The Old Testament, omitting the Apocrypha, is written in Hebrew, with the exception of the following portions, which are written in Aramaic, a kindred Semitic language: Dan. 2:4-7:28; Ezra 4:8-6:18, and 7:12-26. A single verse of Jeremiah (10:11) is also written in Aramaic. No MS. of the Old Testament is reckoned to be earlier than the 9th century A.D., and it has been thought that those MSS. which are extant are all descendants of a common ancestor not earlier than the 2nd century A.D. We have, however, two sources of evidence which are of great value—the *Targums* and the *Versions*. A Targum, or oral interpretation, became necessary as soon as the sacred books were read in a language which had ceased to be the ordinary speech of the people. In course of time, as this oral interpretation became more elaborate, it was reduced to writing; and these written Targums are among our most valuable helps, both for fixing the text as read in the Jewish synagogues, and for determining the interpretation which the Jews attached to difficult passages. But it is upon the *Versions*, or translations made from the Hebrew in early times, that we chiefly depend both for the determination of the true text and for its explanation, and we proceed to give some account of these.



ועשית יריעת
עזים לאהל על
המשכן עשתי
עשרה יריעת
תעשה אתם ארך
היריעה האחת
שלשים באמה

Portion of Manuscript (Exod. 26:7) in Square Hebrew.

(Earliest dated Hebrew MS. in the British Museum.)

1. *Greek Versions.*—Of these by far the most important is the *Septuagint*, which was gradually executed in Egypt from about 300 B.C. to 150 B.C. As a translation it is of very unequal excellence, and it has come down to us in a state of great corruption. But as it is the oldest translation of the Hebrew Bible, and as all the other early translations are made from it, with the exception of the Peshito Syriac and Jerome's Vulgate, the study of it is of prime importance. It is constantly quoted by the writers of the New Testament. But the attempts which of late years have been made to reconstruct the Hebrew Bible from the Septuagint—as in, for example, Wellhausen's *Samuel* (1872) and Cornill's *Ezekiel* (1886)—are generally vitiated by a much exaggerated estimate of its value. The remaining Greek versions belong to a later date, and the translators of them are better known. They were collected in the first half of the 3rd century by the great Christian scholar Origen, in the work he called the *Hexapla* (or sixfold), on account of the six columns into which each page was divided; and these six columns contained as follows:—

1.	2.
Hebrew text.	Hebrew text in Greek letters.
3.	4.
Translation of Aquila.	Translation of Symmachus.
5.	6.
Translation of the Seventy.	Translation of Theodotion.

If this work of Origen had come down to us, we should have had three Greek translations to compare with the Septuagint. Unfortunately, there is nothing preserved beyond a number of quotations. Of the translators mentioned, Aquila was a Jewish proselyte from Pontus, who wrote in the beginning of the 2nd century. He was a very literal translator, and aimed at rendering even the untranslatable Hebrew particles. Theodotion was also a Jewish proselyte, from Ephesus; he aimed at reforming the text of the Septuagint, and his rendering of Daniel was accepted by the church as superior to that of the Seventy. His date is somewhere in the later half of the 2nd century. Symmachus, an Ebionite, belongs to the end of the 2nd century.

2. *Syriac Versions.*—The principal Syriac version, the Peshito (which means either *simple* or *vulgate*), was made (1st century) direct from the Hebrew, with occasional reference to the Septuagint. There is also another Syriac version made direct from the Septuagint as it stood in the Hexapla of Origen, hence called the *Hexaplar* (616-618 A.D.).

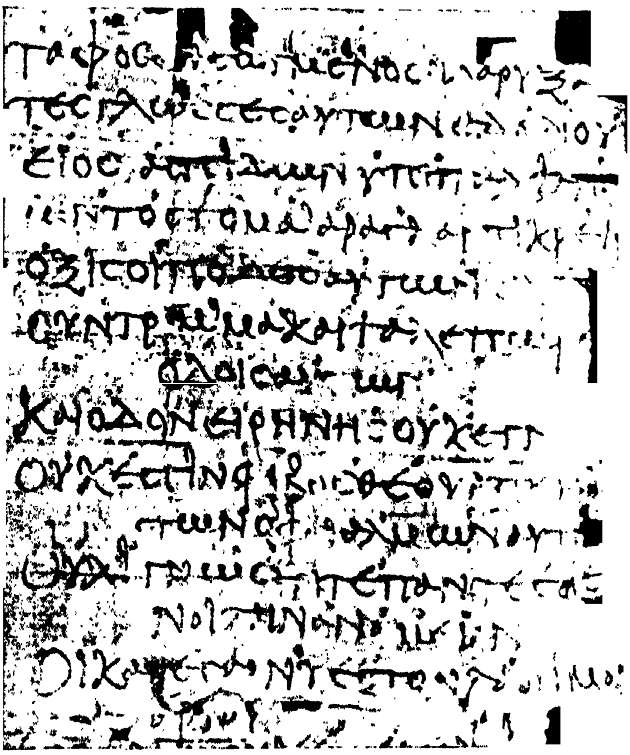
3. *Latin Version.*—The Old Latin, or *Itala*, was a literal translation of the Septuagint, made in the 2nd century A.D. The *Vulgate* is the revision of this, made by Jerome in Bethlehem between the years 392 and 404 A.D., by direct reference to the Hebrew, of which language he had made himself master somewhat late in life. The work of revision is very unequally done: some books underwent very little change; others were much more

carefully treated. In particular the Psalter, which Jerome translated afresh from the Hebrew, had already been twice revised by him on the basis of the Septuagint; these revisions are known respectively as the Roman and Gallican Psalters.

4. Other ancient versions—such as the *Arabic*, the *Persian*, and the *Ethiopic*—are of less value.

The Canon of the Old Testament.—The whole collection of books contained in the Bible is usually spoken of as the Canon, or canonical Scripture, any single book being said to be in the Canon, or canonical. Before Origen's time, the truth recognized by the church had come to be spoken of as the canon or test of doctrine; and the books that were in accordance with the traditional rule of faith, and embodied it, were therefore said by Origen to be canonized or canonical. But since the Scriptures themselves contain in written form this standard of faith, they themselves came to be spoken of, in an active sense, as the canon, or rule by which other books or statements might be tested.

It is probable that in Israel the first religious documents were collections of laws, to be used by the priests in the instruction of the people, and records of events which had influenced the national consciousness. Later on, the prophets, or their amanuenses, wrote down the discourses they had delivered in God's name. But the first approximation to what we call the canon seems to have been the law-book, believed to have been Deuteronomy, found in the temple in the reign of Josiah (2 Kings 22, 23), which was immediately acknowledged by king, prophets, priests, and people as an authoritative record of religious law. It cannot be determined when the other elements of the Pentateuch were composed, but it would seem that all the parts were gathered in one collection by Ezra in the year 444 B.C., and accepted by the people as an exhaustive record of the *Law* (*Torah*), the first great division of the canon. But by this time the chief historical books were written, as well as the greater part of the prophetical books; and precisely to such books the attention of the thinking part of the nation would be turned for knowledge of the past history, and for instruction and consolation in their present position. Accordingly, we find that the books which, in the Hebrew Bible, immediately follow the Pentateuch are the books of Joshua, Judges, Samuel, and Kings, which give a connected history of the nation from the death of Moses to the Babylonian captivity; and all the books which we call prophetical, with the exception of Daniel. This addition to the national religious literature became known as the *Prophets*, for even the historical books were written in a prophetic spirit, and presumably by prophetic men; but we have no precise notice of the circumstances under which this new group was made. It must have been after the time of Malachi (who was somewhat later than Nehemiah), and probably a considerable time later, and when there was no longer any hope of other prophetical books being written. At all events, the earliest available notices on the subject speak of the Law and the Prophets together, or give clear indication that the prophetical books were then in the canon. After a time, though it is impossible to fix a date for the beginning of the practice, it was customary to read parts of the prophetical Scriptures in the stated worship, a section being assigned to accompany the lesson of the Law for the day. Finally, after the Law and the Prophets had been thus joined together, there remained a considerable number of books, some of which are certainly earlier in date than some of the books that had been included. These remaining works have a more diversified character than either of the classes of Law and Prophecy, and they have never received a more definite designation than *Kethubim*, or 'writings,' and we usually apply to them the equivalent Greek name of *Hagiographa*, or 'sacred writings.' We find them referred to in the book of Ecclesiasticus (Prologue) as 'the other books that follow' the Law and the Prophets, or simply as 'the rest of the books.'

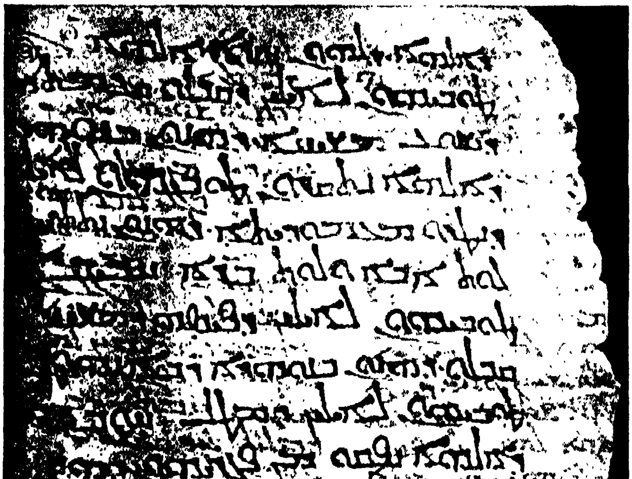


Fragment of Psalter, from Septuagint (*Ps. 11:7 ff.*).

(Earliest MS. of any portion of the Bible known to be in existence. Written on papyr in uncial, in third century. Found in Egypt, 1892; now in British Museum.)

The canon, thus completed, containing precisely the books now found in the Old Testament, was, according to the Talmud, ratified by the Council of Jamnia (or Jabneel, between Joppa and Ashdod), c. 90 A.D. The three great divisions, frequently referred to in the New Testament, in varying phraseology, mark the three stages by which the collection assumed its final form. The total number of books, according to Jewish enumeration, is twenty-four, so that the whole Hebrew Bible is sometimes spoken of as 'the four and twenty.' The divisions and the enumeration are exhibited in the following table:—

	Books.
I. Law, *i.e.* the Pentateuch, or five books from Genesis to Deuteronomy . . .	5
II. Prophets—	
1. Former prophets: Joshua, Judges, Samuel, Kings .	4
2. Latter prophets: Isaiah, Jeremiah, Ezekiel, and the Twelve	4
III. Writings—	
1. Three poetical books: Psalms, Proverbs, Job .	3
2. Five rolls: Song of Songs, Ruth, Lamentations, Ecclesiastes, Esther . .	5
3. Three books: Daniel, Ezra-Nehemiah, Chronicles .	3
	24



Portion of Manuscript in Syriac (Luke 7 : 44–47).

(Found in the convent of Sinai by Mrs. Lewis, 1892.)

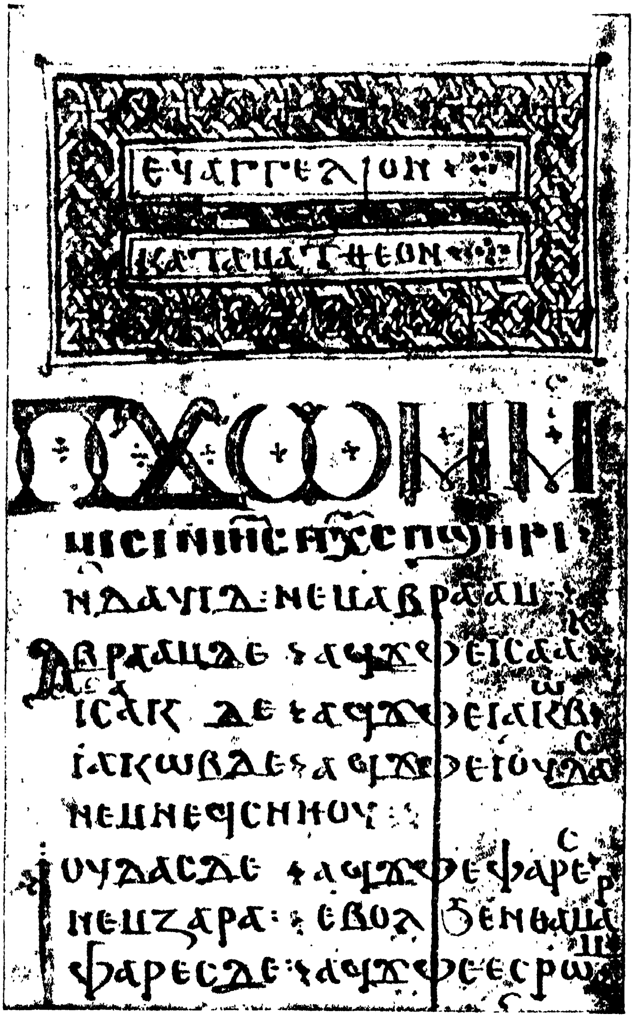
The 'former prophets' are so called simply from their position, not from any assumption of their date. As already explained, they are historical books; and it is to be noted that Samuel and Kings are reckoned each as one book; for these books, as well as Chronicles and Ezra-Nehemiah, were not divided by the Jews till the 16th Christian century. Among the latter prophets, the 'Twelve,' which are now usually termed minor prophets, have always gone together and been reckoned as one book, owing to their limited compass, which admitted of their being written on one roll. The three books, Psalms, Proverbs, and Job, are taken together and provided with a special system of accentual marks for cantillation. It is misleading to speak of them as the poetical books, for some of the other books—*e.g.* The Song of Songs and Lamentations—have an equal claim to the title, and many portions of the prophetical books are in the form of poetry.

The 'five rolls' are so denominated because each was written on a roll by itself, and they came to be associated with, and publicly read at, five great sacred seasons. Daniel, though a prophetical or rather apocalyptical book, does not come with the other prophets; the most probable explanation being that it did not exist, at least in its present form, when the other prophetical books were included in the canon.

Connection between the Testaments.—Between the last Old Testament writing and the rise of the New Testament literature there intervened some two hundred years. Although this period is practically a blank so far as contributions to the canonical Scriptures are concerned, there was really no cessation in the literary activity of the people. But the religious productions of this time, though indispensable for the history of Judaism, and not without value for devotional purposes, manifest neither the lofty genius of the preceding literature, nor the inspired glow of that which was to follow. For this and for other reasons, not the least being that they were (mainly) written in Greek, the Jews never invested them with full canonical dignity. They are known as the Apocrypha of the Old Testament. The Greek fathers, as also Augustine, seem to draw but little distinction between these apocryphal writings and the accepted Scriptures, and the Council of Trent put them alongside of the Old Testament and New Testament as 'sacred and canonical;' but the reformed churches have usually regarded them as of lower rank. Their merit, particularly for purposes of edification, was not denied—was, indeed, in the modern confessions, generally asserted—and they were until the beginning of the 19th century bound up with the Bible, though the use of them as sources of doctrine was held to be illegitimate.

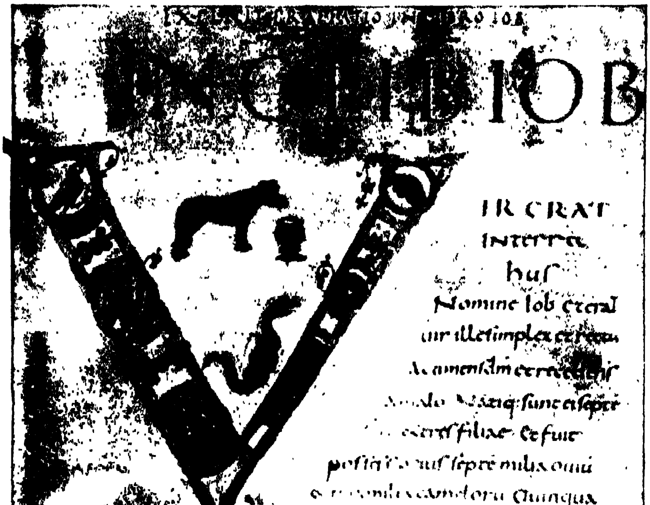
The New Testament.—The New Testament is a collection of twenty-seven distinct writings, from eight (or nine) different hands. The books are usually classed as Historical (five), Didactic (twenty-one), Prophetical (one); though the writings of the first class include much more than one-half of the entire matter. The unity of the whole is remarkable: all the books find their centre in Jesus Christ. The four gospels narrate His life on earth; the fifth historical book tells how the new life, that came from Him through the Holy Spirit, passed from Jerusalem to Rome. The epistles, written by men of varied personal character and temperament, among whom by far the most prominent and the most fertile is the apostle Paul, set forth the significance of the gospel facts as revealed to them according to our Lord's promise (John 16 : 12, 13). The single prophetical book (the Revelation of St. John, or the Apocalypse), however it is to be interpreted, shows the Lamb as King, to become victor on earth, where His church is preparing through conflict to share His triumph. In our English Bible the order of these writings is not chronological. In ancient MSS. there was much variation in position; the seven general epistles were usually placed immediately after Acts, the gospels coming first, though not always in the order now universal. The Pauline epistles seem to have been arranged according to length, so that the earliest and the latest stand together (1 and 2 Thess., with 1 and 2 Tim. and Titus). There is evidence in these writings of an advance of Christian thought toward maturity; but the progress is not along divergent lines, nor can all the books be classified according to assumed types of doctrine. Biblical theology properly discusses the theology of the several writings; but the theology of the New Testament is one, whatever progress is discernible. Moreover, the advance in St. Paul's teaching, as indicated by a comparison of Thessalonians with Ephesians, is almost as marked as that between the general epistles of St. James and St. John, which are regarded as presenting the respective extremes in the progress of doctrine. The gospels cannot be classified by any such principle; for while that of St. John, from its purpose, presents the most mature statements, there is no appreciable advance in doctrine from St. Matthew to St. Luke. The same Lord Jesus Christ was apprehended by all the writers in substantially the same way. See also GOSPELS and PAUL.

Language and Text of the New Testament. The New Testament is written entirely in the Greek language. The existence of a number of various readings in the text of the New Testament necessitates an inquiry into the materials from which the text is derived, and into the causes which have produced the divergent readings. Most of these divergences are mere trifles, caused by careless copying and insufficient correction. The materials of textual criticism are usually reckoned under the heads of Copies, Versions, and Fathers, which might be grouped as—(1) Copies + Patristic Citations from Copies; (2) Versions + Patristic Citations from Versions. For convenience the books are grouped under the heads of Gospels, Acts and Catholic Epistles, Pauline Epistles, and Apocalypse; and the enumeration of authorities is made *de novo* with each group. Sometimes this is indicated by writing a few letters above the sign representing the MS., as D^{Paul}, E^{Act}, or by adding a subscript numeral, as D_2, E_2. Only a few fragments of the New Testament exist written on papyrus. It is, however, almost certain that that was the primitive material on which the apostolic documents were written (*cf.* 2 John 12: 'I did not wish to write with paper and ink'). Of MSS. written on vellum, the most important are those belonging to the 4th, 5th, and 6th centuries, which pass under the name of the 'Five Great Uncials.' They are as follows:—1. ℵ (Aleph; 4th century)—the Codex Sinaiticus, discovered by Tischendorf in 1844 (and 1859), in the monastery of St. Catherine, on Mt. Sinai. The greater part of this MS. is now in St. Petersburg. It contains the whole of the New Testament complete, together with the Epistle of Barnabas, and a large part of the Shepherd of Hermas. The last twelve verses of Mark are wanting; but it is suspicious that the page where they should occur appears to be a cancel. 2. B (Vaticanus; 4th century) is in the Vatican Library at Rome. It contains the New Testament as far as the middle of Heb. 9:14; but the rest of Hebrews, as well as the Pastoral Epistles and the Apocalypse, are wanting. ℵ and B probably proceeded from a common workshop, perhaps the library at Cæsarea; and this may explain why both lack the last twelve verses of Mark. 3. A (Alexandrinus; 5th century) is now in the British Museum. There seems no reason to doubt the tradition which assigns to it Alexandria. This MS. contains the first Epistle of Clement and a part of the second Epistle. 4. C (Ephræmi Syri rescriptus; 5th century) derives its name from the fact that the original text of its Greek Bible was washed out in the 12th century, in order to make room for a Greek translation of some works of St. Ephrem the Syrian. The MS. is now in Paris, but almost nothing is known of its origin and history. About three-fifths of the New Testament have been recovered from its pages. 5. D (Codex Bezæ; 6th century) derives its name from



Portion of Matthew's Gospel (ch. I) in Coptic.

Beza the reformer, who presented it in 1581 to the University of Cambridge, in whose public library it is exposed to view. This MS. is a bilingual, containing, besides the Greek text of the Gospels and Acts, a parallel Latin version of great antiquity. The whole number of Uncial MSS. known to the critical world is estimated at something over 120; but in this enumeration a number of MSS. are counted more than once. The Cursive MSS. are, as might be expected on account of their later dates, much more numerous; probably we might set their number at between 2,400 and 2,500 (the numeration being repeated for the different groups of books as before). Of all this number, only a very few have been rendered available for criticism by exact collation; a fact which is much to be regretted, as there are preserved in Cursive MSS. many rare and curious readings which are of great antiquity, and yet have no attestation in Uncial MSS. It is not meant that all Cursive MSS. deserve complete and exhaustive collation, but most of them merit a more careful study than they have hitherto received. It is also readily to be admitted that they are, relatively to the Uncial MSS. and the versions, of much less value in the determination of the text. But we must bear in mind that the texts of Cursive MSS. are merely the descendants of lost Uncial MSS., and that the maxim that 'all various readings are early' applies to them as well as to the more imposing Uncial MSS.



The Latin Bible, St. Jerome's Version (Vulgate)—Job 1.
(Written in 840 A.D., with gold and silver initials. Now in British Museum.)

Where a number of Cursive MSS. can be proved to come from a common lost original, it is often possible to restore the lost (Uncial) ancestor by a critical comparison of the texts that are descended from it.

A word must be said in passing of *Lectionaries*, or copies of the Gospels, or the Acts and Epistles, arranged for reading in churches. They are very numerous, and almost unknown as to text; but enough is known to enable us to affirm with certainty that they often contain fragments of very early texts. When the lectionary is made up out of lessons from the Gospels, it is commonly called an *Evangelistarium;* when the lessons are taken from the Acts and Epistles, it is known as an *Apostolos* or *Praxapostolos*.

We come now to *Versions*, a class of witnesses to which greater weight is continually being assigned in the determination of the text. The great value of the versions lies in the evidence which they furnish as to the state of the New Testament text at the time when it was translated, though it must be borne in mind that, as they are only copies in a foreign language, they are subject to the same changes and accidents as are ordinary Greek MSS. We may divide the earliest versions into the following groups:—1. SYRIAC VERSIONS; 2. LATIN VERSIONS; 3. EGYPTIAN VERSIONS. Each of these versions is believed to go back in some form to the 2nd century; and this may be taken as proved for the first two groups. The third group has not yet been adequately studied.

1. SYRIAC VERSIONS.—The Syriac New Testament is known to us in the following forms:—(1.) *Old Syriac* (Lewis's Syriac) from Mt. Sinai, discovered in palimpsest in 1892 by Mrs. Lewis. (2.) *Old Syriac*, from the Nitrian Desert (commonly called Cureton's Syriac, after its discoverer, who detected it amongst the treasures brought from the Syrian convent in the Nitrian Desert to the British Museum). This is so nearly the same text with the Sinai version, that they must stand in some close genealogical relation. (3.) *Tatian's Harmony* of the Four Gospels must be considered with the two foregoing versions; for although it is not extant in the original Syriac, but only in Armenian, and in Arabic versions derived from it, yet it is certain that it was in close agreement with the old Syriac version. (4.) The *Peshito* is the next stage in the history of the version. This is a revision of the Old Syriac in order to bring it into closer agreement with the Greek text, as well as, no doubt, to improve the diction and clear it of harsh

or ungrammatical forms. The result of the revision is a version of such beauty that it has been often called the queen of the versions. (5.) The *Philoxenian Syriac* is a Syriac version, made apparently in the interests of literal translation by Philoxenus of Mabug in 508 A.D. Its first form appears to have been lost, but we possess it in a later recension made by Thomas of Heraclea in 616 A.D. From him it is often known as the Harklean or Heraclean version. (6.) The *Jerusalem* or *Palestinian Syriac*. The history of this version is still a problem, but enough of the text has come to light to show that it is in very close connection with the Tatian Harmony and with the Old Syriac, as well as with many of the best Greek MSS.

2. THE LATIN VERSION is known to us in a variety of forms, of which the principal are as follows:—(1.) *Old Latin*, an African version made in the 2nd century. (2.) The *Vulgate*. The Old Latin was revised by Jerome during the last quarter of the 4th century, and this revision, known as the Vulgate, is to-day the final authority of the whole Roman Catholic Church.

3. THE EGYPTIAN NEW TESTAMENT appears in a number of translations and dialects, of which the chief are:—(1.) The Coptic or Memphitic version of Lower Egypt, sometimes called Bohairic (2nd to 3rd century). (2.) The Thebaic or Sahidic version of Upper Egypt, slightly later than the Memphitic. (3.) The Fayyûm version, of which fragments are reported to have recently been recovered.

Besides the above there are the *Ethiopic*, connected with the Egyptian; the *Armenian*, derived from the Syriac; the *Gothic* (Ulphilas); the *Arabic;* the *Slavonic*, etc.

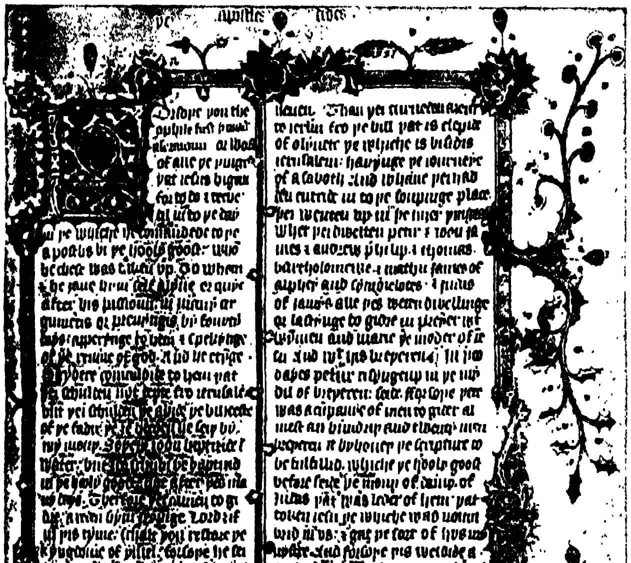
The Fathers.—As we have already said, the Greek copies of the New Testament, as well as the versions made from the Greek, derive great collateral confirmation from the citations made by the fathers of the church. And here we have the advantage that almost every quotation made by a patristic writer is a dated landmark in the history of the text; so that from a study of Origen's works we recover large portions of the MSS. which he used in the 3rd century, and so on. But we are as yet only at the beginning of the studies which would enable us to make proper use of such valuable material.

New Testament Canon.—Previous to the middle of the 2nd century after Christ, the church found its final authority in the scriptures of the Old Testament and in the words of Jesus. Various gospels were already in circulation, and there seems to have existed also a large mass of oral tradition regarding the teaching and work of Jesus; and both written and verbal material was used as the source of information and doctrine. But the apostles having been long dead, as also most of those who had known them, the church began to feel the need of a better defined and a more stable standard of religious truth. This was found in the four gospels, Matthew, Mark, Luke, and John; these accordingly were declared to have the authority of Scripture, and to be worthy of co-ordination with the Old Testament. This canon of the gospels had received such universal recognition before the close of the 2nd century, that Irenæus is found giving reasons why it should consist precisely of *four*. The second stage, the canonization of the epistles, etc., followed almost immediately, though many years elapsed ere the church reached unanimity regarding some of them. The conditioning circumstance of the rise of an accredited collection of the epistles was the spread of heresy, particularly of Gnosticism, within the church. To combat this it was found necessary to make appeal to the apostolic teaching regarding Christ, and as this had, unsystematically but with wonderful fullness, been set forth in letters, etc., from various men of apostolic standing, a collection of these was made, and their regulative character declared. Considerable doubts existed at first about the admission of certain books—*e.g.* Hebrews, the Apocalypse, and some of the smaller epistles—as it was questioned whether these were from apostolic hands; but in course of time something like unanimity was reached, and the New Testament as we have it became the accepted standard of the whole church.

The English Bible.—Portions of Scripture were translated into Anglo-Saxon as early as the 8th century, but the first complete rendering into what may be called English was made by Wycliffe about 1382. It is, however, to Wm. Tyndale that we owe the first printed New Testament, issued at Worms in 1525. Tyndale translated also the Pentateuch, printed at Marburg, Hesse, in 1530. The first *complete* printed English Bible was that of Miles Coverdale, a folio volume of the highest bibliographical value, printed in 1535, probably at Zürich, and based upon the Swiss-German edition (6 vols. Zürich, 1527-9). Next we have Matthew's Bible (1537), which largely utilizes the versions of Tyndale and Coverdale. The Great Bible (so named from the large size of its pages) was prepared at the suggestion of Cromwell, Earl of Essex, and finally issued from London in 1539. The Geneva Bible (often called the 'Breeches Bible,' from its rendering of Gen. 3:7), the work of Wm. Whittingham and others, with notes of a distinctly, even aggressively, Calvinistic trend, was issued in 1560, and was held in high favour for three-quarters of a century thereafter. The Bishops' Bible (called also the 'Treacle Bible,' from its translation of Jer. 8:22) was executed, as a kind of offset to the last named, under the supervision of Archbishop Parker, and published in 1568. Then came the Catholic Rheims New Testament (1582) and the Douay Old Testament (1609). But meanwhile, in consequence of the Hampton Court Conference of 1604, the preparation of what is now known as the Authorized Version was in progress. The Bishops' Bible was adopted as its basis, but most of the above-named translations, particularly the Rheims and the Geneva, were made use of, and the work was finally given to the public in 1611. This edition has exercised an outstanding influence on English thought and literature, and might well have been considered final, had not the recent science of textual criticism shown that its Greek original was itself frequently unsound. This fact, together with the admitted want of uniformity in its language, led scholars to propose a further revision; and when the Houses of Convocation in 1870 sanctioned the proposal, steps were immediately taken to carry it out. Scholars representing widely different sections of the church were invited to take part in the work, and at length, in 1881, the Revised New Testament was issued, the Old Testament following four years later. Interesting particulars regarding the methods and labours of the revisers are given in the published prefaces to their work.

The American Standard Revised Bible, published in 1901 (copyright, Thomas Nelson and Sons), is the latest revision of the Bible in English. The American revisers who collaborated with the British revisers made a large number of emendations, which were not incorporated in the text of the English revision, but were published as an appendix which formed part of every copy issued during a term of fourteen years from the date of publication. Immediately after the publication of the English Revised Version, the English Revision Committee disbanded; but the American Committee kept up their organization, and continued, throughout the whole period of fourteen years, to revise not only the appendix, but the entire Bible, and in 1901 this new version (the *American Standard*) was published.

The Twentieth Century New Testament (Horace Marshall and Sons, 1904) is a translation into modern English from the text of Westcott and Hort. Several Bibles are published expressly for children's reading.



Wycliffe's Bible (*Brit. Museum*)—'*the Apostles' Dedes.*' (*Acts ch. i.*)

Bible Publishing.—The right to publish the Authorized Version in England is vested in the King's Printers (Eyre and Spottiswoode) and the Universities of Oxford and Cambridge. Other publishers must obtain a licence (granted gratuitously) and conform to certain regulations of the Bible Board. The issue of Bibles in Scotland is authorized under licence of a similar Bible Board for Scotland.

Translations into other modern languages have become too numerous even for mention here. They have been to a large extent the work of the agents of the British and Foreign Bible Society. The history of Bible translation in the chief European languages runs parallel to that of the English Bible. One of the finest of modern renderings, comparable in its literary and religious influence to the English Authorized Version alone, is Luther's German Bible (1534). Excellent translations exist also in Dutch (authorized by the Synod of Dort, 1637), Swedish (1774), Danish (1607, revised 1647), French (by Olivetan, 1545, revised by Calvin and by Beza), and other languages, but the history of some of these is, from want of contemporary evidence, often difficult to trace.

Literature.—The literature in all departments of Biblical study is enormous, and additions are constantly being made. Germany, perhaps, takes the lead in productivity, but England (with America) has been making giant strides of late. We can only indicate a few of the most prominent or most accessible books. General.—Bible Dictionaries by Smith, Hastings, Cheyne, and Black. The *King's Printers' Aids*, the Cambridge *Companion*, and Nelson's *Bible Treasury* are useful to non-professional students. Introduction.—Old Testament: Driver, C. H. H. Wright (with excellent bibliographies), Cornill (Ger.); New Testament: Moffat (*Historical New Testament*), Dods, Weiss (trans.), Holtzmann, Jülicher (Ger.). Commentaries.—*International Critical Commentary* (O.T. and N.T., appearing), Cambridge Bible for Schools, vols. in Clark's Handbooks for Bible Classes, Temple Bible (including Apocrypha), Century Bible (N.T. complete). Concise German.—*Kurzer Hand-Commentar zum Alten Testament* (issuing), and *Hand-Commentar zum Neuen Testament* (Holtzmann, Schmiedel, Von Soden, etc.). Theology.—Schultz (O.T. trans.), G. B. Stevens (N.T.). Canon.—Ryle (O.T.), Reuss (N.T. trans.). Original Text.—Hebrew: Van der Hooght, Baer-Delitzsch, Sacred Books of the O.T. (appearing); Greek: Westcott and Hort, Revisers' Text. Textual Criticism.—Buhl, T. H. Weir (O.T.); Hammond, Scrivener, Tischendorf-Caspari (N.T.).

Bible Christians. See METHODISTS.

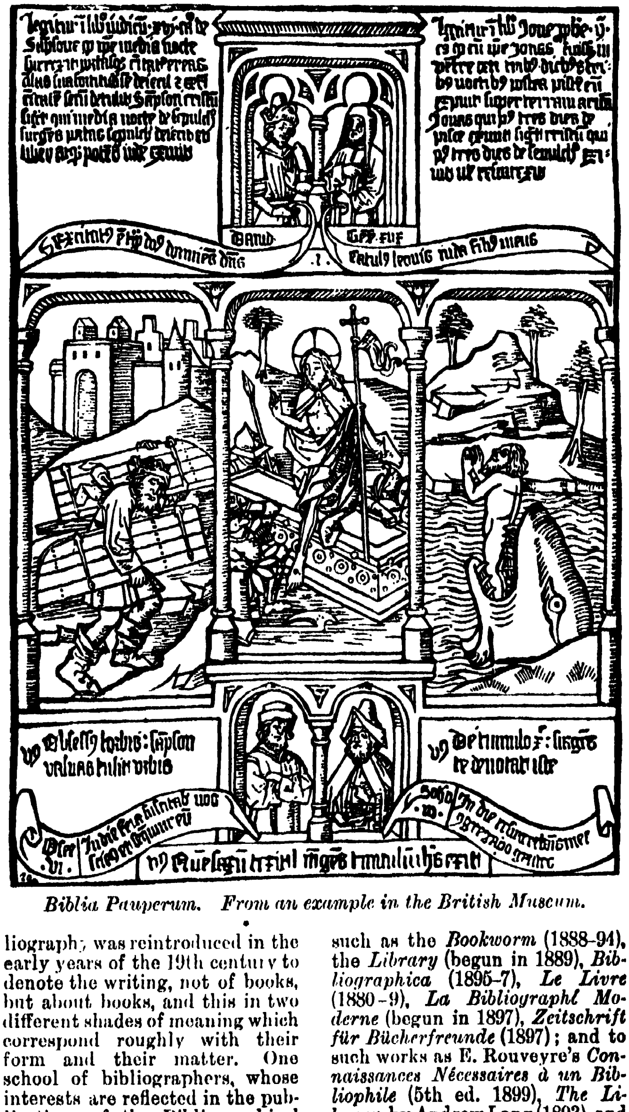
Bible Communists. See PERFECTIONISTS.

Bible Societies, societies formed for the printing and distribution of the Bible. The first Bible society was the Canstein Bible Institute, in the Orphans' Home in Halle, founded by the Marquis of Canstein in 1710, which distributed, before 1719, 40,600 Bibles and 100,000 New Testaments. In the year 1879 the copies printed by the institute had reached the enormous number of 6,100,000. The British and Foreign Bible Society was founded in 1804, with the object of encouraging a wider dispersion of the Scriptures both at home and abroad, the first year's subscriptions reaching £5,600. This organization was followed by the

American Bible Society in New York in 1816, although similar societies had previously been formed on the Continent, at Basel (1804), Berlin and Ratisbon (1805), with two in Africa, five in Asia, and others in Nova Scotia, Canada, and the W. Indies. The British and Foreign Bible Society is the largest in the world. It has 1,200 auxiliaries and branches, with upwards of 3,000 Bible associations in connection, mainly conducted by women. Nearly 16,000 smaller organizations are connected with the two principal Bible societies of the world—those of London and New York. The third institute in importance is the National Bible Society of Scotland, which was formed in 1861, and has issued since that time more than eleven million copies or portions of the Scriptures.

In 1836 the American and Foreign Bible Society was founded in New York by the Baptist denomination, 'to endeavour to ascertain the exact meaning of the original text of the Bible, to express that meaning as literally as the nature of the languages into which they should translate the Bible would permit, and to transfer no words which were capable of being literally translated.' In 1850 the American Bible Union was formed—a society which was instituted with the object of publishing revised versions of the Bible in conformity with the principles of the Baptists, that the word βαπτίζειν should be translated as 'to immerse.' With this exception, the various Bible societies have worked in harmony with each other. See J. Owen's *Hist. of the Brit. and Foreign Bible Society* (1816); W. P. Strickland's *Hist. of American Bible Society* (1849).

Biblia Pauperum, or Poor Men's Bible, the name given by modern writers to a series of MSS. and printed books containing illustrations of events in the life of Christ, with the corresponding Old Testament prefigurements or types, and a small amount of explanatory text in rhyming Latin verse. As early as 1181, fifteen subjects from the life of Christ, each with two Old Testament parallels, were executed in enamels on an antipendium, or altar-front, in the Leopold Chapel of Klosterneuburg in Austria. The earliest known MS. containing this triple arrangement dates from the beginning of the 14th century, and is preserved at St. Florian, Austria. The text, as well as the pictures, was cut in wood, and the books contain from thirty to forty leaves, printed on one side only. See Heinecken's *Idée Générale d'une Collection d'Estampes* (1771), in which the fantastic name *Biblia Pauperum* was first used; Sotheby's *Principia Typographica* (1858); Schreiber's *Manuel de l'Amateur de la Gravure* (1891-95); and an article by Sir E. M. Thompson, 'On a Manuscript of the Biblia Pauperum,' in *Bibliographica*, vol. iii. (1897). See also Block-books.



Biblia Pauperum. From an example in the British Museum.

Bibliography. Derived from the Greek βιβλιογραφία, which means 'the writing of books,' and used in the 17th century in England in this sense, the word bibliography was reintroduced in the early years of the 19th century to denote the writing, not of books, but about books, and this in two different shades of meaning which correspond roughly with their form and their matter. One school of bibliographers, whose interests are reflected in the publications of the Bibliographical Society, which has its headquarters in London, the Edinburgh Bibliographical Society, etc., the Grolier Club of New York, etc., concerns itself chiefly with the accidents of the production of books—*e.g.* the history of handwriting, of printing, bookbinding, paper-making, bookselling, publishing, book illustrations, book-collecting, book plates, book stamps, and kindred topics. Information on each of these subjects is given under its own heading. No very good general treatises on them exist, but reference may be made to the publications of the societies already named, to numerous periodicals (mostly short-lived), such as the *Bookworm* (1888-94), the *Library* (begun in 1889), *Bibliographica* (1895-7), *Le Livre* (1880-9), *La Bibliographie Moderne* (begun in 1897), *Zeitschrift für Bücherfreunde* (1897); and to such works as E. Rouveyre's *Connaissances Nécessaires à un Bibliophile* (5th ed. 1899), *The Library*, by Andrew Lang (1893), and *The Printed Book*, translated from the French of Henri Bouchot by E. C. Bigmore (1890). The titles and descriptions, with notes of former prices (now quite out of date), of a large number of books which collectors value for various reasons, will be found in Brunet's *Manuel du Libraire et de l'Amateur des Livres* (5th ed. 1860–80), Graesse's *Trésor de Livres Rares et Precieux* (1850–69), and in Lowndes's *Bibliographer's Manual of Eng. Lit.*, these being chiefly English (1857–64); also in the annual volumes of Slater's *Book Prices Current* (begun in 1887).

In the sense in which it concerns itself chiefly with the matter of books as opposed to their form, bibliography aims at enumerating all the books of a given author or group of authors, or those published in a given period, or in a given country, province, county, or town, or those dealing with any given subject, or such selected books as may be especially useful to students of such subject or subjects. Information as to special bibliographies of this kind will here be found under the articles that deal with the subjects to which they refer, but the following short list of general works may be found useful:—1. Bibliographies of bibliographies.—Petzholdt's *Bibliotheca Bibliographica* (1866); Vallée's *Bibliographie des Bibliographies* (1883–7); Fortescue's *List of Bibliographical Works in the Reading Room of the Brit. Museum* (1889); Stein's *Manuel de Bibliographie Générale* (1897); Ferguson's *Some Aspects of Bibliography* (1900). 2. General catalogues.—*General Catalogue of the Brit. Museum Library* (1881, etc.; copies presented to most of the larger public libraries of the United Kingdom); *Subject Index to the Modern Works added to the Brit. Museum since 1880* (3 vols. 1902–3); Sonnenschein's *The Best Books: a Reader's Guide to the Choice of the Best Available Books in every Department of Science, Art, and Literature* (1891, 1895). 3. National bibliographies.—Watt's *Bibliotheca Britannica* (1824); Low's *Brit. Cat.* (1837–52), and *Eng. Cat.* (1864, etc.); S. A. Allibone's *Critical Dict. of Eng. Lit.* (1859; Supplement, 1891); Roorbach's *Bibliotheca Americana* (1852–61); Kelly's *American Cat. of Books published in the U.S. from January 1861* (1866, etc.); Leypoldt's *The American Cat.* (1880, etc.); Quérard's *La France Littéraire* (1829–39; Supplement, 1854–64), and *La Littérature Française Contemporaine* (1842–57); Lorenz's *Catalogue de la Librairie Française*, from 1840 (1877, etc.); Heinsius's *Allgemeines Bücher-Lexikon*, from 1700 (1812, etc.); Kayser's *Index Locupletissimus Librorum: Vollständiges Bücher-Lexikon, enthaltend alle von 1750 in Deutschland gedruckten Bücher* (1834, etc.).

Bibliomancy, divination by means of opening the Bible and noting the first passage which the eye lights on, or by entering a church and observing the first words of the Bible which are heard. It was in extensive practice for centuries, especially in the case of the election of bishops.

Bibliothèque Nationale, the great library and museum in Paris. The magnificent edifice in which it is now housed was put up under the direction of Labrouste (1854–75). It includes five departments—(1) printed books; (2) manuscripts; (3) prints, etc.; (4) maps; (5) coins and medals. Of printed books there are more than 2,500,000, and the number grows by about 70,000 annually; of MSS. there are more than 100,000; of prints, etc., over 300,000; and of coins and medals, about 200,000.

Bibulus, M. CALPURNIUS, a Roman of the aristocratic party, son-in-law of Cato, best known as Cæsar's colleague in the consulship in 59 B.C. In the civil war he commanded Pompey's fleet, and died off Corcyra in 48 B.C.

Bicarbonate, an old name for acid carbonate. The bicarbonates differ from the normal carbonates, inasmuch as they contain part of the hydrogen of the hypothetical carbonic acid unreplaced by the metal; for example, the normal carbonate of soda has the formula Na_2CO_3, whereas the bicarbonate is $NaHCO_3$.

Bice (Fr. *bis*, *bise*, 'grayish blue'), a pigment of which there are two colours—blue, obtained from the native blue carbonate of copper; and green, prepared from blue bice, with yellow orpiment added. Both paints are very durable.

Biceps ('two-headed'), an anatomical term, known popularly in connection with the muscle on the front of the upper arm, which flexes the elbow, and which has two separate attachments above. This is the *biceps flexor cubiti*. The *biceps flexor cruris*, one of the three hamstring muscles, runs the full length of the back of the thigh, and bends the knee.

Bicester, par. and mrkt. tn., Oxfordshire, England, on branch of L. & N.W.R., 10 m. N.E. of Oxford; comprises the two parishes of Bicester King's End and Bicester Market End; has a brewery and a tannery, and cattle fairs. Once famous for its Augustinian priory, founded by Gilbert de Basset in 1182. The Bicester and Warden Hill Hunt has existed from 1800. Pop. (1901) 3,023.

Bicêtre, suburb of Paris to the S.S.E. Its castle, built in 1285 by the archbishop of Winchester (whence the name), was rebuilt in the 17th century, and became successively a hospital for retired soldiers, a prison, a poorhouse, and a lunatic asylum. It is called officially Kremlin-Bicêtre. Pop. (1901) 8,652, the asylum containing 3,178 persons.

Bichat, MARIE FRANÇOIS XAVIER (1771–1802), French anatomist and physiologist. Appointed in 1797 to lecture on anatomy, surgery, and experimental physiology, and in 1800 as physician at the Hôtel-Dieu, he was preparing at the same time his *Recherches Physiologiques sur la Vie et la Mort* (1800), and his *Anatomie Générale, appliquée à la Physiologie et à la Médecine* (1801), as well as a *Traité des Membranes*.

Bichromate Cell. See CELL, VOLTAIC.

Bickerdyke, JOHN, *nom de plume* of CHARLES HENRY COOK (1858), English novelist, journalist, and writer on angling and other sports; born in London; has published *Angling in Salt Water* (1887); *Days in Thule with Rod, Gun, and Camera* (1894); *Sea Fishing* (Badminton Library, 1895); *Wild Sports in Ireland* (1897); *The Book of the All-round Angler* (1900), etc.

Bickerstaff, ISAAC, a pseudonym used by Dean Swift when he burlesqued Partridge, the almanac-maker, in 1709.

Bickerstaffe, ISAAC (*c.* 1735–1812), dramatist, was a native of Ireland. His most successful works were *Love in a Village* (1762), a comic opera; and *Maid of the Mill* (1765), an after-piece. See *Biographia Dramatica*, ed. Stephen Jones (1812).

Bickersteth, EDWARD (1850–97), Anglican divine and missionary, born at Banningham, Norfolk; founded Cambridge Mission at Delhi, and left in 1877 to be its first head. He returned to England in 1882, and from that date till 1886 was rector of Framlingham in Suffolk. In 1886 he was consecrated bishop of Tokyo, Japan, where he laboured till 1896. See *Life and Letters*, by S. Bickersteth (1901).

Bickerton, SIR RICHARD HUSSEY (1759–1832), English admiral. He became commander in 1779; was posted in 1781, and was captain of the *Invincible* in the action off Martinique in the same year. After promotion to flag rank, in 1799, he took part in the Egyptian operations of 1801 under Lord Keith, who left him as commander-in-chief at Alexandria after the capture of that town. He was again in the Mediterranean from 1804 onwards, as second in command to Lord Nelson. Promoted to the rank of admiral in 1810; commander-in-chief at Portsmouth (1812); K.C.B. (1815).

Bicycle. See CYCLE.

Bida, tn., W. Africa, in the British protectorate of N. Nigeria, 20 m. from the l. bk. of the Niger, in about 9° 10′ N. lat.; is the capital of the native kingdom of Nupe.

Bidar, tn., Nizam's Dominions, Haidarabad, 72 m. N.W. of Haidarabad, India. Noted for the metalware to which it has given its name. Pop. (1901) 11,367.

Bidassoa, a small stream entering the Bay of Biscay, divides France from Spain where the main line railway and road cross the frontier at Hendaye (Irun). On the Isle of Pheasants, in mid stream, the treaty of the Pyrenees was signed (1659) between France and Spain.

Biddeford, city, York co., Maine, U.S.A., situated on the Saco R., near its mouth; one of the largest cotton-manufacturing towns of the state, employing many Canadian French. It is on the line of the Boston and Maine Ry. Pop. (1900) 16,145.

Bidder, GEORGE PARKER (1806–78), English engineer, born near Dartmoor. He early developed a genius for calculation, and was exhibited as a prodigy. Proceeding to Edinburgh University, he was prizeman in higher mathematics in 1822. He assisted Stephenson in 1834 in the London to Birmingham railway, and constructed several lines at home (especially on what is now the Great Eastern system) and abroad (*e.g.* Denmark, Norway, India). He planned the Victoria Docks, London, invented the railway swing bridge, and was one of the founders of the first electrical telegraph company. He was exceptionally skilful in steering engineering schemes through parliamentary committees, and in opposing them.

Bidding Prayer, a formula of public prayer contained in the oldest Greek, Gallican, and English liturgies, in which the priest details what the congregation are to pray for, ending with the Lord's Prayer. In the canons of 1603 it is laid down that the bidding prayer shall be used before every sermon, lecture, or homily. A collect is now generally substituted; but in cathedrals, at university sermons, and in charitable and other foundations, distinctive bidding prayers are used regularly. In the Surtees Society volume, *Manuale* (1874), forms will be found of bidding prayers from the 11th to the 15th century. See D. Rock's *Church of our Fathers* (1849-53), and Wheatley's *Bidding of Prayers before Sermons* (1845).

Biddle, JOHN (1615–62), English Unitarian, was the son of a tailor of Wotton-under-Edge, Gloucestershire. In 1645 he published his *Twelve Arguments* against the deity of the Holy Spirit. From that date much of his life was spent in prison. In 1648, despite an ordinance inflicting the death penalty upon Unitarians, he issued his *Confession of Faith touching the Holy Trinity according to Scripture,* and soon afterwards his *Testimonies* of the early fathers. He used his freedom under the Act of Oblivion, 1652, to produce his *Twofold Catechism,* for which he again suffered imprisonment. In 1662 he died in prison. See *Life* by Toulmin (1791).

Bideford, par. (3,194 ac.), munic. bor., seapt., and mrkt. tn., near mouth of Torridge, 8½ m. S.W. of Barnstaple, N. Devon, England, on the L. & S.W.R. Has potteries, collar factories, tanneries, roperies, and sail lofts. Was the birthplace of Sir Richard Grenville (of Tennyson's *Revenge*). Here Kingsley wrote part of his *Westward Ho!* Pop. of tn. 8,754.

Bidpai, otherwise PILPAY, BAIDABA, and SENDEBAR, formerly assumed to have been an ancient Indian philosopher, whose collection of apologues, known as *The Fables of Bidpai,* has been widely read throughout the Old World. But this philosopher, Bidpai or Sendebar, is now believed to have had no more real existence than the Scheherezade of the *Arabian Nights.* It would appear that Sâkya-Muni, or Buddha, has the best claim to be regarded as the author, if the collection is indeed the work of one author. For the researches of such scholars as Benfey and Rhys-Davids have established very clearly the fact that these early Indian 'beast-fables' inculcate the Buddhistic teaching in precisely the same manner as the *Jatakas* and certain of the *Fables* of Æsop—these last being also traced back to Buddha. The lower animals converse like human beings, and the tendency of the stories is to preach a certain moral code.

The earliest translation from Sanskrit of the stories attributed to Bidpai was made in 570 A.D., by a Persian physician (Barzoi), who rendered them into Pehlevi, under the title of *Kalilah wa Dimnah;* and this version is noticed by Firdousi in his *Shâh-Nâmeh.* Thereafter the Pehlevi version was retranslated into Old Syriac, and again into Arabic, about 750 A.D., by Abdullah al-Mokaffa, from whose version all the later translations descend. Of English translations there have been twenty since the latter part of the 18th century, the earliest being that by Sir Thomas North, made (1570) from the Italian version of 1552 by Antonio Doni. In 1888 this was reprinted, with a scholarly introduction by Mr. Joseph Jacobs.

Biebrich, or BIEBRICH-MOSBACH, tn. in the Prussian prov. of Hesse-Nassau; stands on the r. bk. of the Rhine, 3 m. S. of Wiesbaden; has a palace (1704-6) of the Grand-duke of Luxemburg; cement, wool, artificial manure, and iron. Pop. (1900) 15,048.

Biel (Fr. *Bienne*), industrial tn. (watchmaking) in the Swiss canton of Bern, at the N.E. end of the Lake of Biel or Bienne (16 sq. m. in area, 1,417 ft. above the sea-level, and 246 ft. in depth). The town is 21 m. by rail N.W. of Bern. In the lake, but nearer Neuveville at its S.W. end, is the Ile de St. Pierre, inhabited in 1765 by Rousseau. The Musée Schwab contains many antiquities. Funicular railways connect the town with the two Jura air-cures, Macolin or Magglingen, and Evilard or Leubringen. Pop. (1900) 22,016.

Biela, WILHELM, BARON VON (1782–1856), German astronomer, born at Rossla, near Stalberg, in the Harz Mts. He entered the Austrian army (1805), but devoting his leisure to the study of astronomy, discovered on Feb. 28, 1826, the comet to which his name was given. Its period was 6·61 years, and it reappeared in 1832, 1839, 1845, 1852; since then it has not appeared, but its course has been marked by brilliant meteoric displays on several of the dates at which it was expected.

Bielaya-Tserkov (Pol. *Bialacerkiew*), tn., Kiev gov., Russia, 30 m. S.S.W. of Vasilkov, on an affluent of the Dnieper. Grain, cattle, beer trade; machinery. Celebrated by Pushkin in his *Poltava.* Pop. (1897) 20,705.

Bielefeld, tn., prov. Westphalia, dist. Minden, Prussia, at the N. foot of the Teutoburger Forest, 35 m. S.E. of Osnabrück; is the centre of the Westphalian linen industry, and also manufactures damask, silk, plush, cement, and sewing-machines. Bleaching is also an active industry. The most notable edifice is the old castle of Sparrenburg or Sparenberg. Seven miles from Bielefeld is the colony known as Bethel, described as a 'colony of mercy' by Julie Sutter. See her book under this title (1904). It began as a home for epileptics, and now also includes a mother-house for the training of deaconesses, a brotherhood of men engaged in similar work, a labour colony (Wilhelmsdorf), and an association workman's home for grappling with social distress. The town dates from the beginning of the 11th century. Pop. (1880) 30,679; (1900) 63,046.

Bielev, or BYELEV, tn., Tula gov., Russia, on l. bk. of Oka, 72 m. S.W. of Tula. Trade in grain, soap, pottery, hides; river port. Pop. (1897) 9,567.

Bielgorod, or Belgorod ('White City' = 'Belgrad'), tn., Kursk gov., Russia, on Upper Donetz (Don basin), 90 m. s. of Kursk; seat of archbishopric; station on Kursk-Kharkov Ry. Three annual fairs. Bee culture; soap, candle, and brick manufactories; tanneries and potteries. Two cathedrals. The earthen rampart running 200 m. between Don and Vorskla, and called the Lines of Bielgorod, was erected between 1633 and 1740. Pop. (1897) 21,850.

Bieli Kliuch ('White Well'), a favourite summer resort of the inhabitants of Tiflis, beside the river Khram, on the Abure plateau, 80 m. from Tiflis. Pop. (1897) 18,526.

Bielitz, tn. in extreme E. of Silesia, Austria, 59 m. W.S.W. of Cracow; one of the chief seats of the woollen industry in the empire. It also makes machinery and rails. Pop. (1900) 16,885.

Biella, tn. and episcopal see, prov. Novara, Italy, 30 m. N.W. of Vercelli; has a cathedral (which, with its baptistery, dates from the 9th century), and manufactures cloth, paper, and ironware. Pop. (1901) 19,267.

Biĕlo-ozero ('White Lake'), lake (25 m. by 20 m.), Novgorod gov., Russia; overflows by the Sheksna into the Volga; is connected by canal with Lake Onega. The ancient town of Bielozersk stands on the S. shore. Pop. (1897) 6,012.

Bielopol, or Byelopolye, tn. in N.W. of Kharkov gov., Russia, 170 m. by rail E. of Kiev; has distilleries, brickworks, tanneries. Founded 1672. Pop. (1897) 15,223.

Bielostok, or Byelostok (Pol. *Bialystok*), tn., Grodno gov., Russia, on Biala, sub-affluent of Vistula, 50 m. by rail S.W. of Grodno city. Rapidly growing industrial centre: cloth, silk, hat, and other manufactories; grain and wood trade. Pop. (1897) 63,927.

Bielski, Martin (1495-1576), Polish historian, the first to write history in the Polish language. Chief works: *Kronika Sviata*, or *Universal Hist.* (1550); *Kronika Polska*, or *Hist. of Poland* (1597), continued and published by his son Joachim.

Bieltsi, Bieltzy, or Beltsi, tn., Bessarabia, Russia, 85 m. N.W. of Kishinev, on ry. line from Czernowitz to Odessa. Manufacture of bricks, soap, and candles; horse and cattle trade. Annexed 1812. Pop. (1897) 18,526.

Bien-Hoa, cap. of the arrondissement of Bien-Hoa, in Lower Cochin-China, on the Donnaï, emptying into the China Sea, 14 m. N.E. of Saigon; manufactures furniture. Pop. 20,000.

Bienne, and Bienne, Lake. See Biel.

Biennial, in gardening, is strictly a flowering plant that does not flower until the year following that in which it emerged from its seed coverings, and does not live beyond the year in which it first flowers. But the length of time which elapses between the birth and death of a plant is largely a matter of climate, and a plant which is biennial in England is sometimes merely annual when grown in a country with a longer summer. The gardener uses the word with a somewhat wider meaning, for often he includes as biennials all those plants which are at their best in the year following the sowing of the seed, though, strictly, many of them are annuals or perennials. Hollyhocks, mulleins, foxgloves, campanulas (certain species and varieties), sweet-williams, Chinese pinks, wallflowers, biennial stocks, rockets, some of the evening primroses, honesty, and sweet scabious are among the best-known garden biennials. Biennials should be sown about the middle of May in drills, on soil which is thoroughly dry, moderately enriched, and finely pulverized. The seeds should be but lightly covered with fine soil, and if necessary, a considerable sprinkling of water from a fine-rosed watering-pot should be given. Evaporation of this water should be checked by means of boughs or fine netting. The seedlings should be transplanted at an early age, and again moved a month later, ample space for individual development being given at every stage. At Michaelmas the plants should be placed in rich, well-cultivated ground, where they are intended to flower in the following year.

Bierley, North, par. in Shipley div., 2 m. S.E. of Bradford, W. Riding, Yorkshire, England; has coal mines and iron works. Pop. (1891) 16,249.

Bierstadt, Albert (1830-1902), American painter, studied at Düsseldorf and Rome, and returned to settle in New York State. He became a National Academician in 1860, and his representation of the scenery of the western states, to which he chiefly devoted himself, was of high merit, in spite of some deficiencies in colouring. Among his best works are *Rocky Mountains* (1863), *North Fork of the Platte* (1864), *Eruption of Vesuvius* (1868), *Valley of Kern's River* (1875), and *Discovery of the Hudson River*, painted for the Capitol at Washington.

Biesbosch (*i.e.* 'rush bush' or 'rush land'), a district of the Netherlands, lying between the provinces of S. Holland and N. Brabant. It consists of an intricate agglomeration of islands, waterways, and marshes, some 70 to 80 sq. m. in extent, and originated in consequence of the bursting of a dam in the Maas in 1421. About one-half of the land then overwhelmed by the water has since been reclaimed. The Haringvliet and Hollandsch Diep connect the Biesbosch with the North Sea.

Bifrost, or Asbro, in Scandinavian mythology, the bridge between earth and heaven over which the gods daily pass to Doomstead, the hall of the Fates or Norns, and the judgment seat under the mystic ash tree Yggdrasil. The keeper of the bridge is Heimdall. The rainbow, in most religions a connecting link with heaven, is the evident origin of the myth.

Bigamy is the offence of going through a form of marriage during the existence of a former marriage, and in Great Britain is punishable by seven years' penal servitude. It makes no difference that the second marriage took place abroad, provided the offender was a British subject, or that it was *ab initio* void; but it is essential that the first marriage should be good. A person is not guilty of bigamy who remarries when she or he has not heard of a first husband or wife for seven years, and does not know him or her to be alive. After seven years' silence it is for the prosecution to prove knowledge. A decree of divorce by the court of the country of domicile is a good defence. *Bona fide* belief in the death of a husband or wife, even though seven years have not expired, is a good defence.

Bigelow, John (1817), American statesman and author, was admitted to the bar in 1839, and in 1849 became joint-proprietor with W. C. Bryant, and managing editor, of *New York Evening Post.* Minister to the court of France (1865-7); secretary of state of New York (1875-7). Publications: *Life of Benjamin Franklin* (1875), whose works he also edited in 1888; *The Wit and Wisdom of the Haytians* (1879); *Molinos the Quietist* (1882); *Life of William Cullen Bryant* (1890); *Life of Samuel J. Tilden* (1895); *The Mystery of Sleep* (1896), etc.

Bigelow, Poultney (1855), American journalist and author, brought up at Potsdam, where he became intimate with the Crown Prince William of Prussia, now Emperor William II. He is known for his voyages in a canoe on European rivers, of one of which a bright account appears in his *Paddles and Politics down the Danube* (1892). His interest in Germany finds expression in *Hist. of the German Struggle for Liberty* (1896).

Bigg. See Barley.

Big-Game Shooting. The father of big-game shooting, William Cotton Oswell, who died in 1893 at an advanced age, was perhaps the best-known African hunter in the 'fifties, though his friend Livingstone became almost as keen a sportsman. The list of African big game at the present time comprises the giraffe, buffalo, eland, elephant, rhinoceros, and many other beasts still fairly plentiful. To-day, indeed, in British E. Africa alone, at least thirty-eight species of antelope and gazelle are hunted. The African elephant, which is a native chiefly of Mombasa, shows good sport, but is a much less dangerous beast to tackle than the African buffalo; the latter is considered by experienced hunters to be the most formidable of all wild beasts, and is found in great numbers over a large area. Lions are still fairly numerous in some parts of Africa, notably in Masailand, Turkwell (near Lake Rudolf), and Suka (in the Congo Free State). Rhinoceroses are as plentiful in E. Africa to-day as they ever were, owing partly to the fact that they suffer comparatively little from disease, and partly also to the fact that they afford such indifferent sport that few men shoot many of them. The same may be said of the hippopotamus, which abounds in E. Africa wherever water is plentiful, and frequents the Nile in great numbers, especially just above and just below Ripon Falls.

Other favourite resorts of the big-game hunter are in N. America. In many parts of Canada, antelope, deer, moose, and other kinds of game are plentiful. Of late years, however, big game has become comparatively scarce in the eastern section of the Dominion, owing to the facilities afforded by the Canadian Pacific Railway. In British Columbia big game still abounds, especially in the Kootenay district. In the northern regions of British Columbia musk-ox are fairly plentiful, and still farther north bison are found in large numbers. Good sport is to be had in parts of California; at one time grizzly bears abounded throughout the mountainous districts of this and the adjoining states, but they have gradually been driven farther and farther in-country. In several of the western states various other bears exist, but they offer comparatively poor sport.

In parts of S. America, also, excellent shooting is to be had, especially in the north, though but a comparatively small section of that vast area has yet been opened up for sportsmen. An American sporting syndicate is surveying several tracts in Paraguay and Patagonia, with a view to opening up those countries by supplying maps and other information. The S. American game list includes the guanaco, six kinds of deer, the ostrich, rhea, jaguar, puma, and tapir, in addition to wild cattle and various sorts of wild pig.

Arctic big-game shooting has few votaries, chiefly because it demands a constitution of iron to face the severe hardships; but its attractions seem to be irresistible to the sportsman who has once shot in northern latitudes. Walruses are sufficiently plentiful in places to afford good sport, though they have been thinned down regularly almost since the close of the 16th century. They breed rapidly, however, and they are able to get away into regions wholly inaccessible to the hunter. The best sport obtainable at the present day is to be found about Spitzbergen and Novaya Zemlya, and to the north and east of those regions. Opinions differ as to the weapon best adapted for walrus-shooting, but it is generally agreed that nothing smaller should be used than a ·450 Express with a solid hardened bullet. Several men experienced in walrus-shooting about Cape Leigh Smith and N.E. Cape declare that in those parts a ·500 Express is not too heavy a weapon to use. Walrus-harpooning is taken up by many sportsmen, who declare that it is infinitely better sport than shooting. The harpoon commonly used is 12 ft. long and 1¼ in. thick. Polar-bear shooting, of which so much has been written, is looked upon with contempt by the majority of big-game shooters.

Forty years ago India used to be regarded as the paradise of the big-game hunter, and though excellent sport is still to be had there, it is fully ten times harder to obtain. Kashmir has many advantages in this respect, especially in the north and east. In the Himalayas big game remains very plentiful, in spite of many hundreds of head being killed there annually. Not many years ago the lion of India used to be killed in fairly large numbers, but to-day he is almost extinct. On the other hand, tigers are plentiful enough. Some tigers prey, as a rule, upon cattle; others live upon game alone; while a third class, fortunately the least numerous, often prey upon human beings. Tiger-shooting is conducted in three ways—shooting from elephants; driving with beaters to guns posted in trees; and decoying to 'bait' during the night, while the sportsman waits in concealment. In the high jungles of the Tarai, at the south foot of the Himalayas, shooting from elephants is the method commonly adopted. Opinions differ as to whether the panther, still plentiful in parts of India, is or is not a sporting beast. He is most plentiful in Burma, though found in considerable numbers in Ceylon. The methods employed for tiger-shooting are also adopted for panther-shooting; but driving seldom proves satisfactory, owing to the quarry's habit of lying close until the beaters have all passed, when he quietly doubles back. One of the most favoured districts for elephant lies along the base of the Himalayas; they are far less numerous in Ceylon now than they were. Buffaloes have multiplied in Assam and Burma within the last few years, and several well-known sportsmen have lately engaged in hunting expeditions there. Other districts in which buffaloes may generally be found in good numbers are the north of Ceylon and the Central Provinces of India; in S. India buffaloes are so scarce that many hunters have been misled into believing that they no longer exist there.

Very good shooting is to be had in many parts of Europe, notably in the Caucasus Mts., which take rank among the best big-game regions of the world. The number of sportsmen who go there increases annually; and the cost of obtaining sport is also increasing, as indeed it is all the world over. Wild boars are exceedingly numerous in the Caucasus, though regularly shot in great numbers. They give excellent sport, being even gamer and more cunning beasts than the wild boars of India. In this region are also to be found ibex, bear, antelope, chamois, goat, and many other animals, though deer are growing somewhat scarce. Chamois are more plentiful in the Swiss and Austrian Alps, and are also fairly numerous in many of the high mountain systems of Central and S. Europe, and in the Tyrol, where driving is the most popular method. First-rate shooting is obtainable in many parts of Spain, though the expense is enormous: it is estimated that every ibex shot in the Spanish highlands by British sportsmen costs £100.

As to the weapons best adapted for big game, opinions vary considerably, though it may be taken as an axiom that a big animal needs a big bullet, whether the tactics adopted be tracking, driving, or stalking. A ·450 Express may be considered a good all-round weapon, and is the best obtainable for such an animal as the chamois. In the Himalayas a ·500 Express is most often employed for soft-skinned animals, and a 12-bore for the thick-skinned animals, while many very practical men advocate an 8-bore for big and unusually ferocious beasts. On the other hand, a ·400 Express is sufficiently powerful for gazelle, antelope, etc.; and for wild boar, the 12-bore Paradox, which is rifled at the muzzle, and shoots a fairly heavy ball up to a hundred yards with great accuracy, is an excellent weapon.

In almost every part of the world big game is gradually becoming scarcer, owing chiefly to the increase in the number of hunters, and to the universal spread of civilization. In many countries it is protected by law, the laws in Norway and Sweden being exceedingly strict. (See PRESERVATION OF GAME.)

A large collection of works on big-game shooting in every part of the world may be consulted at Mr. Rowland Ward's, 166 Piccadilly, London. See also Rowland Ward's *Records of Big Game* (1899); F. C. Selous's *A Hunter's Wanderings in S. Africa* (2nd ed. 1890); Captain H. G. Swayne, R.E., *Seventeen Trips through Somaliland* (1895); Henry Zouch Darrah's *Sport in the Highlands of Kashmir* (1898); Alfred Clark's *Sport in the Low Country of Ceylon* (1896); Arthur H. Neumann's *Elephant-Hunting in E. Equatorial Africa* (1898); E. P. Demidov's *Hunting Trips in the Caucasus* (1898); H. A. Bryden's *Great and Small Game of Africa* (1899); F. Vaughan Kirby's *Sport in E. Central Africa* (1899); R. Lydekker's *Great and Small Game of India, Burma, and Thibet* (1901); Sir S. Baker's *Wild Beasts and their Ways* (1891); T. S. Van Dyke's *The Still Hunter* (1902); W. A. Baillie-Grohman's *Tyrol and the Tyrolese* (2nd ed. 1877); ed. by the late Duke of Beaufort, *Big-Game Shooting*, in the 'Badminton Library' (1885, etc.); Colonel Kinloch's *Large-Game Shooting* (1885); Rowland Ward's *Handbook* (1900); Pease's *Travels and Sport in Africa* (1902); Finlay's *Big Game and Travel in S.E. Africa* (1903).

Biggar, tn. and par. on Biggar Water, E. Lanarkshire, Scotland, on C.R., 12 m. E.S.E. of Lanark. Dr. John Brown, author of *Rab and his Friends*, was born here in 1810. Pop. of par. (1901) 1,897.

Biggarsberg Mountains, a mountain range of S. Africa, branching E. from the Drakenberg Mts., and separating Newcastle district and the N. corner of Natal from the rest of the colony.

Biggleswade, mrkt. tn. and par., Bedfordshire, England, 10½ m. E.S.E. of Bedford, on G.N.R., and on the Ivel; is a centre of market gardening, pickling vegetables being especially cultivated. Pop. (1901) 5,120.

Bigham, CHARLES CLIVE (1872), English journalist, born in London, was special correspondent for the *Times* in the Greco-Turkish war (1897). He has been in the diplomatic service at St. Petersburg (1896–8) and Peking (1898), and has published *A Ride through W. Asia* (1897), *With the Turkish Army in Thessaly* (1897), and *A Year in China* (1901).

Big Horn. (1.) Group of mts. in N. Wyoming, U.S.A.; consists of an uplift mainly of plateau-like character, from the higher parts of which the stratified beds have been removed, exposing the granites, and these even have been subject to considerable erosion. In other places Cambrian beds extend across the summit, while all around the range the younger beds lie up against its flanks in high, steep hog-backs. The highest summit, known as Cloud Peak, has an altitude of 13,165 ft. (2.) River of Wyoming and Montana, U.S.A.; rises as Wind R. in the Wind River Mts., Wyoming, flows nearly N. to its junction with the Yellowstone; length, 350 m.

Bigland, JOHN (1750–1832), miscellaneous writer, born at Skirlaw, Yorkshire; acted as village schoolmaster until the publication of his first work, *Reflections on the Resurrection and Ascension of Christ* (1803), when he devoted himself to literary work. Besides continuing Lord Lyttelton's and Goldsmith's histories of England, he compiled histories of Spain (1810), Europe (1811), England (1815), France (1818), and the Jews (1820), together with *Letters on Natural History* (1806), and geographical works.

Bignonia, a genus composed of about a hundred species of evergreen scandent shrubs, of which *B. capreolata*, the trumpet flower, is the best known in Britain. Though often grown under glass, this species is hardy enough to be grown in sheltered situations against walls in the warmer parts of Britain. If given favourable conditions, including rich, well-dug soil, it reaches a height of 30 or 40 ft., and, with its heart-shaped leaves, presents a noble effect. It bears orange campanulate flowers in June. Unless root-growth be somewhat checked, however, but few flowers will be produced. The weaker shoots should be so thinned out, and the more vigorous shoots so trained, as to admit sufficient air and sunlight thoroughly to ripen the wood. In early spring all the remaining shoots should be shortened with some boldness. Propagation is effected in late spring by cuttings placed in sand and subjected to bottom heat. The cuttings take about two months to root. Each cutting should be taken with three joints. Among the more valuable of the species and varieties which should only be grown in Britain under glass may be mentioned *B. cherere* (*B. buccinatoria*), with orange tubular flowers about 3 in. long, borne throughout the summer in a cool greenhouse; *B. clematis*, requiring a warm greenhouse, and bearing white-and-yellow flowers in June and July; *B. speciosa*, requiring a similar temperature, and bearing yellow-and-lilac bell-shaped flowers in May and June; and *B. venusta*, a stone climber, profusely blooming through autumn and early winter, its long, funnel-shaped corollas being of a yellowish crimson. *B. Chamberlaynii*, a beautiful yellow-flowered stone climber, is now generally known as *Anemopægma Chamberlaynii.*

Bignonia speciosa.

Bigod, SIR FRANCIS (1508–37), of Settrington and Mulgrave Castle, in Yorkshire, succeeded his grandfather in 1515; entered the service of Cardinal Wolsey in 1527, and was knighted about 1529. Under Thomas Cromwell he was engaged in Yorkshire in church reform, but became implicated in the Pilgrimage of Grace (1536–7), for which he was hanged at Tyburn on June 2, 1537.

Bigorre, former subdivision of Gascony, now the dep. Hautes-Pyrénées, France.

Big Sandy, river of the E. States, U.S.A., a l. bk. trib. of the Ohio. It rises in S.W. Virginia and W. Virginia, and joins the Ohio at Catlettsburg.

Bihac, tn. in N.W. of Bosnia, in the Balkan Peninsula, on the Una, 64 m. W. of Banjaluka; was the cap. of the ancient Croatian kings. Pop. (1900) 4,500.

Bihar. (1.) One of the four provs. of the Bengal Presidency; formed part of the ancient kingdom of Magadha, which flourished from the 4th century B.C. to the 5th century A.D. From the 13th century until 1765 it was under Mohammedan rule. (2.) Chief tn. of above prov., 36 m. S.E. of Patna; has considerable trade in silk, cotton, and muslin goods. Pop. (1901) 45,063. (3.) County in E. of Hungary, bordering upon the co. Klausenburg in Transylvania. The E. half is mountainous, the W. half flat and marshy, being traversed by the Körös and Berettyó. The climate is severe. Bihar is rich in agricultural, pastoral, and mineral products. Area, 4,215 sq. m. Pop. (1900) 526,795, mostly Hungarians in the W. and Walachians in the E. Chief tn. Nagy Varad (Grosswardein).

Bihari, ALEXANDER (1856), Hungarian painter, was born at Grosswardein; studied at Vienna, and at Paris under J. P. Laurens. His productions are chiefly *genre* pictures of Hungarian life, specially the region round Szolnok, which forms the subject of his first great work, *Gypsies with the Broken Violin before the Country Justice* (1886), now in the possession of the Austrian emperor. Other notable works are *A Pleasure Trip on the Zagyva*, *Peasants at Supper on the Puszta*, and *A Roumanian Funeral*.

Bihe, isolated vil. and *concelho* on the plateau of Benguella, Angola, Portuguese W. Africa, with a climate sufficiently moderate for European settlement, and for the cultivation of corn and other crops of the temperate zone.

Bijapur, tn., Bombay Presidency, India, 200 m. by rail S.E. of Poona; was until 1686 the capital of a powerful Mohammedan kingdom. During the early part of the 18th century it passed to the Marathas, and became British in 1848. Its mosques and palaces are of great architectural beauty. Pop. (1901) 23,811.

Bijawar, feudatory state in Bundelkhand, Central India. Area, 974 sq. m. Placed under British administration 1901.

Bijayanagar, or HAMPI, ruined city in Bellary dist., Madras, India.

Bijbahar, or BIJBHARU, tn. in Kashmir, India, 25 m. S.E. of Srinagar.

Bijnaur, or BIJNOR, the N. district of Rohilkhand div., N.W. Provinces, India; area, 1,875 sq. m. Bijnaur, the capital, is 35 m. by rail N. of Meerut. Sugar and cotton cloth are the chief manufactures. Pop. of dist. (1901) 779,951; of tn. 17,583.

Bijouterie, articles made of metal (iron, bronze, gold, steel, tin, etc.), intended chiefly for ornamental purposes, and generally set with amber, jet, mother-of-pearl, tortoise-shell, coral, pearls, enamel, etc., and even costly jewels. Previous to 1870 the almost exclusive centre of the manufacture was Paris, but *bijouterie* is now also made at Vienna, Budapest, Prague, Geneva, Berlin, Nuremberg, Stuttgart, Esslingen, Hanau, and Pforzheim. See Fontenay's *Les Bijoux Anciens et Modernes* (1887), and Rogermilès's *La Bijouterie* (1894).

Bikaner, or BIKANEER. (1.) Feudatory state in Rajputana, India; has an area of 23,311 sq. m. The greater part of the state is a dreary, waterless plain. The climate is extreme. Pop. (1901) 584,627. (2.) Capital of the above state, situated on a slight elevation; within a battlemented wall 3½ m. in circuit; contains several Jain monasteries. Pottery and carving. Pop. (1901) 52,775.

Bikelas, DIMITRIOS (1835), Greek poet and historian, born at Hermoupolis, on the island of Syra. He published *Stichoi* (1862), a collection of poems; *Loukis Laras* (1879; Eng. trans. 1881), a novel dealing with the war of Greek independence; *Tales from the Ægean*, a book of travel (1885; Eng. trans. 1894). As historian he has published *Peri Byzantinōn* (1864; Eng. trans., *Seven Essays on Christian Greece*, 1890), and a work on Byzantine and modern Greece (1893). He has also translated several of Shakespeare's plays (1876-87).

Bikh, BISH, or VISH, a native Indian word meaning poison, and applied to the extract of *Aconitum ferox*, which grows in the Himalayas and in Nepal. The extract was used to poison arrows.

Bikrampur, ancient tn., Dacca dist., Bengal, India. For several centuries the centre of government under the Hindu kings of Bengal, and a seat of learning.

Bilaspur, or KAHLUR, chief tn., Bilaspur dist., Central Provinces, India, 250 m. by rail N.E. of Nagpur. Pop. (1901) 18,937.

Bilbao, cap., prov. of Biscay, Spain, on N. of Spain Ry., 348 m. from Madrid, on R. Nervion, near the sea; a very busy, prosperous seaport, the centre of great iron district, exporting ore (largely to England). An extremely clean, pleasant town, it is finely situated, and has a healthy climate. There are several handsome public buildings. Exports (1903): iron ore, 4,028,730 tons, mostly to Great Britain; pig iron, 52,977 tons; wine, 1,586,908 gallons. Imports: coal, 533,796 tons, mostly from Great Britain; coke, 78,042 tons; wood (pitch pine, etc.), etc.), grain, flour, dried vegetables. The town was heroically defended against the Carlist siege (1836). Pop. (1900) 83,306.

Bilberry. See VACCINIUM.

Bilbilis (mod. *Calatayud*), tn. of ancient Spain (*Hispania*), famous for the manufacture of the finest sword-blades and other steel weapons used by the Roman and Carthaginian armies.

Bilboes, fetters fastened to a bar of iron, carried by the Spanish Armada for using upon the men of the English fleet.

Bilderdijk, WILLEM (1756-1831), Dutch poet, born at Amsterdam, and studied at Leyden (1780). He practised law at the Hague till 1786, then went to Germany and England, where he resided some time with Southey, whose *Roderick* his second wife translated (1823-4). Returning to Holland in 1806, after spending the preceding nine years at Brunswick, he was appointed president of the Institute of Holland by Louis Napoleon; but after the abdication of the latter he left Amsterdam, and settled first at Leyden (1817), and in 1827 at Haarlem, where he died. He left ninety volumes, including an incomplete history of Holland (1832-51). His poems show little originality, though his lyrics are distinguished for mastery of form. The chief are *Buitenleven* ('Rural Life'), *Die Ziekte der Geleerden* ('Maladies of the Learned'), in 1807; and his celebrated epic, *Die Ondergang der Eerste Wereldc* ('Destruction of the First World'), in 1809. See collected edition of his poems by Da Costa (1856-9), and *Lives* by Da Costa (1859) and Kollewijn (1891).

Bile is the secretion from the liver, and is discharged into the duodenum. It is a yellow, reddish, or green fluid, its colour depending on the proportions of the pigments bilirubin and biliverdin. It is bitter, and either neutral or slightly alkaline; its sp. gr. is 1·026 to 1·032; the amount secreted daily is from 18 to 36 fluid ounces in the adult. Bile contains certain salts, taurocholate and glycocholate of soda, which are of special service in the emulsification, solution, and diffusion of fatty substances in the food. Bile also acts as an antiseptic, and by increasing the turbidity of the chyme (the form in which food passes down the duodenum) it hinders its progress through the intestine, and so assists absorption. Bile is stored in the gall bladder, whence it is discharged on the passage of food. Drugs which increase the secretion of bile are hepatic stimulants (euonymin, sodium benzoate, etc.); those which act on the bile-expelling mechanism are cholagogues (calomel, etc.).

Fraser has shown that the bile of venomous serpents, when mixed with their poison, prevents an otherwise fatal dose of the latter from causing death; and the same property is possessed, though in a less degree, by the bile of non-venomous serpents, and, in a still less degree, by that of all animals. This antidote has long been known by African natives.

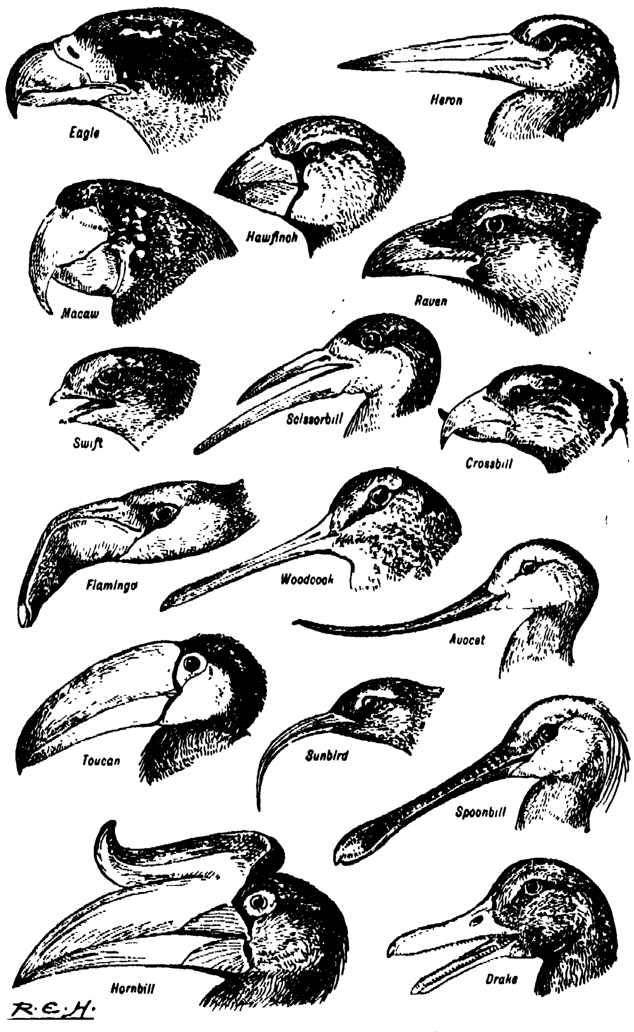
Calculi, or concretions in the gall bladder or gall duct, are discussed under GALL STONES. Certain fevers, with which biliary symptoms are associated, are sometimes called *bilious remittent fever*, *hæmoglobinuric fever*, or *hæmaturic fever*. For these, see BLACKWATER FEVER.

Bilejik, tn., vilayet Brusa, Asia Minor, 60 m. E. of Brusa; captured by the Turks in 1299. Pop. 10,500.

Bilge. See SHIPBUILDING.

Bilgram, tn., Hardoi dist., Oudh, India, 52 m. N.W. of Cawnpur; contains remains of an old fort and temple of Srinagar, built by Sri Ram. Pop. (1901) 11,190.

Bilharzia, a genus of trematodes or flukes, including in *B. hæmatobius* a dangerous parasite of man, which has been prevalent in Egypt since very early times. It infests the abdominal and urinary blood-vessels, and causes hæmaturia, inflammation, and so on. The exact cause of infection, as in many similar instances, is still uncertain, but it is probable that it occurs through drinking impure water. Both sexes are found within the body of the host, the male carrying the female in a groove or gynæcophoric canal, and the embryos escape with the urine.



Bills or Beaks: Characteristic Forms

Bilin. (1.) Town and spa of Austria, in Bohemia, 20 m. S.W. of Aussig; exports alkaline mineral waters, Bilin pastilles, etc. Fruit is grown, and sugar manufactured. Pop. (1900) 7,871. (2.) River of Burma; flows over 280 m. between the Salwin and the Sittaung to the Gulf of Martaban.

Bill, or BEAK (of birds). This consists of an upper and under jaw, clothed in a horny sheath or rhamphotheca, which is sometimes undivided and sometimes composed of several pieces. The bill varies greatly in shape and appearance in different groups of birds, and was much relied upon as a diagnostic character in the earlier classification. As striking peculiarities should be noticed the *raptorial* beak of the birds of prey; the flattened bill of the ducks and geese, with its transverse lamellæ, which act as a sifting apparatus; the *fissirostral* beak of swallows, swifts, and goatsuckers, which is short and wide and fringed posteriorly with bristles; the slender (*tenuirostral*) bills of sun-birds and others, and so on.

Bill, in legislation, see ACT OF PARLIAMENT; in criminal prosecution, see INDICTMENT.

Bill Chamber, a department of the Court of Session, Scotland, presided over by the junior Lord Ordinary during the sittings of the court, and by the judges in rotation during vacation. Cases brought before this court are generally of a summary nature—*e.g.* cases of interdict and suspension. Application for sequestration may be made either in the Bill Chamber or in the sheriff court. During the vacation many of the powers of the Court of Session are exercised by the Bill Chamber.

Bill of Adventure, a writing under the hand of a shipper of goods or a common carrier, showing that the shipment is the venture of another person, and that the shipper or carrier is responsible for nothing more than delivery of the cargo as consigned.

Bill of Costs is an account of fees, charges, and disbursements by a solicitor in a legal business transacted for a client.

Bill of Exchange, an unconditional order in writing addressed by A to B, signed by A, requiring B to pay on demand or at a fixed or determinate future time a sum certain in money to or to the order of C or to bearer. A is the drawer, B is the drawee, C is the payee. The drawee may accept the bill by signing his name across it, and may add any conditions as to time, place, or amount (the bill then becomes an acceptance). An accommodation bill is one drawn and accepted for which no real value has been given. It is usually an arrangement between two parties for securing temporary financial accommodation by getting the document discounted at a bank. But the payee may refuse to accept the conditions. A bill may be made payable on demand, or at a future date, or on the happening of an event which is certain to happen, but not on a contingency. A bill payable on demand must be presented to the drawee within a reasonable time. A bill payable at a future date must be presented when it falls due. A bill is, unless a contrary intention is expressed, a negotiable instrument transferable by indorsement. The drawee having accepted a bill, is bound to pay it, when it falls due, to the payee or any subsequent transferee. If the drawee dishonours a bill either by non-acceptance or non-payment, the drawer is liable to the payee or any subsequent transferee, provided that notice of dishonour has been given to him. A payee or a transferee is liable to a subsequent transferee, provided that notice has been given. A transferee of a bill is called the holder; and a holder in due course is one who receives the bill for value before it is overdue, and without notice of dishonour. A transferee or payee may 'restrictively' indorse a bill by writing that payment must be made to a particular person and no one else. This prevents a further transfer. If a payee's name is misspelt, he should indorse the bill according to the mistake, but he may add the true spelling if he likes. If the drawer and the drawee are the same person, the holder may treat the instrument at his option as a bill or a promissory note. When a bill is not payable on demand, three days of grace are allowed for its payment after it becomes due. An inland bill is one drawn and payable within the British Isles, or drawn within upon a resident in the British Isles. All other bills are foreign. A bill as to form is governed by the law of the place of issue, and as to subsequent transactions (*e.g.* indorsement) by the place of such transaction. A foreign bill is not invalid in England because the foreign stamp is insufficient. All bills require to be stamped according to their amount. See CHEQUE, PROMISSORY NOTE; also Bills of Exchange Act, 1882; Sir J. B. Byles, *On Bills of Exchange* (15th ed. 1891); M. D. E. S. Chalmers, *On Laws of Bills of Exchange* (5th ed. 1896).

Bill of Health. Every ship, on arrival at port, must produce her bill of health, a document obtained from the authorities of her last port, stating whether there is there any infectious or contagious disease. A clean bill is given when there is no disease, a suspected bill when there is a prospect of disease, and a foul bill when there is disease.

Bill of Lading. A bill of lading performs three functions. First, it is a receipt given by the shipowner to the shipper for goods shipped on board his ship. Secondly, it is evidence of the contract of carriage between the shipper and the shipowner. Thirdly, it is a document of title to the goods shipped, and the ownership may be transferred by indorsement and delivery of the bill of lading to a third party. As to the first two functions, it is important to note that a bill of lading, unlike other documents, is not conclusive against the parties who sign it. If the shipowner or his agent—who is usually the master, but, in the case of steamships, generally the ship's broker—signs a receipt, say, for 1,000 tons of coal, such a receipt is not conclusive, in the absence of a provision to the contrary, if the shipowner can in fact show that only 800 tons were shipped. But by the Bills of Lading Act, 1855, such a statement is conclusive in favour of an indorsee for value. It is a disputed point whether a bill of lading is a contract—as it is described in the Bills of Lading Act—or evidence of a contract. But at any rate a bill of lading is not usually signed till part of the contract has been completed—*i.e.* till the goods are on board; and in many cases it does not contain all the terms of the contract. As a document of title, a bill of lading may be transferred by indorsement either by way of mortgage, sale, or mere bailment. But the indorsee takes the bill *cum onere*—*i.e.* he is not entitled to the goods until he has performed the shipper's share of the contract, paid the freight, etc. A bill of lading generally contains a statement that the goods are shipped 'in good order and condition,' and the shipowner will be bound to deliver in the same condition. This is called a clean bill of lading; but, of course, the shipowner may refuse to be responsible for order or condition. Certain perils are generally excepted, so that the shipowner will not be responsible for losses occasioned by these. These are: the act of God and the king's enemies, at common law; and perils of the sea, dangers and accidents, stranding, collision, thieves, robbers, leakage, rust, barratry, capture, arrest, embargo, jettison, fire, and restraint of princes by special agreement. There is a controversy as to whether negligence should be excepted. The American courts refuse to recognize the exception. See Scrutton, *On Charter Parties and Bills of Lading* (1886).

Bill of Mortality. The weekly bills of mortality in London were prepared and issued by the company of parish clerks, formerly called the fraternity of St. Nicholas, incorporated by letters patent of Henry III. in 1233, and again by patent of James I. in 1611—a grant which was renewed by Charles I. in 1636. One object of these bills of mortality was to warn the court at Whitehall and the nobles of the Strand to leave London when the plague became more fatal than usual. The charter of Charles I. incorporated not only the clerks of the parishes of the city of London within and without the walls, but also those of the parishes of the city of Westminster, the borough of Southwark, and of the fifteen out-parishes adjacent; and other parishes were added from time to time until after the plague ceased to visit England. The last appearance of the plague as a cause of death in the bills of mortality is in 1679. They were ultimately superseded by the Registrar-general's tables of mortality, which were commenced in 1840, although the old bills continued to be issued for over twenty years after that date.

Bill of Rights is the name commonly given to the statute in which is embodied the Declaration of Rights presented by both houses of the Convention to the Prince and Princess of Orange in 1689. After declaring the late King James II. to have done various acts contrary to the laws of the realm, and to have abdicated the government, the Bill of Rights proceeds to enact in detail the celebrated declaration as to the rights and liberties of the English people. It was laid down that the crown had no power to suspend or dispense with the ordinary laws, or form judicial courts, or levy money without parliamentary sanction. The raising or keeping of a standing army within the kingdom in time of peace, unless with the consent of Parliament, was declared to be unlawful. Freedom of election for members of Parliament, freedom of speech in debate, and the right of the subject to petition the crown, were alike maintained. The act recognized William and Mary as the holders of the crown for their joint and separate lives, but with the administration of the government during their joint lives in William alone, and regulated the subsequent succession. A clause was finally added that the sovereign should take the test in the first parliament of his reign, and that if any king or queen should embrace the Roman Catholic religion, or intermarry with a Roman Catholic, their subjects should be absolved of their allegiance.

Bill of Sale, a document by which personal goods and chattels are assigned either absolutely or by way of security. The goods may be left in the possession of the assignor, and creditors may thus be misled by a false appearance of prosperity. Again, bills of sale, especially of furniture and stock in trade, are frequently the only security a struggling householder or small shopkeeper can give to a money-lender, who formerly often inserted unfair conditions as to forfeiture on failure to repay a single instalment of a loan, and extortionate terms as to interest so disguised as to conceal the real rate charged. To remedy those evils—the deception of creditors and the oppression of borrowers—the Bills of Sale Acts were passed. The earlier acts were for the protection of creditors. They attempted to define bills of sale, not very successfully, and provided for registration. The Act of 1882, which applies only to bills of sale given as security, was principally for the protection of the borrowers. It provided for registration within seven days of execution; that the bill of sale should express the true consideration, which must not be less than £30, must be in a form given in the schedule, and must contain an inventory of the goods comprised in it; and it restricted the money-lender's power of seizing the goods to certain specified cases. The acts in force are those of 1878, 1882, and 1891. They have led to much litigation, and have certainly not fully achieved their object. There are no bills of sale in Scotland.

Bill of Sight, a form of entry at the custom house, by the best description that can be given of goods which, upon importation, cannot be adequately or correctly described by the importer or his agent.

Bill of Store, a custom-house document, which may be issued by the searcher, permitting goods which had been shipped for foreign ports, but not sold there, to be reimported duty free, at any time within six years of exportation.

Bill of Victualling, or VICTUALLING BILL, a list of stores shipped from bond, or for drawback on ships bound for foreign ports. The list is drawn out and signed by the master, and countersigned by the collector. By the Merchant Shipping Act of 1883 stores not on the list may be destroyed.

Billardiera, a genus of Australian plants named after Jacques Julien Labillardière (1755-1834), a French botanist. The plant is of the order Pittosporaceæ or Pittosporads, and is known in English as appleberry.

Billaud-Varenne, JEAN NICOLAS (1756–1819), French revolutionist, born at La Rochelle, the son of an attorney. His book, *Le Despotisme des Ministres de France* (3 vols. 1789), marked him as a leading spirit in the movement, in which he was one of the most extreme and bloodthirsty enemies of the royal family and of the bourgeoisie. He served as president of the Convention, and was on the Committee of Public Safety. With Tallien and Vadier he destroyed the dictator Robespierre (1794), but was in the following year transported to Cayenne, whence he escaped in 1816, and died at Port au Prince. His genuine *Mémoires* were issued by Begis in 1893; those published in 1821 were spurious.

Bille, STEEN ANDERSEN (1797–1883), Danish vice-admiral, made in 1845 a voyage round the world in the *Galatea* for scientific and commercial investigations, an account of which he issued in 1849–51. Bille was minister of marine in 1852-3, and again in 1860–8.

Billet, in architecture, an ornament having the appearance of a moulding cut through at equal intervals, from which every alternate piece has been removed.

Billet, in heraldry, a small brick-shaped charge. BILLETÉ, or BILLETY, said of a shield *semée*, or strewn with an indefinite number of billets.

Billeting. The practice of billeting or quartering troops on the civil population is in Great Britain illegal, except to the extent expressly allowed by the Army Act, and so long only as that act is kept in operation by an Army Annual Act which specifies the prices to be paid for billets. Billeting otherwise than as aforesaid is still forbidden by the Petition of Right, 1628, and by an Act of 1679.

Billiards. The origin of billiards is not clearly established, nor is it known in what country it was first played. England, France, and Italy seem to have about equal claims, though Bouillet, a French writer in the *Académie des Jeux*, ascribes the invention to England. According to Reilly's English translation of the Abbé M'Geoghegan's *History of Ireland*, there is a reference to billiards in the will of Cathire More, a sub-king of Ireland, who died in the early part of the 2nd century. Cotton, in the *Complete Gamester* (1674), describes billiards as then played. The game was played with two white ivory balls, and heavy curved sticks made of Brazil wood or *lignum vitæ*, one end being much broader than the other. These sticks, called 'maces,' were held in the hand at about the middle of their lengths, and the broad end was made to strike the ball by a sort of jabbing action, whilst the thin end or staff passed over the player's shoulder. The cannon, or *carom* as it was called at one time, is an introduction of the 18th century, brought about by the addition of a third (red) ball, called the *caramboler* or 'rover,' the player's ball being made to strike both balls in the same stroke, either successively or together. In the early part of the 18th century the use of the 'cue,' with its small, tapering, striking end and thicker butt, was first advocated in lieu of the mace, which is now discarded. The wooden end of the cue was sometimes roughed and chalked to get a better grip of the ball, but it was not until 1807 that Captain Mingaud invented the use of a leather tip. That simple device revolutionized billiards, and brought in the modern game.

The first great exponent of English billiards was William Kentfield, whose book (1839) describes the improvements brought about by himself and John Thurston, the famous maker of tables and accessories. Slate was used for the bed of the table, and the framework was rendered sufficiently substantial to carry the extra weight. Fine green cloth covered the bed, and india-rubber was used as a substitute for the list cushions.

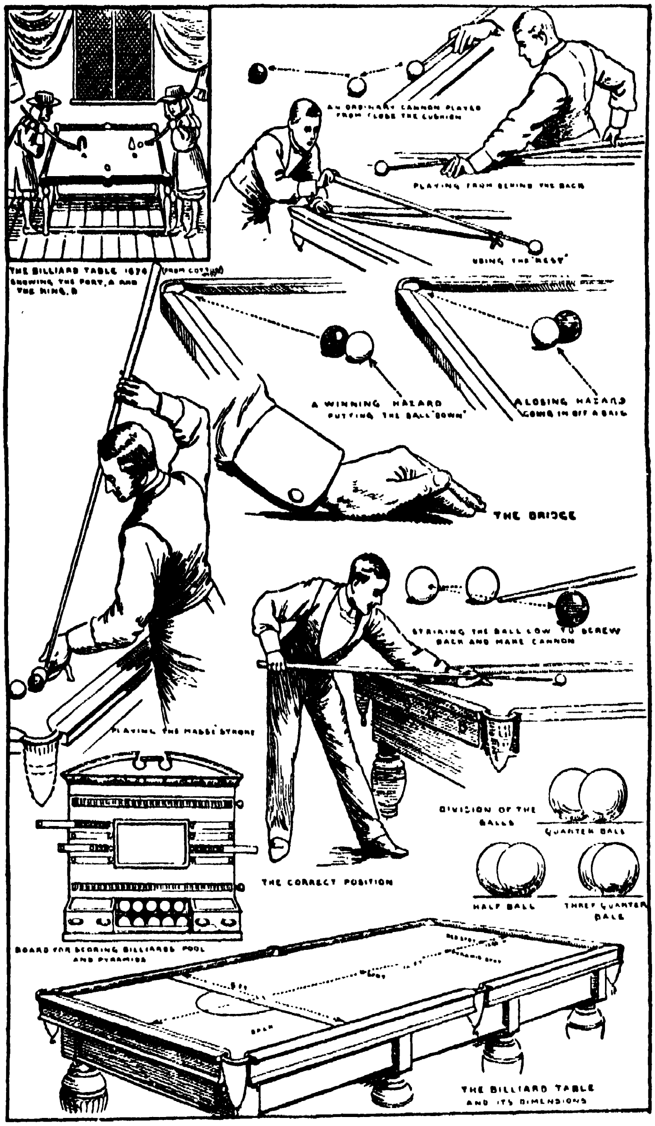
Billiards is played in England on an oblong table, 12 ft. long by 6 ft. broad. There are six pockets—one at each corner, and one in the centre of each side. The cushions are of india-rubber (galvanized india-rubber is now used, as it is not affected by the weather), and are pitched low enough to enable the player to strike the ball with greater freedom when it is situated close to the cushion. At 29 in. from the bottom cushion of the table, and parallel to it, a line, the 'balk,' is drawn right across from cushion to cushion. The centre of this line is marked by a 'spot' (a small round of paper or calico, about one-third of an inch in diameter, glued on to the cloth), and at a distance of 11½ in. each way from this, on the balk-line, are placed two other spots, from which a hoop or half-circle, called the 'D,' is lined out below the balk-line, forming the space from which the players begin the game, or play when their ball is in hand—*i.e.* off the table. In a direct line with the centre of the table, at 12¾ in. from the top cushion, is affixed the 'red spot', upon which the red ball is placed or spotted at the beginning of the game, or when it is driven into a pocket or off the table. After two consecutive winning hazards off the spot, provided no cannon or other score is made by the same stroke, the red ball is spotted in the centre of the table on a spot midway between the two side pockets; and midway between this central spot and the centre of the top cushion is another spot, commonly called the 'pyramid spot,' that being the spot on which the marker places the point ball of the fifteen red balls used in the game of pyramids. (See POOL and PYRAMIDS.)

A set of billiard balls consists of three ivory balls (balls made of a hard substance called 'bonzoline' have been made, and may be regarded as an economical substitute for ivory), two white and one red. To distinguish the white balls one from the other, one is marked with a black spot, and is called 'spot;' and the other is unmarked, and is called 'plain.' The regulation match balls are made to measure two and one-sixteenth inches in diameter. For ordinary playing balls these measurements are not so strictly observed, but in every case it is essential that the three balls of a set should correspond in size and weight.

Long cues are required for use when the striker's ball is out of the reach of the ordinary cue; these long cues are called the 'long butt' and the 'half butt.' 'Rests' with long handles, for use with these cues, are also provided. The scoring board should mark up to 100.

The game of billiards is played somewhat differently in different countries. On the continent of Europe and in America the cannon game is played, with three large balls—plain, spot, and red—upon smaller tables constructed without pockets. One point is scored for every cannon, and the breaks do not approach those of the hazard game in magnitude.

Billiards is usually played by two persons, the game being fixed at 50 or 100 up, or, in the case of matches between first-class players, at several thousands, sometimes to as many as 24,000, played in twelve days, at an average progress of 2,000 per day. Sometimes four players may be engaged in a game, two against two as partners, each player playing alternately; the ordinary game is then often 63, or 126, or more, as agreed by the players. In opening the game the players string for choice of balls and option of breaking. This is done by the two players driving a ball each simultaneously to the top cushion in such a way that they shall return towards the bottom cushion; and the ball which stops nearest to the bottom cushion wins the string. The red ball is then spotted. The first player then places his ball anywhere within the D, and plays out of balk—*i.e. above* the balk-line. It is usual to give a miss, counting one to the opponent, by playing the ball against the side cushion, striking it a little above the balk-line with sufficient 'side' to draw the ball into the protection of the balk-line. To play at the red and bring both balls down the table into the protection of balk is very effective when brought off, but it is too risky an opening to be played by an inexperienced player. The other player next places his ball in the D, and gives a miss also by sending his ball to one of the side cushions, or where, in his judgment, it will be giving his opponent the least chance of scoring. The object of the player is to score, or to leave the balls inconvenient for his adversary; and he may either play for the cannon, or for a losing or winning hazard with the red or white ball. The score is reckoned as follows:—A winning or losing hazard with the white ball scores 2, and a winning or losing hazard with the red ball scores 3. A cannon scores 2. If both winner and loser are played in the same stroke and a cannon also, they all count; so that it is possible to make at one stroke a winning and losing red hazard, scoring 6; a winning white hazard, scoring 2; and a cannon, also scoring 2 – or 10 in all. Besides the scoring strokes which count in favour of the striker, there are also forfeits


THE BILLIARD TABLE 1674 (FROM COTTON) SHOWING THE PORT, A AND THE KING, B
AN ORDINARY CANNON PLAYED FROM CLOSE THE CUSHION
PLAYING FROM BEHIND THE BACK
USING THE 'REST'
A WINNING HAZARD PUTTING THE BALL 'DOWN'
A LOSING HAZARD COMING IN OFF A BALL
THE BRIDGE
STRIKING THE BALL LOW TO SCREW BACK AND MAKE CANNON
PLAYING THE MASSÉ STROKE
DIVISION OF THE BALLS
QUARTER BALL
HALF BALL
THREE QUARTER BALL
THE CORRECT POSITION
BOARD FOR SCORING BILLIARDS POOL AND PYRAMIDS
BALK
THE BILLIARD TABLE AND ITS DIMENSIONS

The Game of Billiards.

which score to his opponent. If the player strikes his ball and it misses both the others, this scores 1 to the other player; if his ball goes into the pocket without striking another ball, this counts 3 to the opponent; and if it is forced off the table, it counts 2. When a ball is forced off the table after striking another or being struck, if no score has been made by the stroke, the ball off the table is 'in hand,' and if the red ball is off it is spotted; but if a score has been made first, it has no scoring value.

When two balls touch, the red is spotted on its own spot, and the adversary's ball is spotted on the central spot, the player continuing his break from balk. Should the striker push the ball instead of striking it, he commits a foul, and loses his turn; or should he move a ball with any part of the cue or person before or during the stroke in a manner not properly a part of the stroke, or should he, by leaning over the table, raise both feet from the ground, he commits a foul, and loses his turn. At one time the strokes were made by the players alternately, whether the player scored or not, the art in those days being to score and by the same stroke to leave the balls inconvenient for the next player. The efforts of the modern player are directed to making runs of scoring, called 'breaks,' and thus to gain 'position' has come to be regarded as the secret of billiards.

The best way to learn is to practise strokes from a book, or under the tuition of an experienced player. There are no regulations as to the weight or size of cues; their weight varies from thirteen to eighteen ounces. The tip should fit exactly without overlapping, and the face of it should be comparatively flat. The player will not obtain an accurate aim until he has learned to keep his eye upon the object ball, and not upon the ball he is striking, especially at the actual moment of the stroke. This is a *sine quâ non* of good billiards.

Another important study is the angle of reflection given by the cushions, which corresponds with the direct line of incidence; but when the player uses the side stroke, the angle will, in a measure, depend upon that. If the impact of the cue is directly in the centre, the ball rolls forward without spin. Should the point of the cue strike the ball on either side of its vertical axis, the ball will travel forward in the line directed by the cue, but will spin in the direction struck. This spin constitutes the side stroke, which is called left or right side, as the case may be. Struck high, the ball follows on; struck low, it spins back to the striker, after striking the object ball, from which it rebounds. Struck low on either side, the ball will curve or screw off the object ball with a greater or less angle, according to the force of the impact and the smartness with which the stroke is delivered.

One consequence of the study of 'position' has been the red winning hazard from the spot. By dint of practice this hazard has been made as many as six hundred and thirty-three times running, which led to its ultimately being 'barred.' In addition to the 'spot stroke,' as these red hazards off the spot are called, 'nursery' cannons found great favour, the player getting the balls together and scoring a succession of cannons, mostly effected by a push stroke. The barring of the push stroke has materially interfered with the nursery cannons, so that the game as played now is of the most open and general character. In the days of the spot stroke and nursery cannons, the writer, W. J. Peall, in a match with C. Dawson, registered a record break of 3,304. With spot barred, John Roberts, jun., has made a record break of 1,392. Among other famous players who have made remarkable breaks are W. Cook, C. Dawson, H. H. Stevenson, W. Mitchell, and E. Diggle. In January 1905 Roberts made a break of 821, the world's record on the 'standard' table (adopted January 1905). It was, however, disallowed because a preliminary measurement of the table had not taken place. Subsequently Stevenson made a break of 788, which stands as the record. See *Billiards for Beginners* (1901), by John Roberts, jun.—a very useful elementary text-book; *Billiards*, by W. Mitchell (1897); *Hints on Billiards* (1895), by J. P. Buchanan; the 1894 edition of *Billiards*, by J. Bennett (ed. Cavendish); and *Art of Practical Billiards for Amateurs*, by A. W. Drayson (1889), specially approved by W. J. Peall. *Le Billard* (1895), by Vignaux, deals exhaustively with the French or cannon game.

Billing, ARCHIBALD (1791–1881), Irish physician, born at Cromlyn, Co. Dublin; author of *First Principles of Medicine* (1831), works on *Asiatic Cholera* (1848) and *Lung Diseases* (1852), also *The Science of Gems* (1867), a treatise on engraved jewels.

Billings, JOSH. See SHAW, HENRY M.

Billings, ROBERT WILLIAM (1813–74), English draughtsman, architect, and author, was born in London, and was taught his art in the office of John Britton. He published several books on the practice of architecture, and works, illustrated by himself, on the Temple Church (1838), Carlisle and Durham Cathedrals (1840 and 1843), etc. But his fame chiefly rests on the *Baronial and Ecclesiastical Antiquities of Scotland* (4 vols. 1845–52). See *Builder* (1874), xxxii. 982–1035.

Billings, city, Montana, United States, on the Yellowstone River, 240 m. E. by S. of Helena, in the centre of a vast stock-raising district, with coal, marble, and limestone deposits in the vicinity. It is rapidly rising into importance. Pop. (1900) 3,221.

Billingsgate, a wharf and fish-market on l. bk. of the Thames, below London Bridge. The market was established in the reign of Queen Elizabeth, and was made free in 1699. The present buildings date from 1874. The name is often applied to the foul language characteristic of such places.

Billington, ELIZABETH, *née* WEICHSEL (c. 1768–1818), famous vocalist, born in London, died in Italy. Her father was a Saxon musician, and her husband an English contrabassist. She made her début in Dublin in 1783, and in 1786 was engaged for Covent Garden at the then large salary of £1,000. She left London in 1794, and toured as a 'star' in Italy; then returning to London, she sang there from 1801 to 1811. Her voice had an extensive compass of three octaves, and she excelled in florid passages. She was a striking beauty, and Sir Joshua Reynolds painted a fine portrait of her as St. Cecilia. Details of her career may be read in *Memoirs of Mrs. Billington* (1792), a suppressed work, to which she replied in *An Answer to the Memoirs of Mrs. Billington* (1792).

Billiton, BLITUNG, or BILTONG, an island of the Dutch E. Indies, lies between Banka and the W. coast of Borneo, with an infertile soil and heavy rainfall (100 to 125 in. annually). Tin occurs almost everywhere; the annual output is 5,000 to 6,000 tons. Other products are iron, gums, scented wood, sago, trepang, pepper, and tortoise-shell. Its area is 1,870 sq. m., and its pop. (1900) 43,386, including 11,905 Chinese.

Billom, tn., dep. Puy-de-Dôme, France, 15 m. S.W. of Clermont. The church of St. Cerneuf dates from the 10th century. There is a hydropathic establishment, and the town trades in thread, linen, corn, and cattle. Pop. (1901) 4,275.

Billon (Fr. 'debased coin'), a term in numismatics for an alloy of silver with a large quantity of copper, used in making medals and coins.

Billot, Jean Baptiste (1828), French general and senator. After a distinguished career in Africa, he was given the command of the 18th Army Corps during the Franco-Prussian war (1870-1). Elected in 1871 to the National Assembly, he was largely responsible for a bill to reorganize the staff of the French army in 1878. In 1882 he became minister of war, but his refusal to deprive the Orleans family of military rank led to his resignation in 1883. He was minister of war again in 1896-8, when he took a prominent part in the Dreyfus affair of 1897.

Billroth, Albrecht Christian Theodor (1829-94), German surgeon, born at Bergen, on the island of Rügen; was appointed professor of surgery at Zürich in 1860, and at Vienna in 1867. He was the first to operate for cancer of the stomach, and to him is largely due the modern ambulance system. His eminence as a surgeon, and his services during the Franco-German war (1870-1), when he served in the German hospitals, were recognized by an appointment to the Austrian Upper House in 1887. His works include *General Surgical Pathology and Therapeutics* (trans. 1879; Ger. 1st ed. 1863, and 15th ed. 1893); *Ueber den Transport der im Feld Verwundeten und Kranken* (1874); *Care of the Sick at Home and in the Hospital* (trans. 6th ed. 1899; Ger. 1st ed. 1892, and 9th ed. 1899).

Bilma, the S. and most important portion of the Kawar oasis, Central Sahara, Africa, in the Tibbu country. Garu (Bilma proper) has rich salt mines.

Bilney, Thomas (d. 1531), English martyr, was born in Norfolk about 1495, and was ordained priest at Ely in 1519. He preached against the mediation of saints, and was arrested in 1527. He abjured, and after a year's imprisonment returned to Cambridge, and resumed public preaching (1531). Arrested and tried, he suffered death by fire, Aug. 19, 1531. See Foxe's *Acts and Monuments*, iv. (1877); Cooper and Thompson's *Athenæ Cantabrigienses*, i. 42 (1858-61).

Bilse, a lieutenant in the German army who wrote a book (1903) entitled *Aus einer Kleinen Garnison*, throwing a lurid light on garrison life in the provincial town of Forbach. The book was suppressed in 1903, and the author sentenced to six months' imprisonment and dismissal from the service. The minister of war said that though the book 'was a disgrace to a Prussian officer, part of it was unfortunately true.' The book has been published in England, under the title *Life in a Garrison Town*.

Bilston, par. (1,845 ac.) and mrkt. tn., 2½ m. S.E. of Wolverhampton, W. Staffordshire, England, with stns. on L. & N.W.R. and G.W.R. It is a typical 'black country' town. Coal, iron, and casting-sand are plentiful in the neighbourhood, and there are many blast-furnaces, foundries, and hardware factories. Its grindstones are famous. Pop. of par. (1901) 24,034.

Biltong. See Billiton.

Bima, seapt. tn. and cap. of sultanate of Bima, on N. coast of Sumbawa I., Dutch E. Indies; exports fine horses.

Bimana ('two-handed'), in zoology, an order established by Cuvier for the reception of man, as distinct from the Quadrumana, or four-handed apes and monkeys. More recent research has shown that, structurally, man so resembles the apes and monkeys that he must logically be placed in the same order as they are, and the old order Bimana is therefore dropped, man being placed in the family Hominidæ, of the order Primates.

Bimetallism. The monetary system of Great Britain (see Money) is monometallic. Gold alone is freely received at the Mint and turned into coin; and gold alone is legal tender, without limit, in the payment of debt. The coins of silver and bronze form a subsidiary or token coinage. They are only valid for the discharge of debts of small amounts, and the quantity coined is restricted, depending on the discretionary power of the Mint, advised by the Bank of England. Under a system of bimetallism, by contrast, the two metals gold and silver would indifferently be legal tender in the payment of debt, and would equally be received at the Mint without restriction. In some more recent proposals it is not considered necessary that standard coins of both metals should be in current use. It is generally admitted that existing token or subsidiary coinages might be left unaltered. All that would be needed would be that the standard should consist of the two metals jointly instead of one alone; and the standard might possibly be only a reserve in bullion or coin kept as the basis of an issue of paper money. A ratio would be fixed between the two metals, and at this ratio they would be accepted at the Mint, and given validity as tender in the final payment of debt. Two chief advantages are claimed for the system. One is the maintenance of a par of value between the two metals, and a consequent steadiness of exchange between gold-using and silver-using countries. Owing to the greater importance of demand in determining the value of money (see Prices, Money), the legal ratio recognized at the bimetallic mints exerts a controlling influence over the market ratio, and is sufficiently powerful to counteract great changes in supply. Slight fluctuations in the market value are met by a tendency to bring the cheaper metal in larger quantities to the Mint, and to melt into bullion the dearer metal obtained in exchange. Historical experience shows that at the time of the Californian and Australian discoveries of gold in the middle of the 19th century, revolutionary changes in the supplies of the metals were accompanied by trifling fluctuations in their relative value; and it is not disputed that the suspension of the free coinage of silver at the Paris Mint in 1873 was followed by large fluctuations in the exchanges between England and India, by which trade was disturbed, and the government of India, raising its revenue in silver and paying interest in gold on its debt, was embarrassed to an extent unknown before. A further advantage claimed for bimetallism rests on the argument that a joint standard is likely to be more stable than a single standard. The fluctuations, it is true, in the value of the two metals taken separately may be greater or more in number than those of only one; but, taken jointly, they may more probably be found to mitigate than intensify one another. In any event, the standard rests on a broader basis, and a fall of prices is less likely to occur, or at least would be less severe and rapid. On the other hand, it is argued that the system presents more complications and is more artificial than monometallism; that it was tried for long periods in the past by individual nations, and caused great inconvenience, owing to the one or the other metal leaving the country from time to time in search of some place where it was rated higher; that, granting that these difficulties might be overcome by the substitution of international bimetallism, it would yet not be easy to secure agreement on the ratio to be chosen, or to prevent afterwards the secession of one or more of the contracting parties. The suspension of the free coinage of silver at the Paris Mint in 1873 rendered the French bimetallic system one of imperfect or, as it has been called, halting or limping bimetallism. The controversy cannot be said to be settled, but the drift of practical action has lately turned away from bimetallism rather than set towards it.

F. A. Walker's *International Bimetallism* (1896) states the question from the bimetallic standpoint. Sir R. Giffen's *Case against Bimetallism* (1892) is written from the opposite side. Major L. Darwin's *Bimetallism* (1887) is an attempt to conduct an impartial examination of the arguments of both parties. The *Reports* of the Gold and Silver Commission, of the International Monetary Conference at Brussels in 1892, and of the Indian Currency Committees (mentioned under PRICES) should be consulted as evidence of the state of the discussion and the facts at different periods in recent times.

Bimlipatam, seapt., Vizagapatam dist., Madras Presidency, India, 15 m. N.E. of Vizagapatam. In the 17th century the Dutch established a factory here, which was ceded to the British E. India Company in 1825. Pop. (1901) 10,212.

Binan, or VINAN, tn. in prov. of Laguna, Luzon, Philippine Is., on W. shore of Laguna de Bay; produces rice and timber. Pop. nearly 20,000.

Binary Nomenclature of plants is the application of two names (a generic followed by a specific) to each plant—*e.g. Rosa canina*, dog-rose. Kaspar Bauhin (1560-1624) introduced the system in 1598 in his *Pinax*. Linnæus (1707-78) extended the binary nomenclature to the whole of the vegetable and animal kingdoms.

Binary Theory, the chemical theory, originated by Davy, that salts always consist of but two elements—a basic or electro-positive, and an acid or electro-negative element. It has long been known that this theory is insufficient. See SALT.

Binche, tn., prov. Hainault, Belgium, 15 m. S.E. of Mons; makes lace and pottery. Pop. (1900) 11,350.

Bindraban. See BRINDABAN.

Bindusara, surnamed AMITRAGHATA, emperor of India from 297 to 272 B.C., when he was succeeded by his son Asoka.

Bindweed. See CONVOLVULUS.

Bingen (anc. *Bingium*, or *Vincum*), tn., grand-duchy of Hesse, prov. Rhine Hesse, Germany, at the confluence of the Nahe with the Rhine, on the l. bk. of the latter; carries on a large trade in wine, and manufactures tobacco, champagne, etc. Thousands of people resort here for the popular festival of St. Rochus (the first Sunday after August 16). The *Nibelungen* treasure is said to be sunk in the Rhine near Bingen; and opposite the town, in the middle of the stream, is the 'Mouse Tower,' which legend associates with Hatto II., archbishop of Mainz. Pop. (1900) 9,600.

The BINGERLOCH, opposite Bingen, is composed of rapids, through which a narrow passage was cut by the Romans, and an effective waterway constructed in 1832.

Binger, LOUIS GUSTAV (1856), French African explorer, born at Strassburg, made journeys to the Senegal and Sudan, and published studies on the language of the Bambara. At the beginning of 1887 he undertook a long journey from Senegal to the river Niger, by which he filled a great gap in the map of that region. He reached Grand Bassam, on the coast, at the beginning of 1889. This journey he described in *Du Niger au Golfe de Guinée par le Pays de Kong et le Mossi* (2 vols. 1891). In 1892 he went again to the Guinea coast, to superintend the delimitation of the boundaries of the English and French spheres of influence.

Bingham, JOSEPH (1668-1723), author of the *Origines Ecclesiasticæ*, or the *Antiquities of the Christian Church*, was born at Wakefield. In 1695 an unjust imputation of heresy caused him to resign his fellowship at Oxford. Thereafter he held successively the livings of Headbourne Worthy, near Winchester, and Havant, near Portsmouth. His great work appeared in 10 vols. (1708-22). Among his other writings were *Three Sermons on the Trinity*, and *The French Church's Apology for the Church of England* (1706).

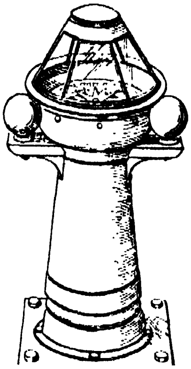
Binghamton, city, New York, U.S.A., the co. seat of Broome co., on the Susquehanna R., 150 m. N.W. of New York city; noted for its dairy products. It has a great variety of manufactures. Pop. (1900) 39,647.

Bingley, par. and mrkt. tn. on Aire R., 5½ m. N.W. of Bradford, W. Riding, Yorkshire, England; has station on M.R. Worsted and paper are manufactured. Pop. (1901) 18,448.

Binh-Dinh, tn., Annam, French Indo-China, 205 m. S.E. of Hué. Eleven miles to the S.E. is the town of Kwinhon, or Quinon, its port on the China Sea.

Binh-Thuan, small tn., Annam, French Indo-China, cap. of prov. Nha-Trang, 130 m. E. by N. of Saigon.

Binnacle (originally *bittacle*, from Fr. *habitacle*) was formerly a rectangular wooden locker with several compartments, to contain respectively the compasses, log-glasses, watch-glasses, and lights to show the compass at night. This case contained three compartments with sliding shutters, the two side ones holding a compass in each, and the middle compartment having a lamp or candle, with a pane of glass on each side to throw a light on the compasses at night. The modern binnacle, besides supporting the compass and containing arrangements for the illumination of it by night, is fitted with various devices whereby the magnetic needle is protected against the effects of shock and vibration, as also against the permanent and induced magnetism of the vessel in which it is placed. See also COMPASS.



Binnacle.

Binney, EDWARD WILLIAM (1812-81), English geologist, born at Morton, Nottinghamshire; practised as solicitor in Manchester (1835), and founded the Manchester Geological Society, of which he was first joint honorary secretary (1838), and president (1857-9 and 1865-7). In papers on *Sigillaria and its Roots*, he demonstrated that all coal seams rest on old soils composed of vegetable matter. He also wrote on bituminous shale, and helped James Young to the discovery of the Bathgate shale seams.

Binney, THOMAS (1798-1874), English nonconformist divine, born at Newcastle; was Congregational minister at Bedford; Newport, Isle of Wight (1824); and Weigh House, London (1829-69); and for a time professor in the Congregational New College. He was a powerful opponent of the Established Church and of ritualism. His most popular work is, *Is it Possible to Make the Best of Both Worlds?* (1853.) See *Life* by Paxton Hood (1874).

Binnie, SIR ALEXANDER RICHARDSON (1839), chief engineer of the London County Council since 1890; was engaged in the Public Works Department of India (1868-74), and designed and constructed the whole of the Nagpur waterworks. He was chief engineer of Bradford (1875-90), and constructed the Bradford waterworks, also the Blackwall Tunnel, Barking Road Bridge, and other important London works. He was knighted in 1897.

Binomial (Lat. *bis*, 'twice;' *nomen*, 'a name'), an algebraical expression containing two terms. By the binomial theorem any power of a binomial can be expanded into a series. The formula is—

$$(x + a)^n = x^n + nax^{n-1}$$

$$+ \frac{n\,.\,\overline{n-1}}{1\,.\,2}a^2x^{n-2} + \ldots$$

$$+ \frac{n\,.\,\overline{n-1}\,.\,\overline{n-2}\ldots\overline{n-r+2}}{\underline{|r-1}}$$

$$nax^{n-1}\,a^{r-1}\,x^{n\ r-1} + \ldots$$

$$\frac{n\,.\,n-1}{1\,.\,2}a^{n-2}$$

$$Ex.\ (x + a)^5 = x^5 + 5ax^4 + 10a^2x^3 + 10a^3x^2 + 5a^4x + a^5.$$

Bintang, isl., Dutch E. Indies, off Singapore; was acquired by the Netherlands in 1823. Produces spices, sago, rice, sugar, etc. Area, 450 sq. m. Pop. about 18,000, almost entirely Malays and Chinese.

Binturong (*Arctitis binturong*), a civet-like carnivore, a native of the E. Indies, arboreal and nocturnal in its habits, with a long, prehensile tail, tufted ears, and bristly fur.

Binue. See BENUE.

Binyon, LAURENCE (1869), English poet and writer on art. He won the Newdigate prize in 1890 (the subject of the poem being 'Persephone'), and became assistant in the British Museum, first (1892) in the department of printed books, and subsequently (1895) in that of prints and drawings. His poetry, the note of which is a lyrical quietism, first gained attention in his *London Visions* (two series, 1895 and 1898). His finest work is displayed in his *Odes* (1900). His other volumes include *Lyric Poems* (1894), *Poems* (1895), *The Praise of Life* (1896), *Porphyrion* (1898), monographs on *Dutch Etchers* (1895), *John Crome and John Sell Cotman* (1897), *Western Flanders* (1898), *Thomas Girtin* (1900); and a *Catalogue of English Drawings in the British Museum* (vol. i. 1898, vol. ii. 1900). See *Monthly Review*, March 1901.

Biobio. (1.) River of Chile, rising in the Andes, and flowing in a N.W. direction through the prov. of Biobio, enters the Pacific at Concepcion, after a course of 220 m. The mouth is 2 m. wide, and the river is navigable for 100 m. (2.) Province of Chile, with an area of 5,245 sq. m., and a pop. (1895) of 88,749. Cap. Los Angeles.

Biogenesis, a term used by Huxley in his *Lay Sermons* for what he defines as 'the hypothesis that living matter always arises by the agency of pre-existing living matter.' The term for the opposing doctrine is *abiogenesis*. See BIOLOGY.

Biograph. See CINEMATOGRAPH.

Biography is the art of presenting a life-work in full and significant delineation. Memorial tributes are an early feature in literature. Even the aged Nestor utilized the privilege of the panegyrist when he harangued his juniors on the tented field; and there is a similar attitude in Plato's delineation of Socrates. Xenophon, another Socratic disciple, writes *Memorabilia* of his master; and though the same author's *Cyropædia* is romantic and fanciful, and his *Agesilaus* is a panegyric, he works them round genuine individual greatness. This is the rudimentary memoir, and, somewhat later, the lament of Moschus over Bion set an elegiac example that has had momentous results. Several Latin writers have merit as biographers. Cicero shows abundantly that he might have written lives with high success. Cornelius Nepos, Sallust, Quintus Curtius, and Tacitus all contribute to this department of literature. The *Agricola* of Tacitus is an admirable presentation of life and character. Suetonius is inartistic, but not without merit. The *Anabasis Alexandron* of Arrian is valuable both for matter and style. But Plutarch, who lived in the reign of Domitian, is the first great biographer in the world's history. His *Parallel Lives* comprises forty-six biographies in pairs, a Greek and a Roman alternately, and several separate sketches, the whole constituting a work of sovereign value. It has been often translated, and North's English version of 1579 introduced Shakespeare to this gallery of noble characters.

Now and again in the middle ages there are notable products of biographical impulse. The Venerable Bede (673–735) wrote the *Life of St. Cuthbert*. St. Adamnan (d. 704) produced in his *Vita Sancti Columbæ* a genuine memoir, edited in 1857 by Dr. Reeves. A real and worthy life-study presents itself in Eginhard's *Vita Caroli Magni*—the life of Charlemagne (*c.* 820). Of this there are various editions, and an English version was published by Mr. W. Glaister in 1877. Alfred the Great was also fortunate in his contemporary biographer, Asser Menevensis, a monk whom the king appointed bishop of Sherborne. First published in 1572 by Archbishop Parker, the best edition of it is that of Wise (1722). Six early biographies of St. Dunstan (960–988) were edited by Bishop Stubbs in his *Memorials of St. Dunstan* (1875). Ælfric's *St. Guthlac* and William of Malmesbury's *Wulfstan* both deserve mention. The biographical work of the middle ages fitly culminates in Boccaccio's reminiscences of Dante, this happy connection, as has been aptly said, supplying 'a great man to describe a greater.'

Formal biographers were somewhat late in appearing in English literature. In the 14th and 15th centuries there were choice opportunities, but the literary bias was towards other ideals. Sir Thomas Malory, Lord Berners, and Caxton might have been biographers under other conditions, for they had direct sympathy with personalities; and Caxton's devotion to earlier men of letters helped materially to establish their importance. Prose style steadily developed in the 15th century, and is well illustrated in the work of 'saintly Fisher and unbending More.' Fisher's prose is strong and not inartistic, and the funeral sermon on Henry VII. shows a capacity for a memorial record. More's *Richard III.* (1513) is more than a merely biographical study, but it recognizes the importance of grouping historical facts round an individual career. A lurid record of the times is Foxe's *Acts and Monuments of the Church*, or the *Book of Martyrs*, published at Basel in 1559 (Eng. ed. 1563). William Roper, who died in 1577, wrote the *Life of Sir Thomas More*, edited by S. W. Singer in 1817.

There are still few biographies in the Elizabethan age. Cavendish's *Life of Cardinal Wolsey*, written about 1557, and first printed in 1641, is a striking little book, which was undoubtedly used in the composition of Shakespeare's *Henry VIII.* The somewhat unsatisfactory *Life of Sir Philip Sidney* by Lord Brooke, published in 1652, has supplied points that have been constantly used by subsequent biographers of the perfect, gentle knight. There is room for regret that Ben Jonson did not write a life of Shakespeare. How much it might have told, and what fatuous speculations it might have prevented! Jonson's memorial tributes are admirable, but a biography would have enhanced his literary reputation, and earned lasting gratitude. Bacon, whose *Henry VII.* has certain biographical merits, fared somewhat better than Shakespeare; various biographies, *Baconiana*, etc., duly followed the *Life* by Rawley, published in 1657. Passing reference must be made to the biographical material in Drummond of Hawthornden's *Notes of Ben Jonson's Conversation* (Shakespeare Society Papers, 1842). Sometimes irrelevant and occasionally indiscreet, these records mark a unique episode. Milton's *Life*, by his nephew, Edward Phillips, appeared in 1694, and another was published by Toland in 1699. Both were useful, but have small literary merit. Fuller's *Worthies of England* (1662) is an attractive miscellany. Mrs. Hutchinson (1620–64) produced, in her *Life of Colonel Hutchinson*, a work of uncommon merit, which was not published till 1806. Clarendon's *History of the Rebellion* has interesting biographical features; it appeared in 1704–7. But the foremost biographer of the age is Izaak Walton, whose *Lives* of Donne, Wotton, Hooker, Herbert, and Sanderson appeared, in the order named, between 1640 and 1678. A volume containing the first four was published in 1670, and the complete set was edited in 1796, with a *Life* of Walton by Dr. Thomas Zouch. Unaffected in style, and radiant with the author's genial personality, these biographies have an enduring charm. John Evelyn (1620–1706) produced a pleasing *Memoir of Margaret Blagge*, wife of Godolphin, the lord treasurer (ed. Bishop Wilberforce, 1848). Anthony à Wood's *Athenæ Oxonienses* (1691) is a storehouse of information and gossip about Oxford men. To 1691 belongs also Langbaine's *English Dramatic Poets*, an explicit and faithful record. John Aubrey (1626–97) wrote curious and valuable 'Minutes of Lives' (Bacon, Milton, Hobbes, etc.), first published in *Letters by Eminent Persons* (1813). Gilbert Burnet, biographer of Matthew Hale, has much good matter in the *History of his own Time*.

Literary accomplishment marks the biography of the 18th century. Steele's tribute to Addison (*The Theatre*, 1720) makes a good beginning. Roger North (1653–1734) wrote lives of himself and his brothers, and the engaging *Lives of the Norths* appeared in 1742–44. Middleton's *Cicero* (1741) and Jortin's *Erasmus* (1758) are standard works. Theophilus Cibber's *Poets* and his *Actors and Actresses*, both dated 1753, help to mark the onward movement. Literary grace and charm were given to biography by the illuminating pen of Goldsmith. His *Voltaire* (1759) utilizes his personal knowledge, and displays his narrative and descriptive resources. In 1762, after a sojourn in Bath, he produced his inimitable mock-heroic *Life of Beau Nash*, conferring immortality on a marionette of supreme quality. His *Parnell* and *Bolingbroke*, published in 1768 and 1770 respectively, are less important. It is an easy transition from Goldsmith to Dr. Johnson, whose *Lives of the Poets* (1779) remains, after all possible deductions, an admirable specimen of literary biography. Some of the best are those of the smaller men, some are manifest results of mere journey-work, and some—those, for example, of Milton and Gray—exhibit strong prejudice. In all, the independent critic works steadily, heedless of results. In the *Life of Dr. Johnson*, published in 1791, James Boswell took the foremost place among British biographers. His artlessness is the secret of his success. His genial affability recalls the method of Walton. 'An inspired idiot' he may have been, but he was a superb artist in biographical narration. The high character of the 18th-century biography is well sustained by William Roscoe in his strong and picturesque *Lorenzo de' Medici* (1796).

The development of the biographer's art made great advance in the 19th century, as may readily be seen from a comparison of a work like Hayley's *Cowper* (1803) with the elaborate studies of later days. Books such as Hayley's give more minute and more skilful biographers a fresh opportunity. The same thing may be said of the work of Dr. Thomas M'Crie, whose *Life of Knox* appeared in 1811, and *Life of Andrew Melville* in 1819. Whatever Sir Walter Scott wrote has value. His small biographies have interest and charm, and his *Life of Dryden* (1808) maintains its authoritative position. His elaborate work on Napoleon, produced later in life, was the result of the most serious and elaborate preparation, but it was done at a time when Scott was unable to devote to his materials those great and apparently inexhaustible powers that had so long done marvellous service. Southey was an ideal biographer, whose mastery of his art did not always imply exact and detailed knowledge of the subject under discussion. His *Life of Nelson* (1813) is one of the most readable books in the language, and he is hardly less successful with his *Life of Wesley* (1820) and his *Life of Bunyan* (1830). His *Cromwell* and his *Dr. Andrew Bell*, both published in 1844, are not important; for in the one case the subject is too great for the treatment it receives, while in the other there could never be more than a temporary interest involved. Hazlitt, like Scott, failed with *Napoleon* (1828), but his *Conversations with James Northcote* (1830) is a personal record of unique and stimulating interest. Moore's *Byron* (1830) might well have been other than it is—it would have been somewhat less amorphous had Moore been possessed of stronger critical powers—but it has indubitable qualities of greatness. The *Life of Crabbe* (1834), by his son, does justice to a very worthy subject. With Lockhart we reach one of the literary heights and resting-places of the century. His *Burns* (1828) has strength, tone, and style; and after all that has been written on the poet, it maintains its authoritative value. With his other study Lockhart was most happily fitted. He was closer to Scott than even Boswell was to Johnson, and his *Life of Scott* (1837–9) competes with Boswell's great work for the first position among English biographies.

With Carlyle the survey makes a fresh start. A unique figure in literary history, he touched nothing on which he did not leave strong marks of his personality. His lectures on *Heroes and Hero-worship* have much interest for the student of biography. His *French Revolution* is a brilliant picture gallery, that leaves, by its numerous representative delineations, impressions of the most vivid and powerful character. His *Past and Present* is a continuous and fascinating study of personal merit or demerit and the consequent moral influence. His true and sincere man he finds in the lofty poet, as in Schiller; in the comparatively unimportant man of letters—good and great if only he be worthy—as in John Sterling; and in the statesman and the ruler, as in Cromwell and Frederick the Great. Probably Carlyle has not said the last word on his poet and his men of action—other studies of Cromwell have already appeared, Carlyle's own treatment is found to need supplementing, and the *Frederick* is not immaculate—but on John Sterling he is definite and final. Him he has firmly placed with those literary friends who are commemorated in *Lycidas* and *Thyrsis*, and this consideration marks an important feature in biographical work. Carlyle's *Sterling* shows that the biographer discovers and reveals essential greatness, being himself a prophet or seer. *Schiller* in its first form appeared in 1825, *Oliver Cromwell's Letters and Speeches* in 1845, *John Sterling* in 1851, and *Frederick the Great* in 1858–65.

Meanwhile other biographers were at work, and making contributions to their subject that in some respects fell hardly short of even Carlyle's achievement. Dean Stanley's *Life of Dr. Arnold* (1844) at once asserted its claim to recognition as a performance of rare excellence; and the same may be said of Hill Burton's *Life and Correspondence of Hume* (1847). John Forster is one of those whose exceptionally excellent results seem to prove the saying that, like the poet, the biographer is born, not made. His *Goldsmith* (1848) was most elaborately refined into its ultimate beauty of form and feature. His *Landor* (1868) and *Dickens* (1872–4), hardly less well done, are both works of very fine quality. His *Swift* remains a promising fragment. Mrs. Gaskell's *Charlotte Brontë* (1857) has distinguished grace and charm—the author, herself an eminent novelist, being able to work with ready sympathy on her deeply suggestive subject. In his *Life of Goethe* (1859) George Henry Lewes produced a singularly bright and substantial work, giving in it one of the best studies of a foreign author made by an Englishman. The Rev. Stopford Brooke's ***Frederick W. Robertson*** (1865) is, on the other hand, a most successful delineation of one great English preacher by another, whose position was destined to be high in pure literature as well as in the studies peculiar to his profession. James Spedding's *Bacon* (1857-74) is the result of long and special application to his subject, and has monumental significance. By far the greatest work of Mark Pattison is his *Life of Casaubon* (1875), the author fully mastering the inherent difficulties of his task, and producing a book of high and enduring quality. Sir Theodore Martin's *Life of the Prince Consort* (1874 80) happily weaves contemporary history about a personality of unaffected dignity and attractiveness, his somewhat delicate undertaking being accomplished with spirit, tact, and thoroughness. Sir Theodore had qualified as biographer with his bright memoir of his friend Professor Aytoun in 1867, and he gave further illustration of his rare skill, sympathy, and personal devotion in his *Lord Lyndhurst* (1883) and ***Helen Faucit**, Lady Martin* (1900). Sir George Trevelyan's *Macaulay* appeared in 1876, and at once became a classic. Professor Masson's *Life of Milton* (1859-80) combines history with biography on a most extensive plan, and challenges criticism of its bulk while presenting the results of wide investigation and practised literary skill. Froude's *Carlyle* (1882-84), lacking in the reticence desired by some, has the countervailing recommendations of comprehensiveness and charming style. His *Julius Cæsar* (1886) is a thoroughly sound little book. Mrs. Oliphant, who proved her biographical competency in the *Edward Irving* of 1862, further illustrated it in her *St. Francis of Assisi* (1870), *Montalembert* (1872), *Principal Tulloch* (1888), and her volumes on Florence and Venice. In 1897 she produced the first two volumes of *William Blackwood and Sons: Annals of a Publishing House*. Mr. John Morley's *Edmund Burke* (1867), *Voltaire* (1872), *Rousseau* (1876), *Diderot* (1878), *Richard Cobden* (1881), and *Life of Gladstone* (1903), are all standard works of distinguished character. An equally distinguished place is to be assigned to Sir Leslie Stephen's *Henry Fawcett* (1885) and Professor Dowden's *Shelley* (1886). The late 19th century did all possible justice to Shakespeare. The outstanding biographies are Halliwell-Phillipps's *Outlines* (7th ed. 1887) and Mr. Sidney Lee's minute, exhaustive, and skilful *Life of William Shakespeare* (1899).

Of American biographies there may be mentioned:—J. Marshall's *George Washington* (3rd ed. 1839); W. Irving's *Life and Voyages of Christopher Columbus* (new ed. 1893); R. W. Griswold's *Poe* (1850); J. Parton's *Thomas Jefferson* (1894) and *General Jackson* (1892); P. M. Irving's *Washington Irving* (new ed. 1880); J. R. Gilmore's *President Garfield* (1880); *Story of Garrison's Life* (1885-9); J. E. Cabot's *R. W. Emerson* (1887); J. Hawthorne's *Nathaniel Hawthorne and his Wife* (1885); T. R. Lounsbury's *James Fenimore Cooper* (1881); W. S. Kennedy's *O. W. Holmes* (1883); *Longfellow* (1882); E. E. Hale's *J. R. Lowell and his Friends* (1898); Professor A. V. G. Allen's *Phillips Brookes* (1900).

Some representative works and biographers of Italy, France, and Germany are the following. For Italy there are Vasari's *Painters, Sculptors, and Architects* (1550); Muratori's *Rerum Italicarum Scriptores* (1723-51); *Life of Boccaccio*, by Baldelli and by Tiraboschi; *Machiavelli e i suoi Tempi* (Eng. trans. 1890); Castiglione's *Raphael*, etc. The *Vie de Saint Louis* of Joinville (1309) has distinct literary importance, and so have Brantôme's outspoken and vivid *Memoirs* (1659). The *Mémoires* of Saint-Simon (1675-1755) are a rich mine of history and biography. Later French biographers are Voltaire, Cousin, Guizot, Montalembert, and Sainte-Beuve (*Portraits Littéraires, Port Royal, Causeries de Lundi*, etc.). German writers include Förster, Schröckh, Herder, Bruhns, Guhrauer, Klein, Fischer, Varnhagen von Ense, Barthold, Haym, Otto Jahn, Ranke, Düntzer, Köstlin, Zeller, Brandl.

Cyclopædic biographical works, both general and particular, have been frequently compiled. These include: *Acta Sanctorum* of the Bollandists (1643-1794); Bayle's *Dictionnaire Historique et Critique* (1697, etc.); *Biographia Ecclesiastica* (1704); *Biographia Britannica* (1747-66, ed. Dr. Kippis; with additions, 1777-93); *Biographica Classica* (1778); *Biographical Dictionary, New and General* (1798); Michaud's *Biographie Universelle* (1811-28; new ed. 1870, etc.); Chalmers's *Biographical Dictionary* (1812-17); Rose's *New General Biographical Dictionary* (1829-47); Chambers's *Biographical Dictionary of Eminent Scotsmen* (1835; new ed. 1859); *English Cyclopædia*, with biographical section (1856); *Nouvelle Biographie Générale* (1857-66); *Das geistige Deutschland: Deutsches Künstler-Lexikon der Gegenwart* (1898); Sparks's *American Biography* (1834); Appleton's *Cyclopædia of American Biography* (1888). National dictionaries, in whole or in part, have been produced in Sweden, Holland, Austria, Germany, Norway, Italy, Spain, and Belgium. The English *Dictionary of National Biography*, one of the most comprehensive and thorough of such enterprises, was edited in 66 volumes by Sir Leslie Stephen and Mr. Sidney Lee (1885-1901). The first cast of Mr. Lee's important biography of Shakespeare was in this work, and its concluding volume contains his full and authentic life of Queen Victoria, which was subsequently published separately.

Individual writers have produced groups of biographies, of which these are examples:—Allan Cunningham's *British Painters, Sculptors, and Architects* (1829-33); Agnes Strickland's *Queens of England* (1840-8), *Queens of Scotland* (1850-9); Mrs. Jameson's *Early Italian Painters* (1845); Campbell's *Lord Chancellors* (1845-7) and *Chief-Justices* (1849-57); Lord Lindsay's *Lives of the Lindsays* (1849); Hook's *Archbishops of Canterbury* (1861-76); Smiles's *Engineers* (1862); Dr. Doran's *Their Majesties' Servants* (1864), biographies of English actors and actresses; Grove's *Dictionary of Musicians* (1879-85); Sir William Fraser's *Scotts of Buccleuch* (1879), and other similar works on noble houses; Miss Thackeray's *Book of Sibyls* (1883); Hamilton's *Poets Laureate of England* (1888); Dean Burgon's *Twelve Good Men* (1888).

Many valuable monographs have been contributed to various series, which have multiplied in great profusion. Some of these are:—Ancient Classics, Foreign Classics, and Philosophical Classics for English readers; English Men of Letters (a most admirable biographical library, edited by Mr. John Morley); English Worthies; English Men of Action; English Statesmen, containing Lord Rosebery's monograph on Pitt; Eminent Women; The Queen's Prime Ministers; Famous Scots; Great Writers; Heroes of the Nations; Great Craftsmen; Modern English Writers; Westminster Biographies; Makers of British Art; Great Educators; The World's Epoch-makers; American Men of Letters. See, further, AUTOBIOGRAPHY.

Biology. This term, which literally means 'life-lore,' was first used by Lamarck in a work which appeared in 1801; and it was also used in the following year, to all appearance independently, by Treviranus. From the first its usage was twofold—(*a*) to include *all the departments of science which have to do with living creatures* as such, or in particular aspects (*e.g.* botany, zoology, anatomy, physiology, and embryology); and (*b*) as a convenient term for *the study of the general problems concerning the nature and origin, continuance and progress of organic life.* There seems little justification for a third usage, especially common in Germany, to include the study of habits and interrelations. For this important department of biology some other word, such as bionomics or ethology, is decidedly to be preferred.

Biology, in the second sense above defined, has the same relation to the more specific inquiries, such as botany and zoology, that the fundamental principles of chemistry and physics have to astronomy, meteorology, mineralogy, and the like. For biology has to do with the general phenomena of life, most of which are common to plants and animals; and it should be fundamental to all the specialized departments. It will become so when a larger number of foundation-stones have been securely laid.

On the other hand, it should be noted that while biology in the second sense is concerned with generalities, it necessarily rests upon biology in the first sense—*i.e.* on the detailed descriptions furnished by all the specialized inquiries. Its office is to formulate and unify the results of these, and there is no item of anatomical or physiological analysis which may not have its import in relation to the general theory of life. For this reason it seems well that the double usage of the term should continue, reminding us, on the one hand, that there can be no safe generalizing except on the basis of particulars, and, on the other hand, that the full import of particulars is not appreciable until they are summed up in general formulæ.

Subdivisions of Biology.—The term biology, in its widest significance, includes all life-lore; but life-lore obviously admits of numerous subdivisions, and these should be referable either to a logical or to a practical scheme. One natural basis of subdivision is according to subject-matter, but this is rather a matter of convenience than a logical classification. Thus, since Claude Bernard's classic book on the *Phenomena common to the Life of Plants and Animals* (1879), no one has seriously attempted to maintain that the distinction between botany and zoology is more than one of convenience. Plants and animals are equally alive, though the expressions of their life are divergent—even Linnæus united them under the common title 'Organisata'—and there is no good reason for separating botany and zoology, except that the distinction is useful to our limited intelligence. Difference in subject-matter would also justify the establishment of a special science of protistology for the study of those simple living creatures which lie, as it were, at the base of the V-shaped genealogical tree, having taken no decisive steps towards either an animal or a vegetable mode of life. It is evident, then, that the subdivisions of biology according to subject-matter present no particular difficulty. They may tend to become embarrassingly numerous, they may sometimes obscure the unity of the science, but they seem to give *dignity* to particular lines of study, and some of them are very convenient. Thus we have not only ornithology but oology (the study of birds' eggs), not only entomology but dipterology (the study of flies), not to speak of ichthyology (of fishes) and conchology (of shells), bryology (of mosses) and lichenology (of lichens), and scores of other subdivisions, some of which border on the grotesque.

But there is another more logical plan of subdivision, which requires more explanation. It is that which recognizes that living creatures may be studied scientifically from several different points of view—as regards (1) their form and structure, (2) their habits and functions, (3) their development and history, and (4) the causes which have operated in that history or evolution. In other words, we may ask four complementary questions in regard to a living creature: (1) What is this, as a whole and in its parts? (2) How does this living mechanism work? (3) Whence has this form of life arisen, as an individual and as a member of a race? (4) What has been the mode of its historical origin, what have been the factors in its evolution?

1. The study of form and structure, conveniently termed *morphology*, includes all description of external features, all anatomical analysis, the study of minute structure in general (*histology*), and of cells in particular (*cytology*). Whether we dissect the animal or the plant or simply draw it, whether we use only our own living lenses or put glass ones in front of them, we are morphological in our inquiry so long as we do not raise questions as to how the creature we are studying lives and grows and has been evolved. These questions are or may be in the background of consciousness while we are pursuing our morphological study, but they are not for the moment relevant. The morphologist does not study activity; the organism is to him like a watch that has stopped. In other words, he has to do with statical, not with dynamical, relations. The history of this inquiry, especially through the 19th century, shows a gradually deepening analysis. The morphologist passed from the study of externals to a dissection of the internal organs—*e.g.* Cuvier; thence to an unravelling of their component tissues (nervous, muscular, connective, glandular, etc.)—*e.g.* Bichât; thence, with a better microscope, to a description of the minuter component units or cells—*e.g.* Schwann and Schleiden; and he has in recent years been in part occupied with an inquiry into the visible microscopic structure of the material which is regarded as the physical basis of life—*e.g.* Bütschli. At each of the five levels—the intact creature, its organs, its tissues, its cells, the living substance—there remains much work to be done; and it should also be noted that morphology loses half its interest unless it is studied comparatively, and misses its aim unless it forms the basis of a natural classification (*taxonomy*). It should be carefully observed that the morphologist is not restricted to the study of individuals; thus it is at present one of his most urgent tasks to re-define a species by precise statistical observations on the range of variability which each specific type exhibits.

2. The second question, 'How does this work, as a whole and in each of its parts?' is the fundamental question of *physiology*. The habits and behaviour of the organism, all its relations to the environment, both animate and inanimate, its modes of nutrition and reproduction, are as much part of physiology as inquiries into circulation of the blood or the movement of sap. If we say that the morphologist is concerned with statical relations, we may likewise say that the physiologist deals with dynamical relations. His fundamental problem is vital activity or function; and here again the history shows, especially through the 19th century, a gradually deepening analysis. The physiologist passed from general studies of habit and temperament to more precise inquiries into the functions of particular organs, thence to a study of the properties of tissues (*e.g.* Bichat) and the phases of cell life (*e.g.*

Schwann, Schleiden, Goodsir, Virchow), while much attention has also been given to the chemical and physical changes occurring in the complex substances which form the physical basis of life (*e.g.* Claude Bernard). On each level, as with morphology, there is still much to do. Moreover, the work is only at its first stage until synthesis reverses the method of analysis, and a vigorous attempt is made to use the analytical results—let us say, the study of protoplasmic metabolism—in a deeper interpretation of the general life of the creature. It seems likely, however, that the analytic method must be followed to much more precise conclusions than have been hitherto reached before there can be stable success in the complementary synthetic interpretation.

3. The third biological question, 'Whence is this?' requires a double answer. There is the *development of the individual* through a succession of stages, from the fertilized egg-cell to the embryo, and thence onwards to adolescence along a path often complicated by larval stages, when what arises from the egg, be it caterpillar or tadpole, is very unlike the finished form. In the case of many plants, the relations of sporophyte and gamophyte introduce equally important complications. There is, on the other hand, *the history of the race* to which the organism belongs—its affiliation through related forms, either living or extinct, to a more generalized stock. The first answer is given by *embryology*, the second by *palæontology;* but both are concerned with processes of growth or 'becoming,' though it is convenient to keep the word development for the individual life-history, and the word evolution for the progress of the race. In more technical language, the answer to the historical question is to be found in a study of ontogeny (individual development) on the one hand, and of phylogeny (racial evolution) on the other. It would be convenient to have a term like 'geneology' to include both.

4. The fourth biological question is, 'How has the organism come to be what, where, and as it is?' This is an inquiry into historical causes, into the factors of evolution; and the answers, still far from complete, are often comprised under the term *ætiology*. The objection has been raised that the evolutionary question indicates rather a point of view than a distinct department, and it is no doubt true that the question should always be on the lips of biological students—anatomist and physiologist, embryologist and palæontologist alike. At the same time, it must be borne in mind that *all* the departments imply artificial abstractions: morphology and physiology are complementary, both need the historical setting afforded by embryology and palæontology, and all are illumined by the light of the evolution idea, and by the results of concrete inquiries into the factors in the evolution process. To sum up, biology may be subdivided, according to the particular aspect emphasized, into (*a*) morphology, (*b*) physiology, (*c*) geneology (embryology and palæontology), and (*d*) ætiology.

Problems of Biology.—We see a seed germinating, a frog's egg dividing, a young bird creeping out of the egg, a child growing up; we find evidence that since the earth became fit to be a home of life many races of organisms have come and gone, and that more and more complex forms have successively emerged; we see marvellous intricacy of organic structure from the lowest to the highest, and amid the manifoldness an adherence to a few main types of organic architecture; we see the behaviour of young creatures to one another and to the immediate environment, a great variety in the modes of nutrition and reproduction, the abundance of multiplication, the diverse expressions of nervous and muscular activity, the subsidiary processes of digestion, absorption, respiration, excretion, and so on, which keep the two master activities of moving and feeling agoing; we study the endless problem of balancing income and expenditure; and behind all we see the fact of death. No one can contemplate these and other phenomena without being impressed with the magnitude of the problems of biology. It is our object in what follows to indicate what the chief biological problems are, and to arrange them in a rational order. The selected bibliography will show how the study may be pursued.

Characteristics of a Living Organism.—Like an engine, an organism is a material system which transforms matter and energy; but it is, within limits, a self-stoking, self-repairing engine; and it is further distinguished by its powers of growth and reproduction. Moreover, as Professor Joly indicates, from the physicist's point of view there is this further difference between the inanimate and the animate system, that while transfer of energy into the former (*e.g.* heating a bar of iron or charging a Leyden jar) is attended with effects conducive to dissipation and retardative of further transfer, the opposite seems to be true of the living creature, which has an extraordinary capacity for accumulating potential energy, for accumulating it even acceleratively. So striking is this, as evidenced when an organism, in virtue of its stores, lives or works for days without food or rest, that some have doubted whether the doctrine of the conservation of energy was really applicable to living creatures. But there is no sound warrant for doubting the universal applicability of the physicist's axiom. An actively living organism is continually undergoing physical and chemical change (or *metabolism*): matter and energy pass in, matter and energy pass out; yet, like a whirlpool in a river, the animate system manages to retain an approximate integrity of form, in spite of the ceaseless flux. The pill of potassium, placed on a pool of water, dances about like a water sprite on the surface, fizzing and flaring here, there, and everywhere; but its activity is soon at an end, and in a minute or two it has ceased to exist as such. On the other hand, the whirligig beetle, which darts about in a similar fashion, has a power of persistence which excites our admiration: if it can secure food and periods of rest, it can go on for months, or even years. This power of persistence, associated with periodic recuperation and rest, is part of the secret of the living organism. A crystal of alum dropped into a saturated solution of alum grows before our eyes: its growth illustrates both differentiation and integration—that is to say, it becomes more complex and more thoroughly unified; it has also a notable power of regenerating lost parts; and there are phenomena which dimly suggest the capacities of adjustment to surroundings, and of reproducing their like, which characterize living creatures. But it is obvious that the crystal grows only at the expense of material similar to itself, whereas the living creature grows at the expense of food-material different—and it may be, as in the case of plants, very different—from its own substance. Nor is there, as yet, any decisive evidence that crystals ever exhibit that effectiveness or adaptiveness of response to surrounding influences which is characteristic of even the simplest living organisms.

The method of those who insist upon pressing chemical formulæ into the service of biology (to which there can be no objection so long as false abstractions are not made) may be illustrated by a case taken from a work recently published, by Dr. Giglio Tos—*Les Problèmes de la Vie* (1900). We are asked to 'feed' two molecules of acetic acid with perchloride of phosphorus, and the resulting chloride of acetyl with zinc ethyl; we are asked to subject the resulting methyl-ethyl ketone to oxidation; and the result is that from the two original molecules of acetic acid we get four. This is supposed to illustrate the phenomena of assimilation and reproduction; but the plain fact is that we cannot at present correlate this chemical experiment in any tangible way with the processes of assimilation and reproduction as they occur even in the simplest organisms. However desirous we may be to carry the lessons and results of the inorganic world into biology, we cannot shut our eyes to the magnitude of the steps between this coercive treatment of acetic acid and the nutritive and reproductive behaviour of an amœba or a diatom. We are ignorant of the composition of what is glibly called 'a living molecule;' we are not even aware that such a thing exists. To sum up, a living organism undergoes rapid change, and yet retains its integrity of organization: it grows, but at the expense of material different from itself; it reproduces, giving origin to other units potentially or actually like itself; it is capable of effective response to the environment; and it has, in some measure, a co-ordinated and adaptive activity.

The Nature of Life.—The problem of the nature of life is certainly not solved either by the word 'vitality' or by the word 'protoplasm,' which represent the two extremes of interpretation. The facts are that chemical analysis reveals no elements in a living organism which are not common in the inanimate surroundings; that the chemical peculiarity of the physical basis of life is not in the nature of the material elements involved, but in their complexity of composition; that careful physical experiments all go to show that the formula of the conservation of energy is just as true of the living creature as it is of the engine; that there is no evidence of any special vital material, nor room in the balance-sheet for any special 'vital force' or specific 'life energy.' But these data are preliminary to an interpretation, rather than form part of one. In this connection two facts may be emphasized: (1) biologists are not yet in a position to restate even what seem to be relatively simple vital phenomena in terms of chemical and physical formulæ, and (2) they do not find in inanimate material systems any analogous operations which enable them to make clearer the adaptive and co-ordinated activity of even a unicellular organism. It seems to come to this, that although there are vital processes in living creatures which can be *in part* restated in terms of chemical and physical formulæ, we cannot at present in this way interpret the distinctively vital behaviour of any creature. We are forced to the conclusion that a living organism is a particular synthesis of matter and energy, the secret of whose organization remains hidden. Nor can we forget that the behaviour of higher animals cannot be thought of apart from the idea of intelligence, and this renders the false simplicity of pretended materialistic interpretations even more obvious.

Origin of Life.—What Francesco Redi began in the 17th century was perfected by Pasteur and Tyndall in the third quarter of the 19th century—*viz.* the destructive criticism of alleged cases of spontaneous generation, or the origin of living creatures from not-living matter. In experiments which suggest this it has always been found that germs of life were present from the start, or that they found entrance at some stage in the operations; and the biologist may safely make the negative statement that no records of precise observation afford any evidence that any form of life has ever come into being except from a parent form of the same kind. There is no known evidence of not-living matter giving origin to living organisms. But this fact of biogenesis does not exclude (*a*) the possibility that the evolution of living matter from not-living matter once took place, (*b*) the possibility that it may be taking place now in conditions unknown to us, and (*c*) the possibility that the conditions of spontaneous generation, or abiogenesis, may be artificially reproduced. To make a dogma out of a negative fact is bad science.

There are many, like Huxley, Haeckel, Nägeli, Pflüger, Ray Lankester, who have expressed the opinion that if they could have been witnesses of the beginning of organic evolution, they would have seen the origin of protoplasm from not-living matter. It may be that the synthesis, which we do not understand, took place in some chemical hotbed when the earth was very young; it may be that the first protoplasmic mixtures fed upon other naturally synthetized carbon compounds which had failed to reach the vital level of complexity; but the difficulties in even imagining the origin, the evolution of a protoplasmic unit are so great that we are not surprised to find the suggestion of Helmholtz and Lord Kelvin, that the germs of life were borne to earth by meteorites from elsewhere. But while the scientific attitude in regard to the origin of life must at present be agnostic, we venture to make four remarks. 1. That the discussion, which is in essence extremely theoretical, has been of great practical value; for it has brought to light many facts of great importance in connection with the preservation and improvement of food-stuffs, the occurrence of parasites, the use of antiseptics, and the nature of many diseases. 2. That since 1828, when Wöhler made urea artificially, there has been great activity on the part of the synthetic chemists, who are able, for instance, to build up sugars from inorganic substances; and it is conceivable that carefully-thought-out mixtures of such substances might result in a vital combination. 3. That even if proteids were synthetized, and even if mixtures of proteids and other substances were brought together so as to result in a chemical organization like protoplasm, the biologist would still have to ask whether the artificially compounded corpuscles had the insignia of vitality, such as effective response to environment, co-ordinated activity, growing and reproducing power. 4. That if living matter has originated from not-living matter, then we must credit not-living matter with the potentiality of giving origin to that kind of organization which in appropriate conditions may manifest consciousness and intelligence.

Differentiation and Integration.—When we compare simple forms of life, such as amœba and slime fungi, with more complex creatures, such as squirrel and oak tree, we get an impression analogous to that which follows from a comparison of an early embryo with the adult organism. We express the contrast by using words like 'higher' and 'lower,' and in the terms employed there is often a suggestion of anthropomorphism, as if we estimated the position of an organism in the scale of being by its degrees of approximation to ourselves. But the biological standard is not crudely anthropomorphic, for it is evident that the oak tree is not genetically any nearer man than the slime fungus is, though we call the former much 'higher' than the latter. The criterion is twofold—(*a*) in reference to complexity of structure, or the number of parts with specialized functions, and (*b*) in reference to the degree in which the parts are unified and correlated in the life of the whole. The one criterion is differentiation—the structural expression of division of labour; the other is integration—the unification of the organism, for example, by the nervous and vascular systems. The former may be compared to the expansion, the latter to the federation, of an empire; and the criteria apply to Stephenson's 'Puffing Billy' as compared with a 20th-century locomotive, just as they apply to a sponge as compared with a bird. It is necessary, however, to notice that an organism which is, on the whole, of simple type may show a high degree of differentiation in particular directions, as radiolarians and sponges often do as regards their skeleton systems. Furthermore, a consideration of the contrast between embryo and adult makes it plain that there may be great potentiality of differentiation and integration, although these are not expressed; and this should be borne in mind when we compare apparently simple unicellular organisms with obviously complex multicellular forms.

Given a number of simple protoplasts—*i.e.* corpuscles of complex substances united in an organization which does not at present admit of being interpreted in terms of physico-chemical formulæ—the biologist has in his imagination to picture the gradual emergence of successive differentiations and integrations. The numerous grades of organization now observable among Protozoa (unicellular animals) and Protophyta (unicellular plants) are of obvious usefulness in the hypothetical reconstruction. We know, for instance, of many different degrees in the differentiation of the nucleus, of locomotor structures, of skeleton, and so on; and the risk of fallacy in arguing from the present to the past is lessened by the interesting fact that these unicellular creatures are not subject to natural death in the same degree as higher animals are, or it may be not at all. This fact suggests the possibility that some of the simplest of the unicellular organisms may have been living on, but little changed, since the early days of life's beginnings. How the differentiations and integrations came about is a question which cannot be fully answered in the present state of biology. We shall return to it in the paragraph on evolution, but we may notice here that some of the primitive differentiations and integrations may have been, so to speak, continuations of similar processes observable in the varied forms of crystals and minerals; that some may have been further expressions of the fundamental organization which made life possible; that some may have been due to the influence of diverse environments operating on the plastic protoplasts. That the last-named results might be hereditarily entailed on successive generations is admitted by all; for, at the low level we are considering, the distinction between 'body' and germinal matter has not yet been made. One of the early steps was probably the differentiation of three main phases of cell life—amœboid, ciliated or flagellate, and encysted—which are still often observable in the course of a protist's life-history, and which afford a general classification for the different kinds of cells in a higher animal. Another early differentiation was doubtless the establishment of a distinction between a kernel or nucleus in the cell unit and the general cell substance or cytoplasm. From nuclear substance in the form of diffuse particles in the cell to the establishment of a definite trophic centre there are many gradations observable to-day; and the specialization may be followed further in the ciliate infusorians, where there is always a distinction between a macro-nucleus, concerned apparently with the everyday life of the unit, and a micro-nucleus, the importance of which is chiefly reproductive. It is not yet possible to define with precision the function of the nucleus in a cell, but it is certain that there are important interactions between nucleoplasm and cytoplasm, and that a fragment of a unicellular organism bereft of its nuclear constituent does not grow or recover itself, though it may exhibit irritability and contractibility for a brief space. Other differentiations, again, concerned the cytoplasm (or general cell substance), which is marked by great complexity of organization, the gross aspects of which are described as reticular, granular, fibrillar, or alveolar. The important fact is that unlike white of egg, which has, in spite of its complex molecular constitution, a simple physical structure, the physical basis of life reveals more and more complex organization the further we see into it.

Cell Theory.—In 1838 and 1839 Schleiden and Schwann formulated the 'Zellen-Lehre,' or cell doctrine, which amounts to this, that all organisms have a cellular structure; that all but the unicellulars are built up of numerous cells; that development and growth imply the multiplication of cells, all normally the progeny of the fertilized ovum; and that physiologically the life of the whole multicellular organism is capable of being expressed as the co-ordinated summation of the lives of the component units. The cell may be defined as a nucleated unit or unit-area of living matter, and although the original statement of the cell doctrine may not be altogether adequate, even after corollaries suggested by Virchow, Goodsir, Max Schultze, and others, the general fact remains as one of the foundation-stones of biology.

Body-making and its Consequences.—When a unicellular organism divides into two or more units, these usually part company and live independent lives. In some cases (numerous, though relatively few) the daughter units remain combined and form a colony, as is well illustrated by *Volvox* and its relatives. This is the beginning of a 'body,' and it should be noted that there are some simple multicellular animals and plants which are not more differentiated than the *Volvox* colony. Another possible mode of origin is hinted at in those unicellular plants and animals in which the nucleus has divided many times, though the cell substance has not; a step towards body-making which is echoed in the development of various ova *e.g.* in certain species of *Peripatus*, a primitive arthropod.

Differentiation within a multicellular colony will tend to the establishment of *tissues* (aggregates of similar cells with one prominent function in common), and eventually of *organs* (more or less unified integrates of tissues subserving a particular function or several functions). It is interesting to notice that in sponges there are tissues, but no definite organs apart from the gut, and that from this level onwards the origin of organs is gradual. Often, as we follow the emergence of organs, it is seen (1) that there is a change of function—a subsidiary activity becoming locally the dominant one; and (2) that a structure, after serving temporarily for a specific function, gives place in the development of the individual to another, technically called its 'substitute:' thus the notochord, for instance, is replaced in most vertebrates by its substitute the backbone. One of the differentiations involved in body-making is of special interest—*viz.* that which, especially in animals, expresses the distinction between the *somatic cells* (specialized as absorptive, digestive, elaborative, glandular, conductive, contractile, and irritable) and the *germ-cells*, which remain, in many cases, obviously unmodified, unspecialized, and not implicated in body-making, but continue unaltered the organization of the fertilized ovum from which the creature arose. Even in the protist colonies like *Volvox*, sometimes claimed by zoologists as an animal, equally often claimed by botanists as a plant, this all-important distinction between somatic and reproductive cells may be clearly discerned. There is not, of course, any hard and fast distinction—thus, a clump of body-cells from a plant or a simple animal may be able to regrow the whole nor, on the other hand, do the strongest upholders of the distinction, such as Weismann, maintain that the germ-cells live a 'charmed life' apart from the general metabolism of the body. Many of the wearisome obscurities in the discussion concerning the transmissibility of 'acquired characters' or 'modifications'—*i.e.* structural changes effected on the soma as the result of environmental or functional influence—are due to the lack of a sufficiently concrete appreciation of the facts of the case. Sometimes the germ-cells are set apart at an early stage in development; sometimes their distinct appearance is late; in either case they owe their peculiar power of reproducing to their retention of the original organization of the fertilized ovum. And though they may be strengthened or weakened by the general metabolism of the body, or even thereby prompted to vary, this fact is very different from the Lamarckian assumption that specific changes in the body can affect the germ-cells in a manner so specific and representative that the 'modifications' of the parent are transmitted to the offspring. (See HEREDITY.)

Another result involved in body-making is *natural death.* We recognize at least three ways in which a full stop may be put to the life of an individual—(1) by some violent shock which shatters the organization, as when the grouse falls before the sportsman's gun; (2) by the poisons and lesions and blockages produced by intruding parasitic organisms, as when the grouse dies of grouse disease, known to be due to bacterial infection; (3) by the accumulation of physiological arrears or fatigue effects (especially in organs like brain, heart, and liver), which mount up until the organism, in a state of physiological insolvency, dies—a natural death. This consideration of the different modes of death brings us naturally enough to another problem—the continuance of life.

The Continuance of Life.—While it is characteristic of living organisms that they persist in spite of their ceaseless changes (metabolism), there are in most cases limits to this endurance. The structural effects of fatigue are not always removable by rest and food; arrears accumulate quickly or slowly according to the nature of the organism; eventually they become fatal in their amount, and the creature dies. It has been maintained that the unicellular animals are exempt from this natural death; their relative simplicity of structure makes complete recuperation possible, their capacity of regenerating injured portions is perfect, and their modes of reproduction are inexpensive. The so-called 'immortality of the Protozoa' suggests that reproduction should not be looked at as primarily an arrangement securing the persistence of a mortal race, for reproduction is more primitive than death, and is indeed one of its frequent causes.

Here the biologist has to face the problem presented by the different modes of reproduction: (*a*) asexual, when a portion of the parent organism, whether continuous or discontinuous, grows into or reproduces a unit-whole, more or less like the parent, as in the budding hydra or the fragmenting sea anemone, the gemma-producing liverwort or the bulbil-making tiger-lily; (*b*) sexual, when there are definite egg-cells or ova, and sperm-cells or spermatozoa. This scheme is complicated by the occurrence of a degenerate form of sexual reproduction (parthenogenesis), when ova develop without fertilization by sperm-cells; and by the occurrence of alternations of sexual and asexual reproduction, as in the life-history of many zoophytes, or of most of the fernlike plants. Starting with the growing cell—where the increase of mass tends to outrun its increase of surface—the biologist has to endeavour to explain what 'the limit of growth' means, and to show that the reproduction which so often ensues at the limit is in its simplest expressions a mode of discontinuous growth. Experimental work shows that a non-nucleated fragment of a protozoon will for a time move and respond to stimuli, but does not feed or grow; which goes to show that what is essential in reproduction is that the separated portion or portions should have the characteristic organization of the parent organism. And this leads us again to the important general idea of 'genetic continuity'—the idea that the germ-cells have their particular power of reproducing because they are the unmodified, unspecialized lineal descendants of the germ-cells which gave rise to the parent organism.

It is especially to Virchow (1858) that biology owes the conception 'of an uninterrupted series of cell divisions, extending backward from existing plants and animals to that remote and unknown period when vital organization assumed its present form. Life is a continuous stream. The death of the individual involves no breach of continuity in the series of cell divisions by which the life of the race flows onwards. The individual body dies, it is true, but the germ-cells live on, carrying with them, as it were, the traditions of the race from which they have sprung' (E. B. Wilson).

Fertilization.—The study of reproduction must include an inquiry into the origin and meaning of fertilization. As to the former, the flowing together of many cells to make a 'plasmodium,' the union of three or four in 'multiple conjugation,' the ordinary conjugation of two apparently similar units, and the union of slightly dimorphic cells are possible stages, leading towards what is certainly typical both in animals and plants—the union of a minute active spermatozoon with a relatively large passive ovum. As to the meaning of the process, there are, in the first place, many facts which suggest that the nuclei are the chief bearers of the hereditary qualities of the (usually) two parents; and, in the second place, there are other facts which suggest that the entrance of the spermatozoon supplies some dynamic stimulus, which prompts to division. In many cases it has been shown that, besides the nucleus, the spermatozoon brings into the ovum a minute corpuscle called the centrosome, which seems to play an important part in the segmentation which follows. Of much interest also is the process of maturation which precedes fertilization; in that process the number of nuclear elements or chromatin bodies in the egg-cell and in the sperm-cell is reduced, so that after fertilization the number which is characteristic of the species is still present.

In 1878 Huxley wrote: 'It is conceivable, and indeed probable, that every part of the adult contains molecules derived both from the male and from the female parent; and that, regarded as a mass of molecules, the entire organism may be compared to a web, of which the warp is derived from the female and the woof from the male.' This has been confirmed by subsequent research, and has been rendered more precise by the evidence, which goes to show that a very important part of the web is represented by the chromatin substance of the nuclei. The modern interpretation is thus summed up by Prof. E. B. Wilson: 1. From the mother comes, in the main, the cytoplasm of the embryonic body, which is the principal substratum of growth and differentiation. 2. From both parents comes the hereditary basis or chromatin by which these processes are controlled, and from which they receive the specific stamp of the race. 3. From the father comes the stimulus inducing the organization of the machinery of mitotic division, by which the egg splits up into the elements of the tissues, and by which each of these elements receives its quota of the common heritage of chromatin.

Sex.—The biologist finds another series of problems in the facts of sex. Of two eggs in a nest, one will develop into a male, the other into a female; what is the difference between the eggs, and their development, and their final result? Is it that the animate mechanism which we call an organism has, so to speak, two grades of gearing, and that one or the other may be fixed by environmental influences acting on the germ-cells, or on the embryos, or in some cases (*e.g.* tadpoles) even on the larvæ? Is there one constitutional and fundamental difference, which we compare to a difference in gearing, which finds expression in the hundred and one differences in structure and habit which so often distinguish male from female? That every germ-cell has a complete specific inheritance—potentially complete for either sex—seems obvious enough from cases like that of drone bees, who, though males, have no father; but how are we to conceive of the process by which male characteristics find expression in the development of one germ-cell, and female characteristics in another, or both in a third (hermaphroditism)? From these fundamental questions, still far from answerable, the biologist will pass to the adaptive relations of one sex to another and to functions that are characteristic of each, to the problem of preferential mating and sexual selection, and so on along an ever-lengthening radius.

Development.—Let us suppose that the biologist has become in some measure clear that an egg-cell is able to reproduce an organism like the parent, in virtue of its genetic continuity with the fertilized egg-cell which gave rise to that parent; that he has interpreted the fertilization of the egg-cell (*a*) as an intimate and orderly union of maternal and paternal heritages (tending, on the one hand, to ensure specific constancy, and yet, on the other hand, to prompt variations), and (*b*) as also implying a stimulus to that cleavage or segmentation with which all development begins. He has still before him the problems presented by each and every process of development. Out of the apparently simple there emerges the obviously complex; each stage seems to condition its successor, but the actual nexus of events is obscure. How much of the process is the unfolding of a preformed organization, how much of it is due to the reciprocal action of cells, and to the reaction of the whole embryo to its environment? How is a fit statement to be made of the fact that one of the first two cells into which an egg (*e.g.* of the frog) divides will in certain circumstances develop by itself into a one-sided embryo, and, in other circumstances into a half-sized complete embryo? Again, while it seems fairly clear that the maternal and paternal contributions which come together in fertilization form the warp and woof of the developing embryo, and that the little body—called the centrosome—which the spermatozoon brings into the egg along with the paternal heritage behaves like the weaver at the loom, how are we to interpret the fact that in the final result the hereditary resemblance is sometimes almost exclusively to one parent and sometimes an average between the two? Or, again, how is a generalization to be framed which will recognize, on the one hand, the tendency of the individual development to recapitulate the racial evolution, and, on the other hand, the fact that there are specific peculiarities which are capable of being detected almost from the first? In the life-history of the frog there are hints of a recapitulation of ancestral piscine stages, and yet, from the beginning and throughout, the developing organism is distinctly amphibian.

Heredity.—The problems of development are closely united to those of heredity, or the relation of genetic continuity between successive generations. This relation has its visible material basis in the germinal matter of the ova and sperm-cells, and what most distinguishes the modern conception of the germ-cells is a recognition of their continuity in character and organization with the germinal material from which the parent arose. It is to this continuity that they owe their power of developing into organisms like the parents.

While there tends to be a great completeness in the expression of what may be called the specific inheritance—like tending to beget like—the completeness of hereditary resemblance is only approximate. Thus the biologist is brought to face the problem of variations—*i.e.* inborn or congenital differences within a species as distinguished from differences due to 'modifications' or the structural effects on the body induced by changes in the functional and environmental influences. The former are heritable or transmissible, but this has not been proved for the latter.

The biologist has also to study the expression of the offspring's inheritance in relation to the characteristics of the two parents; it may be a blend, or it may be unilateral, or it may be a combination without being a blend. The inheritance is normally dual, but the contributions from the two parents may not find equal expression; moreover, since the inheritance of each parent was also dual, and so on backwards, an inheritance is in a strict sense mosaic or multiple, made up, as it were, of contributions from many ancestors. The problems become yet more complicated when the facts of filial regression, atavism, and reversion are considered. For some higher animals, and notably for man, it is likewise necessary to take account of what may be called the external as opposed to the organic heritage—the influence, in other words, of traditions, customs, and the like. Here biology is linked to comparative psychology and sociology.

Evolution. The largest problems which the biologist raises are those of organic evolution. A survey of plants and animals discloses a maze of relationships to which here and there the genetic clue has been found; in a few cases a more than plausible genealogical tree has been constructed. One species seems often to merge with another, as nebula with nebula in the heavens; even when the central or more typical forms in two or three related groups seem distinct enough, there are outliers which might equally well be affiliated to any one of the three sets. Even genera may be arranged in series, which seem to represent successive steps of progress, or it may be of retrogression; and there are not wanting 'synthetic types' or 'connecting links' uniting stocks which would otherwise appear quite discontinuous. An anatomical survey shows us the same material of bone, muscle, and nerve twisted and fashioned into manifold forms—*e.g.* in the fore or hind limbs of vertebrates—and the persistence of vestigial structures in organisms where they seem of little moment or relevancy, though they are essential organs in other organisms of lower degree. Another survey shows the plasticity of the organism, as an individual under the moulding influences of environment and functions, and as a race when we compare with precision the members of successive generations. The rock or geological record, extending back for many millions of years, shows the gradual emergence of higher and higher forms of life (higher as judged by the twofold standard of differentiation and integration), and affords the sublime spectacle of races gradually attaining a climax and then waning into extinction. And again, the study of development shows in a few days or weeks or months an individual progress from the fertilized egg-cell to the finished form—a process in which each step seems to condition and determine the next, in which obvious complexity is evolved from apparent simplicity. A survey of these different sets of facts has led to the formulation of the general evolution idea, that the present is the child of the past and the parent of the future, that the forms of life around us have been derived by long-continued processes of change from ancestors on the whole simpler and more generalized. The evolution formula suggests a mode of origin, a process of becoming, a progress, or it may be in some cases a retrogression, from one established order of being to another; and it owes much of its cogency to the fact that it appears to be applicable to all orders of facts from the solar system to human institutions. It cannot be exactly demonstrated, as the doctrine of the conservation of energy may be, but it is justified, like the conception of the ether in physics or the atomic theory in chemistry, by its utility as a thought-economizing general formula, unifying a multitude of facts, and contradicted by none.

But while the general idea (or, as some would say, fact) of evolution is all but unanimously accepted by biologists—and it is the only scientific interpretation in the field—there is great uncertainty in regard to the factors in the process.

These factors may be distinguished as primary and secondary. Originative factors are those that induce hereditary changes or variation; the secondary or directive factors are those that operate upon the raw material afforded by the first. As to the first, precise inquiry is only beginning, for we know almost nothing in regard to the causes of variation, and relatively little in regard to their nature and amount. It may be that environmental and functional changes affecting the body also exert an influence on the complex germinal material; it may be that the processes of maturation and fertilization induce new permutations and combinations of molecules in the material basis of inheritance; and it may be that environmental influences act directly on liberated germ-cells before fertilization occurs. But it is premature to make any definite statement. Researches into the actual occurrence of variations show that they are very frequent, that they are sometimes 'saltatory,' 'transilient,' or 'discontinuous'—that is, as it were, leaps to a new position of organic equilibrium—and that they are sometimes slow and gradual, like stages of growth or phases in development; that they are sometimes genuinely new departures, often describable as 'freaks' or 'sports,' and that they are often 'definite,' expressing a little more or less of one of the parental or specific characteristics; that they are sometimes apparently particulate, affecting one part or organ of the body, and sometimes more general, as if the organism varied as a whole and not piecemeal. But many years of work will be necessary before general statements as to the nature of variations can be made with anything like safety.

In actual practice, the biologist has to begin by recording the observed differences between members of a species, say of crab and buttercup. Then must follow an attempt to discriminate between those differences which can be demonstrably described as due to 'modifications' (bodily changes due to diversity in the environment or function of the organisms) from those which cannot be so regarded, and are therefore interpreted as the outcrops of germinal variations. If it be true that the former do not in any specific or representative manner affect the inheritance, then they can have no more than an indirect effect in evolution. But this question is still much discussed. As to the secondary or directive factors which operate upon the raw material afforded by variability, there are as yet only two which will stand much testing—*viz.* natural selection and isolation.

The first is a result of what is called, 'in a wide and metaphorical sense,' as Darwin said, the struggle for existence. From two parents many offspring usually arise; the conditions of existence put limits to the increase of population, and some form of struggle ensues. There is competition between fellows of the same kin—*e.g.* between rats, between locusts, between seedlings in a plot—competition for food, for standing-room, for mates, and so on; and there is the struggle between the variable organism and its inanimate environment, which is also variable. Similarly, there may be struggle between ova and between spermatozoa; the conception is all-embracing. It varies infinitely in its form and intensity; but wherever the effectiveness of vital response to given conditions is of critical moment, there natural selection operates. The relatively less fit tend to be eliminated, to have shorter, less successful lives, to have fewer and less vigorous offspring, and so on. The relatively more fit (which need not mean *higher*) tend to survive; and if the relative degrees of fitness depend on germinal variations (by hypothesis inheritable), there results a process of racial evolution.

The second directive factor on which some reliance may be placed is expressed in the term isolation, which includes a variety of ways in which free intercrossing between members of a species is prevented—*e.g.* by geographical barriers, by change of habit, by a reproductive variation causing mutual sterility between two sections of a species living on a common area, and so on. The importance of this factor becomes evident when we consider that without some form of isolation—corresponding to one part of the breeder's procedure—particular variations of small amount would tend to be lost or neutralized by intercrossing. But although Romanes went the length of saying that 'without isolation, or the prevention of free intercrossing, organic evolution is in no case possible,' there is still a lack of sufficiently precise evidence in regard to the alleged swamping of new variations when there is no isolation, and in regard to the supposed general prevention of free intercrossing.

In regard, then, to the factors of organic evolution, as in regard to the other difficult problems of metabolism and growth, differentiation and integration, reproduction and sex, development and heredity, biology has still to wait awhile for its foundation-stones. The outlook is, however, hopeful, especially when we consider the rapidly-increasing body of workers, the improvements in method, the more frequent recourse to experimental tests, the growing tendency to the correlation of different lines of inquiry and of the different sciences, and the dominance of the critical mood.

Some biological classics:—Carl Ernst von Baer, *Ueber Entwickelungsgeschichte der Thiere: Beobachtung und Reflexion* (1828–37); Charles Darwin's *Origin of Species* (1859; new ed. 1902), *Descent of Man* (1871; new ed. 1901), *Variation of Plants and Animals under Domestication* (1868); Goethe's *Zur Morphologie* (1790), etc.; Ernst Haeckel's *Generelle Morphologie* (1866); Lamarck's *Philosophie Zoologique* (1809); Fritz Müller's *Für Darwin* (1864); M. J. Schleiden's *Beiträge zur Phytogenesis* (1838; trans. 1847); Th. Schwann's *Mikroskopische Untersuchungen* (1839; trans. 1847); Herbert Spencer's *Principles of Biology* (1864–66); R. Virchow's *Die Cellularpathologie* (1858).

Some works discussing the general problems of biology:—W. K. Brooks's *Foundations of Zoology* (1894); Ernst Haeckel's *Generelle Morphologie* (1866); C. Lloyd Morgan's *Animal Behaviour* (1900), new ed. of *Animal Life and Intelligence* (1890–1); Karl Pearson's *The Grammar of Science* (new ed. 1900); Herbert Spencer's *Prin-*

ciples of Biology (1864-6); J. A. Thomson's *The Science of Life* (1899); M. Verworn's *General Physiology* (trans. 1899); J. Ward's *Naturalism and Agnosticism* (1899); A. Weismann's *The Germ-Plasm* (1893).

Some text-books of zoology:—C. Claus's *Grundzüge der Zoologie* (4th ed. 1880-2); Hatchett Jackson's edition of G. Rolleston's *Forms of Animal Life* (1888); T. H. Huxley's *Anatomy of Invertebrated Animals* (1877), and *Anatomy of Vertebrated Animals* (1871); Ray Lankester's *Treatise on Zoology* (in progress, 10 vols. 1900, etc.); T. J. Parker and W. A. Haswell's *Text-book of Zoology* (2 vols. 1897); A. Sedgwick's *Student's Text-book of Zoology*, vol. i. (1898); J. A. Thomson's *Outlines of Zoology* (3rd ed. 1899).

Some text-books of botany:—A. B. Frank, *Lehrbuch der Botanik* (1892); Korner von Marilaun, *Pflanzenleben* (1887 and 1891, trans.); F. Ludwig's *Lehrbuch der Biologie der Pflanzen* (1895); J. von Sachs's *Text-book of Botany* (2nd ed. 1883); W. Pfeffer's *Pflanzenphysiologie* (1897); Strasburger, Noll, Schenck, and Schimper, *A Text-book of Botany*, trans. by Porter (1898); S. H. Vines's *Student's Text-book of Botany* (1895); J. Wiesner's '*Elemente der wissenschaftlichen Botanik*,' particularly vol. iii., *Biologie der Pflanzen* (1889).

General morphology:—Herbert Spencer's *Principles of Biology* (1864-6; first volume revised, 1898); Ernst Haeckel's *Generelle Morphologie* (1866)—a scarce classic. See also W. His, *Unsere Körperform* (1874); G. Jaeger, *Allgemeine Zoologie* (1878); P. Geddes's article 'Morphology,' *Encyc. Brit.*; Bronn's *Morphologische Studien* (1858); treatises on Comparative Anatomy of Animals, by Gegenbaur (trans. 1878; in process of re-ed.); Wiedersheim (trans. of 2nd ed. 1897); and the older works of Owen and Huxley. Compare also K. von Zittel's *Text-book of Palæontology* (trans. and re-ed. 1900); Hatchett Jackson's ed. of G. Rolleston's *Forms of Animal Life* (1888).

General physiology:—Max Verworn's *General Physiology* (trans. 1899); Claude Bernard's *Leçons sur des Phénomènes de la Vie commune aux Animaux et aux Végétaux* (1878); C. B. Davenport's *Experimental Morphology* (1897 and 1899, in progress).

Comparative physiology:—Jeffrey Bell's *Comparative Anatomy and Physiology* (1887)—an excellent introduction; C. F. W. Krukenberg's *Vergleichend-physiologische Studien und Vergl.-Physiol. Vorträge* (1881-9); A. B. Griffiths's *Comparative Physiology* (1891); W. D. Halliburton's *Essentials of Chemical Physiology* (4th ed. 1901); M. I. Newbigin's *Colour in Nature* (1898).

Embryology:—F. M. Balfour's *A Treatise on Comparative Embryology* (1880-1)—a classic work, but now requiring to be corrected by more recent investigations; Sir M. Foster and F. M. Balfour's *Elements of Embryology*, revised by Sedgwick and Heape (1883)—mostly occupied with the development of the chick; O. Hertwig's *Embryology of Man and Vertebrates* (trans. 1893); Korschelt and Heider's *Embryology of Invertebrates* (trans. 1895); A. Milnes Marshall's *Vertebrate Embryology* (1893); C. Sedgwick Minot's *Human Embryology* (1892); A. C. Haddon's *Introduction to the Study of Embryology* (1887); L. Roule's *Embryologie Générale* (1893), and *Embryologie Comparée* (1894); Bergh's *Allgemeine Embryologie* (1895).

For discussion of the general theory of development, see O. Hertwig's *The Biological Problem of To-day* (trans. 1896), and W. Roux's *Gesammelte Abhandlungen über Entwicklungsmechanik der Organismen* (1895).

Palæontology:—H. A. Nicholson and R. Lydekker's *Manual of Palæontology* (2 vols. 1889); K. A. von Zittel's *Text-book of Palæontology* (trans. by C. R. Eastman, vol. i. 1900); Gaudry's *Les Enchaînements du Monde Animal* (1888-90); M. Neumayr's *Die Stämme des Thierreichs* (vol. i. 1889); also text-books by Bernard, Hoernes (1886), Koken (1882), Steinmann and Döderlein (1890), etc.

Ætiology:—The works of Darwin, Wallace, Spencer, Haeckel; W. Bateson's *Materials for the Study of Variation* (1894); Samuel Butler's *Evolution, Old and New* (1879); E. D. Cope's *Origin of the Fittest* (1887); *The Primary Factors of Organic Evolution* (1896); G. H. Th. Eimer's *Organic Evolution* (trans. 1890); P. Geddes's article 'Variation and Selection,' *Encyc. Brit.*; J. T. Gulick's 'Divergent Evolution through Cumulative Segregation,' *Jour. Linnæan Society* (vol. xx. 1888, etc.); St. George Mivart's *The Genesis of Species* (1871), *Lessons from Nature* (1876), etc.; C. von Nägeli's *Mechanisch-physiologische Abstammungslehre* (1884); K. Pearson's *The Chances of Death* (1897); *The Grammar of Science* (new ed. 1900); G. T. Romanes's 'Physiological Selection,' *Jour. Linnæan Society* (vol. xix. 1886); *Darwin and after Darwin* (3 vols. 1892-7); Karl Semper's *The Natural Conditions of Existence as they affect Animal Life* (1881); H. de Varigny's *Experimental Evolution* (1892); M. Wagner's *Die Entstehung der Arten durch räumliche Sonderung* (1889); A. Russell Wallace's *Darwinism* (1889); A. Weismann's *The Germ-Plasm* (1893); and *The Evolution Theory* (trans. 1904).

Protoplasm:—For full and critical discussion and bibliography, E. B. Wilson's *The Cell in Development and Inheritance* (2nd ed. 1902); Yves Delage's *La Structure du Protoplasma*, etc. (1895). For physiological aspects in particular, Max Verworn's *General Physiology* (trans. by Lee, 1899); a valuable address by Sir J. S. Burdon-Sanderson, *Nature*, xl., Sept. 1889, pp. 521-526, and Rep. Brit. Association for 1889; and three articles in the *Encyc. Brit.*—'Physiology' (Sir Michael Foster), 'Protoplasm' (P. Geddes), 'Protozoa,' large type (E. Ray Lankester).

For philosophical discussion, see T. H. Huxley's famous address, 'Protoplasm: the Physical Basis of Life' (in his *Collected Essays*); Hutchison Stirling's *As Regards Protoplasm* (1872); the chapter 'Vitalism' in Bunge's *Physiological Chemistry* (trans. 1890).

The cell:—Of great value in itself and in its bibliography, E. B. Wilson's *The Cell in Development and Inheritance* (2nd ed. 1902). See also R. S. Bergh's *Vorlesungen über die Zelle* (1894); Y. Delage, *op. cit.* (1895); L. F. Henneguy's *Leçons sur la Cellule* (1895); O. Hertwig's *Die Zelle und die Gewebe* (1893 and 1898, the first part trans. 1895). Two important initial works in histological analysis were Leydig's *Lehrbuch der Histologie des Menschen und der Thiere* (1857), and E. W. von Brücke's *Elementarorganismen* (new ed. 1898). For instruction as to the practical study of cells, the work of V. Haecker, *Praxis und Theorie der Zellen- und Befruchtungs-Lehre* (1899) can be strongly recommended.

Reproduction and sex. A convenient introduction, with bibliography, will be found in *The Evolution of Sex* (revised ed. 1901), by P. Geddes and J. A. Thomson; Darwin's *Descent of Man* (new ed. 1901). See also A. Weismann's papers on heredity and kindred subjects (trans. 1889); J. Cossar Ewart's *The Penycuik Experiments* (1899); J. T. Cunningham's *Sexual Dimorphism* (1900), with Lamarckian interpretation.

Heredity:—Yves Delage's *La Structure du Protoplasma, l'Hérédité*, etc. (1895); Francis Galton's *Natural Inheritance* (1889); Prosper Lucas's *Traité Philosophique et Physiologique de l'Hérédité Naturelle* (1847); Th. Ribot's *L'Hérédité Psychologique* (new ed. 1882); H. de Vries's *Intracellulare Pangenesis* (1889); A. Weismann's *Essays on Heredity* (trans. 1889), and *The Germ-Plasm* (1893); E. B. Wilson's *The Cell in Development and in Inheritance* (2nd ed. 1902); J. A. Thomson's *Heredity* (1904).

Animal instincts and intelligence:—J. Loeb's *Comparative*

Physiology of the Brain and Comparative Psychology (trans. 1901), illustrating the extreme physiological position; E. Mach's *Contributions to the Analysis of the Sensations* (trans. 1897); C. Lloyd Morgan's *Introduction to Comparative Psychology* (1894); *Animal Life and Intelligence* (1890–1), re-ed. as *Animal Behaviour* (1900); *Habit and Instinct;* G. J. Romanes's *Animal Intelligence* (4th ed. 1886); *Mental Evolution in Animals* (1883); J. Steiner's *Die Functionen des Centralnervensystems und ihre Phylogenese* (1885–98); E. L. Thorndike's 'Animal Intelligence,' in *Psychological Review*, vol. ii. (1898), and other papers; C. O. Whitman's *Animal Behaviour* (Wood's Holl Biological Lectures for 1898, Boston); E. Wasmann's *Instinct und Intelligenzim Thierreich* (1897), well illustrating the more conservative position.

Bionomics.—See the large works on natural history, notably A. E. Brehm's *Thierleben*, 3rd ed., by Peschuel-Loesche (10 vols. 1890–3); the *Cambridge Natural History*, ed. by S. F. Harmer and A. E. Shipley (10 vols., 6 published); *Cassell's Natural History*, ed. by P. Martin Duncan (6 vols. 1883); *Standard or Riverside Natural History*, ed. by J. S. Kingsley (6 vols. 1888); the *Royal Natural History*, ed. by R. Lydekker (1893); and for plants, Kerner's *Plant Life* (2 vols. trans. 1891).

It is also very important to consult the works of the travelling naturalists, and a representative list will be found in the preface by J. A. Thomson to the translation of A. E. Brehm's *From North Pole to Equator* (1896). Among the most notable are Darwin's *Voyage of the 'Beagle'* (new ed. 1890), A. R. Wallace's *Malay Archipelago* (10th ed. 1890), H. W. Bates's *Naturalist on the Amazons* (3rd ed. 1873), T. Belt's *Naturalist in Nicaragua* (2nd ed. 1888), Wyville Thomson's *Voyage of the 'Challenger'* (1877), H. N. Moseley's *Naturalist on the 'Challenger'* (1879), W. H. Hudson's *Naturalist on La Plata* (1892).

The general nature of bionomical inquiry may be illustrated by the following books, representative of various lines of work:—C. Darwin's *Formation of Vegetable Mould through the Action of Worms* (1882); A. Espinas's *Des Sociétés Animales* (1877); L. Fredericq's *La Lutte pour l'Existence chez les Animaux Marins* (1889); F. Houssay's *Les Industries des Animaux* (1889); W. Kirby and W. Spence's *Introduction to Entomology* (1815–26); M. Newbigin's *Life by the Seashore* (1901); J. A. Thomson's *The Study of Animal Life* (4th ed. 1901); Gilbert White's *Natural History of Selborne* (new ed. 1902).

Geographical distribution of animals and plants.—For a short introduction to the subject, see chapter by J. A. Thomson in the *International Geography*, ed. by H. R. Mill (1899). See also the maps in the physical atlas by Berghaus and by Bartholomew; F. E. Beddard's *Text-book of Zoogeography* (1895); A. Heilprin's *The Geographical and Geological Distribution of Animals* (1887); R. Lydekker's *Geographical History of Mammals* (1896); W. L. and P. L. Sclater's *The Geography of Mammals* (1899); Trouessart's *La Géographie Zoologique* (1890); A. R. Wallace's *Geographical Distribution of Animals* (2 vols. 1876); *Island Life* (1880; 2nd ed. 1892). Geographical distribution of plants: O. Drude's *Die Florenreiche der Erde* (1884), and other works; Kerner's *Pflanzenleben*, end of vol. ii. (1891, trans.); J. Wiesner's *Biologie der Pflanzen* (1889).

History of biology:—J. V. Carus's *Geschichte der Zoologie bis auf Joh. Müller und Charles Darwin* (1864); Julius von Sachs's *Hist. of Botany, 1530–1860* (trans. from the Ger., 1890); K. von Zittel's *Geschichte der Géologie und Palæontologie* (1899). To these three notable historical works J. A. Thomson's *Science of Life* (1899) may serve as a convenient introduction. It contains a selected list of historical references. See also Huxley, articles 'Biology' and 'Evolution,' in *Encyc. Brit.;* E. Ray Lankester's *The Advancement of Science* (1890), which includes a valuable article on the history and scope of zoology; H. F. Osborn's *From the Greeks to Darwin* (1894); E. Perrier's *La Philosophie Zoologique avant Darwin* (1884); H. A. Nicholson's *Natural History: its Rise and Progress in Britain* (1886); E. Haeckel's *History of Creation* (trans. rev. 1876); E. Clodd's *Pioneers of Evolution* (1897).

Bion, a poet of the Alexandrian period of Greek literature, a contemporary of Theocritus, and the friend and master of Moschus, who wrote an elegy on him. He was born at Smyrna, but spent his last years in Sicily. Few of his poems have come down to us entire; they are of the class called bucolic, but deal chiefly with the loves of gods and heroes. The best known is the *Epitaph of Adonis*. Bion is a graceful verse-writer, who manages his metre—the hexameter—with skill and elegance; and he expresses a refined and delicate sentiment, but without the vigour and naturalness of Theocritus. Editions: (with Moschus), Hermann (1849); (with Moschus and Theocritus), Ahrens (1855–9), Hartung (with notes, 1859); Eng. trans. by Andrew Lang (1889).

Bion OF BORYSTHENES, Greek Cynic philosopher, contemporary with Eratosthenes and Zeno, studied and taught at Athens. Of his trenchant satires only fragments remain, ed. by Mullach (1867).

Biondi, SIR GIOVANNI FRANCESCO (1572–1644), romance writer, born at Lesina, off Dalmatia; passed from the Venetian to the English diplomatic service (1609). Author of *An History of the Civill Warres of England* (trans. 1641) and three romances, *Eromena* (1624; trans. 1632), *La Donzella Desterrada* (1627; trans. 1635), and *Il Coralbo* (1635; trans. 1655), which were very popular in English translations.

Bionomics ('laws of life'), a term suggested by Professor E. Ray Lankester to designate the study of the external life of plants and animals, their interrelations with other individuals, and their adaptations to their organic and inorganic environment. The importance of considering the organism, not as an isolated existence, but as a link in the great chain of living creatures, was first fully realized by Darwin, and his volume on *Earthworms* (1881) may be taken as a typical example of a bionomical investigation. See Professor J. A. Thomson's *Science of Life* (1899).

Biot, JEAN BAPTISTE (1774–1862), French physicist, was born at Paris. He was appointed to the professorships successively of mathematics at Beauvais, of physics at the Collège de France, Paris, in 1800, and of physical astronomy at the Faculté des Sciences in 1809. He experimented on the refractivity of gases in 1803, joined Arago in measuring an arc of the meridian in Spain in 1806, and determined the length of the seconds pendulum along a British arc in 1817–18. The Rumford medal was awarded to him in 1840 for his researches on polarized light, and he invented the polarimeter. He published valuable treatises on Curves (1802), on Physical Astronomy (1805), on Physics (1816–17), and on Egyptian Astronomy (1823). He died in Paris.

Biotite, a mineral belonging to the mica group, but distinguished from other micas by its black colour, and by the presence of considerable proportions of magnesia and iron. It is a common and important rock-forming mineral, occurring in most granites, gneisses, schists, and in a great variety of crystalline rocks. When fresh it forms black, shining spangles, with a brilliant surface, and is easily recognized by its softness (it may be scratched like a piece of paper) and by its perfect cleavage, in consequence of which it breaks up into thin, smooth scales.

Bipinnaria, a term used to describe the bilateral larval form of certain echinoderms. The name, like that of Brachiolaria, was given under the erroneous impression that the larva was a distinct animal.

Bipontem, Palatinate. See ZWEIBRUCKEN.

Biquadratic (Lat. *biquadratus* = twice squared), an equation involving the fourth power of the unknown quantity—*i.e.* of the form $x^4 + px^3 + qx^2 + rx + s = 0$, where p, q, r, and s are constants. Sometimes a biquadratic can be reduced to a quadratic, as, for instance, when it happens to be a perfect square, or can be reduced to the form $x^2(x + a)^2 + bx(x + a) + c = 0$. In other cases it may be solved by means of an auxiliary cubic, by Descartes', Ferrari's, or Euler's method, unless the roots are all real or all imaginary, when the cubic equation has generally real and unequal roots.

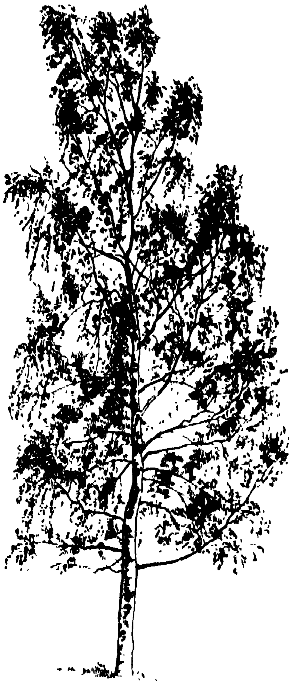
Bir, or BIREJIK, tn., Asiatic Turkey, on l. bk. of Euphrates, 80 m. N.E. of Aleppo; the limit of Euphrates navigation and the crossing point of the great caravan route between Syria and Bagdad. Pop. over 10,000.

Birbhum, dist. in Bardwan div. of Bengal, India; area, 1,752 sq. m. Rice is the chief crop. Pop. (1901) 902,280.

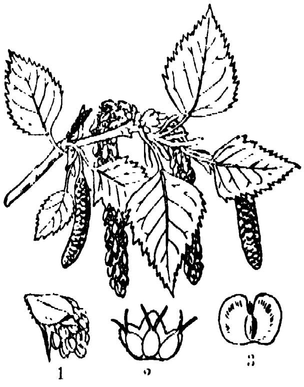
Birch. The common species, *Betula alba*, is one of the hardiest trees known, thriving in the most exposed situations, growing as a forest tree at an altitude of 2,500 ft. above sea-level, and as far north as 70°. It is the only tree found in Greenland, and occurs commonly throughout Russia and Siberia. According to climate, the height of the tree varies from 3 to 80 ft. The leaves are small, ovate, and unevenly serrated. The male and female catkins occur on the same tree. The fruit is a very small nut with membranous wings to assist in dispersal. The thin silvery cuticle, which scales off like slips of paper, was once used for writing on, and the enduring character of the bark has long been noted. Thus, the Laplanders often use it as a house-roofing material, and the N. American Indians built their canoes of it. The species of birches are easily propagated by means of seeds, gathered in autumn and sown in spring. The seeds should be barely covered with fine sandy soil. The varieties are propagated by grafting or budding.

Much of the virtue of russia leather is due to the employment in its manufacture of the oil obtained from birch bark; and the same oil is used by the Russian peasants as a disinfectant for wounds.

There are many varieties of *B. alba*, the most characteristic being the weeping *B. alba pendula* and the slightly pendulous *B. alba purpurea*. Among the other species may be named *B. nana*, a dwarf species about 2 ft. high; the papery birch, *B. papyracea*; *B. pumila*, a dwarf species; *B. glandulosa*, also a dwarf kind; the Siberian species, *B. daurica*; and the tall red birch, *B. nigra*. See Regel's *Monographische Bearbeitung der Betulaceæ*; C. A. Johns's *Forest Trees of Britain* (1869); F. E. Hulme's *Wild Fruits of the Countryside* (1902).



Common Birch.



Twig of Common Birch.

1, Male flower; 2, female flower; 3, seed.

Birch, CHARLES BELL (1832-93), English sculptor, who, after studying in Berlin, settled in London, and produced in bronze and marble realistic and military groups, as well as statues of public men, notably of Beaconsfield for the Junior Carlton Club and for Liverpool, and of Gladstone for the City Liberal Club, and statues of Queen Victoria at Aberdeen and at Udaipur, India. His best-known work is the bronze griffin on the pedestal which marks the site of Temple Bar, Fleet Street. He was elected A.R.A. in 1880.

Birch, JONATHAN (1783-1847), English translator from the German; born in London. He published a translation of Plutarch's *Banquet* (1833), *Divine Emblems*, an original work (1838), and was the first to translate both parts of *Faust* (1839 and 1843). In 1846 he settled in Prussia, and devoted his latest years to a translation of the *Nibelungenlied* (1848).

Birch, SAMUEL (1757-1841), English dramatist, was a London pastrycook, who became lord mayor (1814). He was a strong supporter of Pitt's administration, but resisted the Catholic claims; an ardent Tory, but opposed the Corn Bill of 1815. His principal works were two musical dramas, *The Adopted Child* (1795) and *The Smugglers* (1796); the *Speeches in Common Council against the Catholics* (1805 and 1807); and *The Abbey of Ambresbury*, a poem in two parts (1788 9).

Birch, SAMUEL (1813-85), Egyptologist, was grandson of Samuel Birch, lord mayor of London. After studying Chinese, he became in 1836 assistant in the department of antiquities at the British Museum. From 1866 till his death he was keeper of Oriental antiquities. He was one of the founders of the Society of Bible Archæology (1870). Among other books he wrote *Hist. of Ancient Pottery* (1858; 2nd ed. 1873); *Ancient Hist. from the Monuments: Egypt* (1875); and descriptions of the Greek Vases (1851), Ancient Marbles (1861), Rhind Papyri (1866), Hieratic and Demotic Inscriptions (1868), and other collections in the British Museum. See his *Life*, by his son Walter (1886).

Birch, THOMAS (1705-66), English historian and biographer, was born of Quaker parents in Clerkenwell, London. Patronized by the Hardwicke family, he was rapidly preferred, until, in 1746, he became rector of St. Margaret Pattens, London, and Depden, Suffolk (1761-6). His principal works were the *Life of Robert Boyle* (1744), *Memoirs of the Reign of Elizabeth, 1581-1603* (1754), and *Historical View of Negotiations between the Courts of England, France and Brussels, 1592-1617* (1749).

Birch, WALTER DE GRAY (1842), son of Samuel Birch, Egyptologist, entered the British Museum MSS. department in 1864. A student of the Anglo-Saxon, Mediæval Latin, Spanish, and Portuguese languages, particularly with reference to monastic records, etc. He has edited the *Journal of the British Archæological Association* for many years.

Birch-Pfeiffer, CHARLOTTE (1800-68), German actress and dramatic writer, was born at Stuttgart. She became one of the leading actresses; in 1837 manager of the theatre at Zürich, but in 1844 accepted an engagement at the Theatre Royal, Berlin, and stayed there to the end of her life. She was also a prolific playwriter and novelist, her plays being still popular in Germany, especially *Die Günstlinge*, *Hinko*, *Die Waise von Lowood* (a dramatization of Charlotte Brontë's *Jane Eyre*), and *Pfefferrösel*. Her *Gesammelte Dramatische Werke* appeared in 23 vols. (1863-80), and her novels in 3 vols. (1863-5). Her daughter is the novelist Wilhelmine von Hillern.

Bird, EDWARD (1772-1819), English subject painter, was born at Wolverhampton, and educated himself. In 1809 the Royal Academy accepted his *Good News*, which at once established his reputation. Other genre paintings, *County Auction* and *Gipsy Boy*, were equally successful; his *Village Politicians* and *Blacksmith's Shop* are well known. He was elected A.R.A. in 1812, and R.A. in 1815. For the *Death of Eli* he was awarded the prize of the British Institution; and by the *Field of Chevy Chase*, his greatest work, he procured the post of court painter to Queen Charlotte. His last historical piece was the *Embarkation of Louis XVIII. for France*. See A. Cunningham's *Lives of the Most Eminent British Painters* (1879-80).

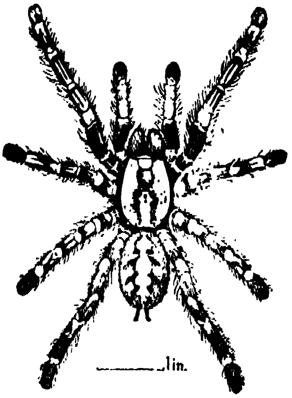
Bird, GOLDING (1814-54), English physician, born at Downham, Norfolk; was appointed lecturer on natural philosophy at Guy's Hospital (1836), and on materia medica at the College of Physicians (1847). He did much in the application of chemistry to medical practice. Chief works: *Urinary Deposits* (1844), *Elements of Natural Philosophy* (1839).

Bird, ISABELLA. See BISHOP.

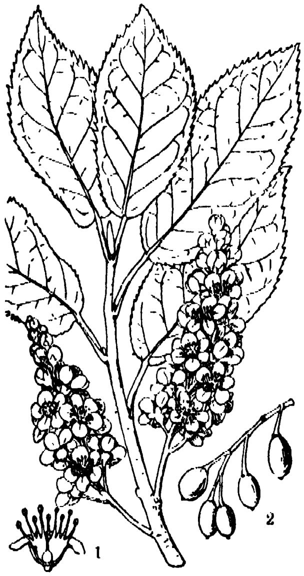
Bird, ROBERT MONTGOMERY, (1803-54), American author, was born at Newcastle, Delaware. He early turned his attention to literature, and wrote three successful tragedies—*The Gladiator* (a favourite piece with Edward Forrest), *Oraloosa*, and *The Broker of Bogota;* he was also the author of well-known novels—*Calavar* (1834), *The Infidel* (1835), *Nick of the Woods* (1837), etc.

Bird, WILLIAM. See BYRD.

Bird-catching Spider, the name given to the species of the genus Mygale, which are very large, hairy spiders found in tropical countries. They appear to live chiefly on insects, but the fact that they can kill small birds would appear to be well authenticated. The body may reach a length of 2 in., and the span is stated to be sometimes as much as 7 in.



Bird-catching Spider.



Bird Cherry (*Prunus padus*).
1, Flower (section); 2, fruit.

Bird Cherry (*Prunus padus*) is a species of the order Rosaceæ, and in the same genus as cherry and plum. It belongs to temperate Europe and Asia, and is found in many woods in Britain, where it is known as the hagberry—*i.e.* 'berry of the woods.' It differs from the wild cherry in being in full leaf before it flowers, usually in May. The flowers are much smaller than those of the wild cherry, and are set in racemes from 3 to 5 in. long; these are upright at first, but as the flowers expand the raceme becomes pendulous. The cherries are black, about the size of peas, somewhat astringent and bitter.

Bird-lice, or MALLOPHAGA, a family of Neuropterous insects which are not blood-suckers like true lice, but have mouths adapted for biting, and feed upon the feathers of birds or the hair of mammals. An active form known as *Menopon pallidum* commonly infests domestic poultry, though other species also occur on these birds. Mallophaga occur on mammals as well as on birds, but it does not appear that they multiply with the same rapidity as true lice, or that under natural conditions they are often numerous enough to cause serious trouble.

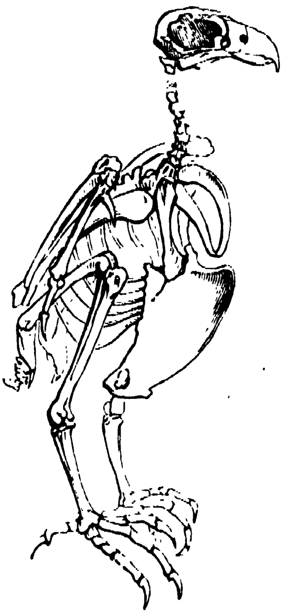
Birdlime, a viscid material obtained from the bark of holly by boiling. It is used by bird-snarers for smearing twigs.

Bird of Paradise, a general name given to the members of the family Paradiseidæ, which includes beautiful birds inhabiting the Malay Archipelago, and extending into the Australian region. The birds of paradise are certainly passerine birds, probably most nearly allied to the crows, but they excel all other birds in their magnificent development of accessory plumes and their glory of colour. As usual among birds, these statements are true only of the males, the females being relatively plain. The diet consists largely of seeds and fruits, but these are mingled with insects, and also, to a less extent, with worms, snails, frogs, and lizards. Among the most striking forms are the great bird of paradise (*Paradisea apoda*), the one commonest in collections; *Cicinnurus regius*, or the king paradise bird, which is glossy scarlet with a bright green throat patch; the glossy black rifleman (*Ptilorhis paradisea*); and the magnificent bird of paradise (*Diphyllodes magnifica*), with its wonderful erectile ruff. For descriptions of the birds in their native haunts, reference should be made to A. R. Wallace's *Malay Archipelago* (10th ed. 1890). See also article BOWER-BIRD.

Birds constitute one of the best-defined groups in the animal kingdom, being distinguished at once from all other animals by the characteristic covering of feathers. The presence, in addition to feathers, of an epidermic covering of scales over parts of the body is an external character which suggests a descent from reptiles—a suggestion borne out alike by details of internal structure and by geological evidence.

Indeed, in spite of the fact that some birds do not fly, we may say, speaking broadly, that birds are distinguished from reptiles by those peculiarities of structure and function which bear, directly or indirectly, upon the power of flight. It may, therefore, be convenient to discuss the characteristics of birds in connection with the power of flight rather than in strict systematic order.

The organs of flight in a bird are the fore limbs, which have been converted into wings. The result of this is that the posterior limbs only can be used in supporting the body on the ground: the bird—to use an old term—is a biped. Now, these changes of function of fore limb to wing, and hind limb to sole support, have produced striking and, in a sense, independent modifications of structure. For it is exceedingly interesting to notice that of the two rival groups of reptiles which are claimed to be ancestral to birds, the one set (Pterosaurs) have fore limbs converted into wings, and the other (Dinosaurs) have the hind limbs converted, as in birds, into the sole supports of the body. It may, therefore, be convenient to consider the two sets of modifications separately.



Skeleton of a Bird (*Falcon*).

Considering first the fore limb, we find that the conversion into a wing has resulted in the reduction of the hand to three fingers, of which one only (the index) is well developed. It is this first or index finger which bears the large *primary* feathers of flight, and it is always of considerable length. The length is partly given by the long palm-bone (metacarpal), which is fused to the palm-bone of the rudimentary middle finger. The first digit, or thumb, is represented by a small rod of bone, which bears a small independent tuft of feathers, known as the false wing (*ala spuria*). In the majority, though not in all existing birds, claws are absent from all the fingers. There are only two separate wrist-bones, and the wrist-joint possesses very little freedom of movement. Without entering into structural details, one would notice the peculiar folding up of the arm when at rest, and the strong ulna, or outer bone of the fore arm, which carries the *secondary* feathers of flight. Especially important in connection with flight are also the united clavicles, which together form the merrythought or wishbone; the strong coracoids, bones represented in ourselves only by a process on the shoulder-blade; the great keel on the breastbone to which the muscles of flight are attached; the fusion of the vertebræ in the back to form a firm fulcrum on which the wings may play, and so on.

In connection with the modified hind limbs, one would notice especially the great elongation of the pelvis, which extends both in front and behind the cup in which the top of the thigh is placed, so that the weight of the body lies partly in front of and partly behind the point of support. A comparison of a skeleton and a living bird will show how beautifully the body is balanced about the legs; but to this statement swimming birds form an exception, for in them the legs are placed far back, and the gait is in consequence clumsy and awkward. Again, in the limb itself the ankle-bones seem to be absent, and the bones of the sole of the foot (metatarsals) are fused together and with the missing tarsals to form a single bone. The little toe is always absent, a bird never having more than four toes.

In living birds the tail is always short, and usually ends in a bony plate, the ploughshare bone, which carries a bunch of tail feathers, of much importance in flight.

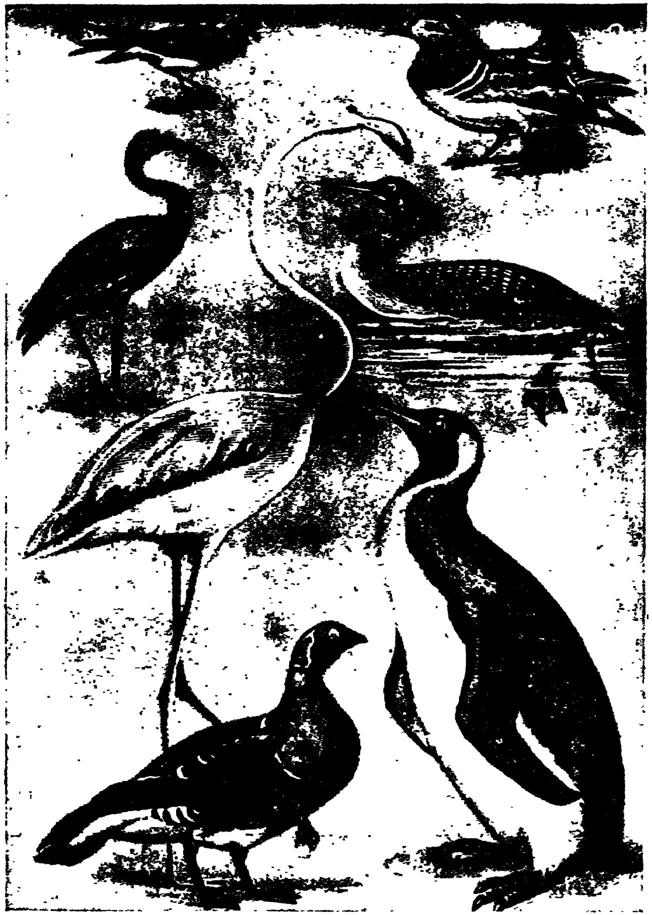
The feathers give the necessary resistance to wings and tail during flight, and keep the body warm. Its temperature is unusually high, this being, again, no doubt associated with the quickened respiration necessitated by flight. This respiratory efficiency depends on the development of air-sacs connected with the lungs, and with it is associated a four-chambered heart, and a circulation as perfect as that of a mammal. As in swift-moving animals in general, the head is relatively small, though the brain is better developed than that of a reptile. In living birds teeth are absent, and the jaws are covered with a horny beak. Birds lay eggs as reptiles do, but the exigencies of flight demand that these should be few in number. This is, again, rendered possible by the fact that their high intelligence enables the parents to protect their eggs and young by many ingenious devices, and the young are also, in almost all cases, cherished with much devotion until the dangers of early life are past. The vast migrations performed by many birds are ascribed by several ornithologists ultimately to the desire to seek safe nesting-places in which the young may be reared. Finally, in accordance with their high specialization, we find that birds not only rank among the most beautiful and highly ornamented of animals, but also frequently possess the power of song, and are believed to exhibit preferential mating in its most pronounced form.

The classification of birds is a matter of great difficulty, for many characters hitherto relied upon prove, on inquiry, to be merely adaptations to a similar method of life.

Most authorities agree that birds should first of all be divided into two great sets—the Archæornithes ('primitive birds'), including only the strange fossil known as Archæopteryx; and the Neornithes ('modern birds'), including all other known birds, fossil or living, in all of which the tail is short and the palm-bones fused. The Neornithes may be divided as follows:—

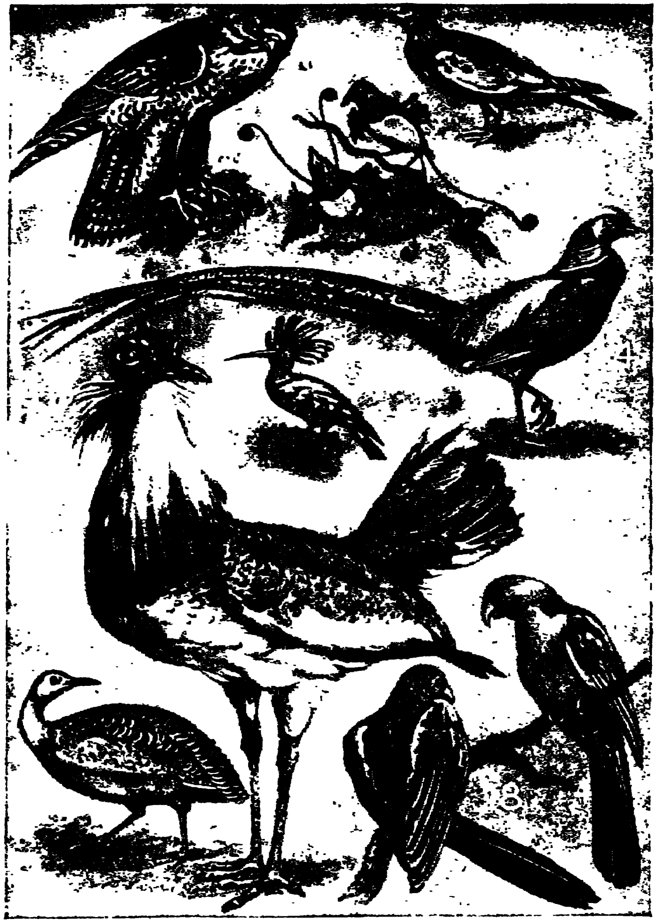
1. Ratitæ, flightless birds with raftlike breastbone, including the living ostriches, emu, cassowary, and kiwi, with the extinct moas and others.
2. Odontolcæ ('teeth in furrows'), fossil birds with long bills, numerous teeth, and flat breastbones, such as Hesperornis and Enaliornis.
3. Carinatæ ('sternum with keel'), birds which typically have a keel on the breastbone, including the vast majority of living forms and not a few fossils.

The following are the chief orders as defined by Dr. Gadow:—The Colymbiformes ('swimming birds') include the primitive divers and grebes, and the Sphenisciformes ('penguin-like') include the aberrant penguins, birds with no power of flight, but with well-developed wings used as flippers in swimming and diving. In the Procellariiformes ('petrel-like') are included the petrels and albatrosses, in which the bill has a compound sheath; while the gannets, pelicans, cormorants, and others, together with such wading



Wading and Swimming Birds.

1. Black-vented stormy petrel. 2. Mandarin duck (male). 3. Scarlet ibis. 4. Great northern diver. 5. Common flamingo. 6. Red-breasted goose. 7. King penguin.



Land Birds.

1. Lanner falcon. 2. Stockdove. 3. King bird of paradise. 4. Golden pheasant. 5. Hoopoe. 6. Great bustard. 7. Rufous tinamou. 8. Parrot *Aprosmictus cyanopygius*, E. Australia.

birds as storks, herons, ibis, etc., fall into the Ciconiiformes ('stork-like'). The last-named birds lead through the flamingo to the ducks, geese, and swans, which, with others, constitute the order Anseriformes ('goose-like'). Very different are the members of the next order, the Falconiformes ('falcon-like'), or diurnal birds of prey, with their strong claws and raptorial beaks. The small order of Tinamiformes ('tinamou-like') includes the primitive tinamous, S. American forms which in external appearance resemble the members of the next order, the game birds or Galliformes ('fowl-like'). In the Gruiformes ('crane-like') are included rails, cranes, bustards, and others which in a sense are transitional between the game birds and the shore birds included in the large order of Charadriiformes ('plover-like'), an order comprising not only limicoline forms like plovers, sandpipers, snipe, but also the sea-gulls and their allies, and the grain and fruit eating pigeons. Parrots and cuckoos are placed together in the order Cuculiformes ('cuckoo-like'); while the very heterogeneous order of Coraciiformes ('raven-like') includes owls, kingfishers, swifts, humming-birds, woodpeckers, and many others.

Largest of all is the unwieldy order Passeriformes, or perching birds, including all the song-birds (Oscines), and thus the vast majority of the smaller British birds. They are characterized, among other points, by the structure of their feet; and in the birds of paradise reach, perhaps, the summit of avian beauty, and in the crows, according to many ornithologists, the summit of bird intelligence. The weaver-birds and the tailor-birds show also some of the most wonderful forms of nests, and the 'gardens' and bowers of the bower-bird indicate a keen appreciation of beauty. All these are passerine birds.

For general descriptions of birds, see *A Dict. of Birds*, by A. Newton (1893-6), and the volume on *Birds* in the 'Cambridge Natural History,' by A. H. Evans (1899). For British birds, reference should be made to the following, among others: *An Illustrated Manual of British Birds*, by Howard Saunders (1889), and *Handbook of British Birds*, by J. E. Harting (new ed. 1901), both useful books of convenient size. Among the more elaborate works on the same subject may be mentioned *A Hist. of British Birds*, by F. O. Morris, 6 vols. (1851 7), and *A Hist. of British Birds, with Coloured Illustrations of Eggs*, by H. Seebohm, 6 vols. (1883-5). Much interesting information on migration and kindred topics is to be found in *Heligoland as an Ornithological Observatory: the Result of Fifty Years' Experience*, by H. Gätke (trans. by R. Rosenstock, 1895). For general accounts of the structure of birds, reference may be made to *The Structure and Classification of Birds*, by F. E. Beddard (1898), and to a smaller work by F. W. Headley, *The Structure and Life of Birds* (1895).

Bird's Eyes, in timber, are the nodules that appear in planed wood. They are caused by lateral latent shoots which terminate in dormant buds.

Bird's-foot (*Ornithopus*), a genus of eight species in the order Leguminosæ. Two are natives of the British Isles, but are rare. *O. sativus* is the Serradilla, a forage crop on the Continent, but little cultivated in Britain.

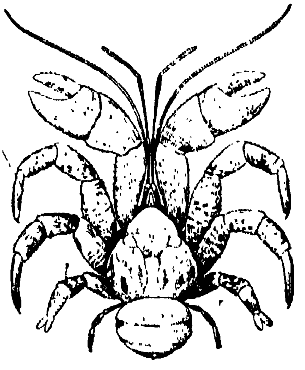
Bird's-foot Trefoil (*Lotus corniculatus*) belongs to the order Leguminosæ, and represents a genus of eighty species which are widely distributed. It has creeping stems and small clover-like leaves; it sends up a naked stem a few inches long, from the top of which arise three or four flowers, crimson-tipped in the bud and yellow in full bloom. The pods are about an inch long, and spread out like the digits of a straight-toed bird. The plant is common by roadsides and on grassy banks, and is often sown among permanent pasture.

Bird's-foot Trefoil (Lotus corniculatus).

Birejik. See Bir.

Biretta, or Baretta, originally used for a pontifical cap, but now for the square cap worn by Roman and certain Anglican clerics.

Birgus, the robber or cocoanut crab, nearly allied to the hermit crab, found on the coral islands of the Indo-Pacific region. It is a land form, and lives upon cocoanuts, which it is capable of opening with its very strong claws.



The Robber or Cocoanut Crab.

Birjand, or Birdjand, tn., prov. Khorassan, Persia, 240 m. s. of Meshed and 210 m. N.E. of Kerman. Pop. 14,000.

Birkbeck, George (1776-1841), the founder of mechanics' institutions, was a native of Settle, in Yorkshire. In 1800, while a professor of natural philosophy at Anderson's College, Glasgow, he established courses of lectures in science to working-men. In 1804 he removed to London. See Godard's *Life of Dr. Birkbeck* (1884).

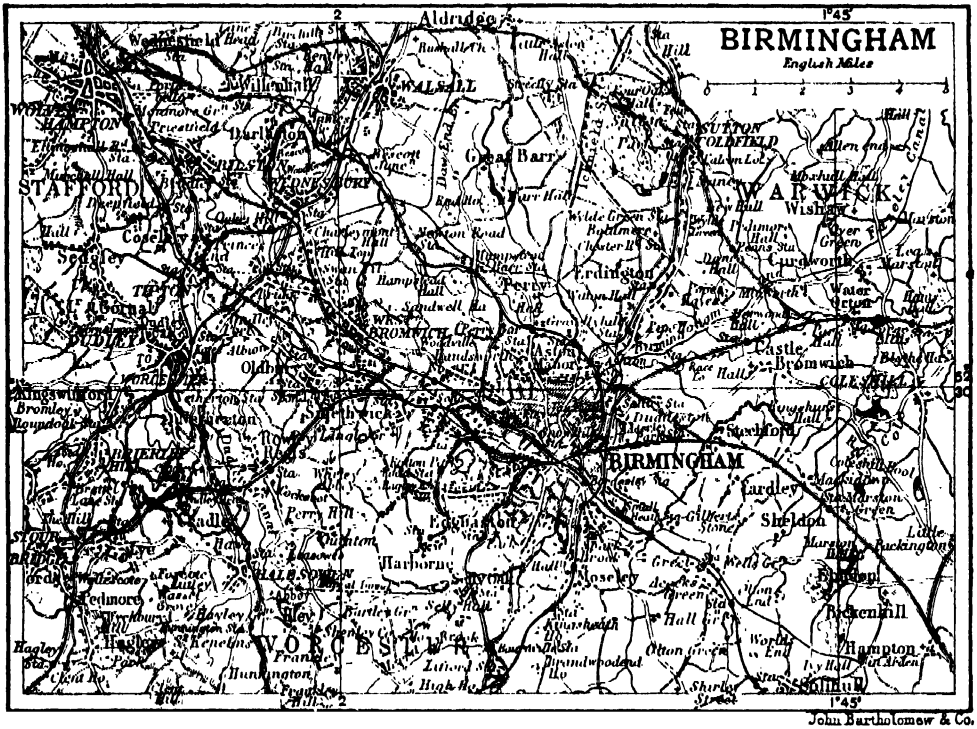
Birkbeck Institute, founded by George Birkbeck as the London Mechanics' Institute (1824), with the aid of Brougham, Bentham, Cobbett, and others. The original idea was to teach mechanics the correct knowledge of the principles of their respective trades, but later the field was enlarged, and a comprehensive general education is now aimed at. It is now known as Birkbeck College, and is held in Bream's Buildings, Chancery Lane. It was incorporated in 1891 as part of the City Polytechnic.

Birkdale, par., S.W. Lancashire, England, on the coast, 1½ m. s.w. of Southport, of which it forms a populous suburb; station on L. & Y.R.; has well-equipp hydropathic. Pop. (1901) 14,1

Birkebeiner, the name of a political party in Norway at the end of the 12th and the beginning of the 13th century, which first arose in opposition to Erling Skakke and his son Magnus, and subsequently fought for the male heirs of Sigurd Mund, as represented by King Sverre and his descendants. They were so called because they were said to be obliged to wear birch-bark clogs for lack of boots. Their chosen candidate, Hakon Hakonsson, was, in 1218, elected king of Norway.

Birkenfeld. (1.) Principality of Germany, dependent upon the grand-duchy of Oldenburg, but entirely surrounded by the Prussian province of Rhineland. Its surface is hilly and well wooded, and is drained by the Nahe. Agriculture and horticulture are carried on, and the polishing of gems (agates). It has only a personal union with the grand-duchy. Area, 194 sq. m. Pop. (1900) 43,406. (2.) Town of the above, 38 m. by rail N. by E. of Saarbrücken. Pop. (1900), 2,230.

Birkenhead, par., co., parl., and munic. bor., mrkt. tn. and seapt., on l. bk. of Mersey, opposite Liverpool, 15 m. N.W. of Chester, N.W. Cheshire, England. It has terminal stations on the L. & N.W., the Great Western, and the Birkenhead and Hoylake Rys. Though dating from the 12th century, it became important only after the opening of the dock at Wallasey Pool in 1847. The docks have a water area of 164 ac. 4,190 yds., and a lineal quayage of 9 m. 925 yds. Woodside Lairage is one of the largest and best-equipped abattoirs in the kingdom. (See illustration, p. 11.) The town was incorporated in 1877 with Claughton, Oxton, Tranmere, and part of Higher Bebington. In 1831 it was a village of little over 200 inhabitants; in 1861 it contained 51,649; in 1901 the number was 110,926. The tunnel under the Mersey, between Birkenhead and Liverpool, was opened in 1886. Shipbuilding forms the chief industry, the Laird shipyard (established in 1824) being of world-wide renown. Coal is largely exported. There are engineering works, breweries, and iron-smelting works. Here is St. Aidan's theological college. Birkenhead Park (laid out by Sir Joseph Paxton), in Claughton, and opened in 1847, is one of the finest of its kind in the country. Mersey Park and Bidston Hill (observatory) are also worthy of note.



John Bartholomew & Co.

Birkenhead, a British steam troopship wrecked in Simon's Bay, S. Africa, on Feb. 26, 1852, when 454 of the crew and soldiers perished. The gallantry of those on board, and especially of the troops, will ever be remembered.

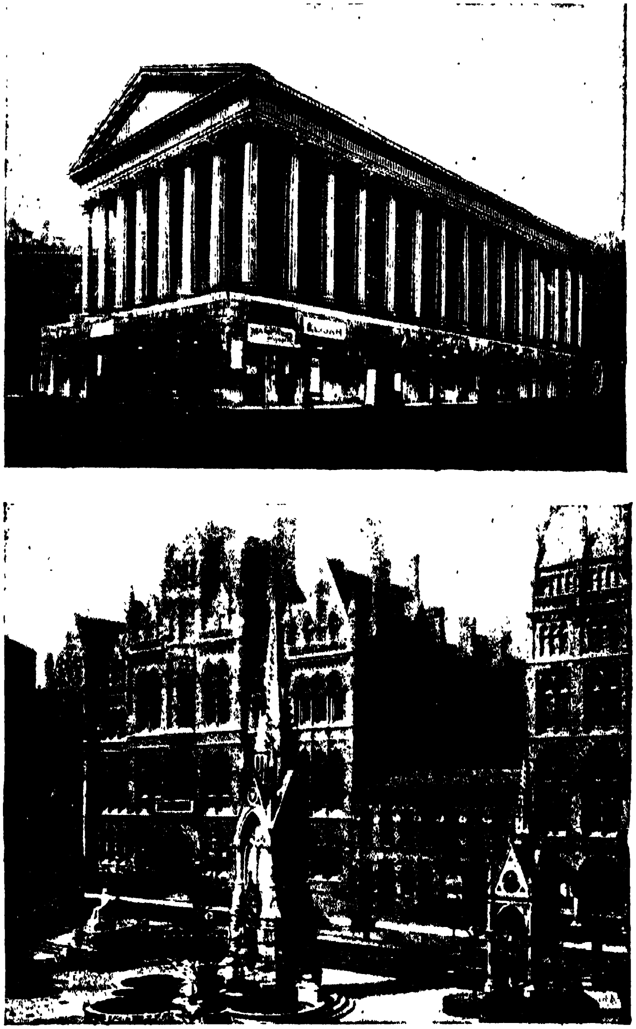
Birkenhead, Sir John (1616–79), English pamphleteer, born near Northwich, Cheshire, and educated at Oriel College, Oxford. During the civil war he wrote the weekly sheet *Mercurius Aulicus* (1642–5), the royalist rival to the parliamentary *Mercurius Britannicus*. Appointed reader in moral philosophy, he was ejected by Parliament, and went into exile with Charles II. (1648), but after the restoration he was knighted (1662).

Birks, Thomas Rawson (1810–83), English theologian, born at Stavely, Derby; was second wrangler at Cambridge (1834), and succeeded Maurice as professor of moral philosophy there (1872). He was a strong controversial theological writer on the evangelical side, producing *Horæ Evangelicæ* (1852), *The Bible and Modern Thought* (1861), *Modern Utilitarianism* (1874), *Modern Physical Fatalism* (1876), etc.

Birmingham, parl. bor., munic. bor., city (lord mayor since 1893), and co. bor., Warwickshire, England, 112½ m. N.W. of London; junction of the L. & N.W, the Great Western, the Midland, the Birmingham, Wolverhampton, and Dudley lines. The municipal borough (1832) includes the parishes of Birmingham and Edgbaston, and part of Aston; the parliamentary borough (extended 1885) includes the local government districts of Balsall Heath, Harborne, Saltley, and the hamlet of Little Bromwich, and is divided into seven single-member constituencies. Birmingham is the commercial capital of the Midlands, a most progressive and flourishing place. Though mentioned in Domesday, and sacked by Prince Rupert during the civil war (1643), the city is essentially modern, and has no antiquities worth mentioning, except Aston Hall and some monuments of the Berminghams (St. Martin's church), who held the manor from at least the reign of Edward I. Many of the streets, notably New Street, are wide and stately, and the public buildings are metropolitan in character. The town hall, of Corinthian design, with massive detached columns copied from those of the temple of Jupiter Stator at Rome, contains a fine organ, and is famed for the Birmingham musical festival (instituted 1768), which is held triennially. Mendelssohn's *Elijah* was here first produced in 1846. The council house, the corporation museum and art gallery, and many other public and educational buildings, are also notable. Birmingham University, founded 1900, possesses the usual faculties, but has a stronger modern scientific and commercial bias than any other British university. It owes much to its chairman, the Right Hon. Joseph Chamberlain, M.P., who has been closely associated with its municipal progress. The university has its nucleus in Mason College, founded by Sir Josiah Mason in 1875 for scientific education; and other educational establishments are Queen's College (1828), King Edward's grammar school (founded 1552), the new school of art (1885), the free grammar school (1833), the corporation technical school, Birmingham or old library (1797). It gives name to a Roman Catholic see (1879); the cathedral (1839–41) was designed by A. W. Pugin. Amongst many statues is one to the chemist Dr. Priestley, whose house was sacked and burnt and his library and MSS. destroyed by a 'church-and-king' mob in 1791. Birmingham has eight public parks, the largest being Cannon Hill Park, covering 57 ac. The proximity of Birmingham to the S. Staffordshire coal field makes it the hardware metropolis of the kingdom. Steam-engines, gas-engines, railway plant, small-arms (Royal Birmingham Small-arms Factory, ammunition, bicycles, screws, and metal ornaments are a few of its many manufactures. Birmingham is the birthplace and chief centre of the brass trade, and cheap jewellery (thus 'Brummagem'), glass, electro-plate, steel pens, brewing, and chemicals are largely manufactured. Watt perfected the steam-engine here, and, in conjunction with Boulton, founded the Soho Works. Murdock, Eginton, John Wyatt, and other mechanicians, have also been closely associated with the town. Birmingham took a leading part in the reform agitations of 1832 and 1835; was the centre of the Chartist movement resulting in the riot of 1839. The foundation of the bishopric of Birmingham was announced on Jan. 13, 1905. Pop. (1901) 522,182.

Birmingham, city of Alabama, U.S.A., the co. seat of Jefferson co., situated near the middle of the state; an important railway centre; iron manufacturing. Pop. (1900) 38,415.

Birmingham Daily Post was established in 1857 by Mr. John Feeney, in association with Sir John Jaffray, and was the first daily newspaper to be published in the provinces at the price of one penny. For many years it was edited by Mr. J. Thackray Bunce, who was succeeded in 1898 by Mr. A. H. Poultney. The *Post* has come to be regarded almost as the semi-official organ of Mr. Joseph Chamberlain. Strongly Radical in politics, the *Post* maintained the Liberal Unionist cause at the Home Rule split in 1886. But it has always prided itself upon its independence, and during the American civil war it stoutly supported the cause of the North.



Birmingham: Town Hall and University (Mason's College).

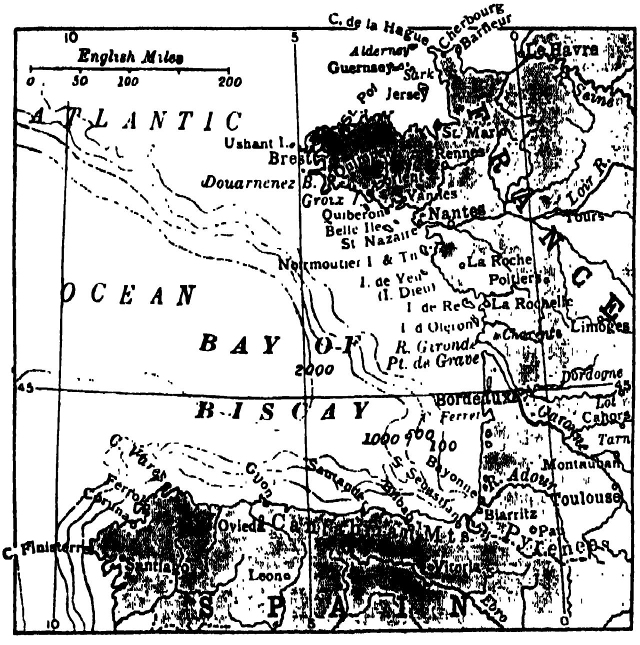
(*Photos by Frith.*)

Birnam, vil. in par. of Little Dunkeld, Perthshire, Scotland, on r. bk. of Tay, ¾ m. s. of Dunkeld, on Highland Ry. South of the village rises Birnam Hill (1,324 ft.), once covered by a royal forest (see *Macbeth*, act iv. sc. 1, line 92, etc.). Remains of 'Duncan's Camp,' a vitrified fort, on S.E. slope.

Birney, James Gillespie (1792–1857), American anti-slavery politician, was very active from about 1832, and in 1837 became secretary of the American Anti-Slavery Society. He unsuccessfully stood in 1840 and 1844 for the United States presidency. See W. Birney's *J. G. Birney and his Times* (1890).

Biron, ERNST JOHANN (1690–1772), Duke of Courland, whose real name was Bühren, was the favourite of the Empress Anna Ivanovna, niece of Peter the Great, and became practically ruler of all the Russias. A bloodthirsty tyrant, he was responsible for the execution or banishment of hundreds who stood in his way. Biron assumed the regency when the empress died (1740); but a conspiracy was formed against him by Münnich, with the result that he and his family were exiled to Siberia. He was recalled (1741) shortly afterwards by the Empress Elizabeth, but took no further part in state affairs.

Biron, family of distinguished French generals. ARMAND DE GONTAUT, BARON DE BIRON (1524–92), fought against the Huguenots. His son, CHARLES (1561–1602), became marshal (1594) of France and (1598) duke, and governor of Burgundy. He was beheaded in the Bastille for treasonable practices. ARMAND LOUIS (1753–94), Duc de Lauzun, accompanied Lafayette to America (1778), and, returning in 1783, became general-in-chief of the army of the Rhine in 1792. He was executed during the Reign of Terror for resigning his command.



Bay of Biscay.

Birr. See PARSONSTOWN.

Birrell, AUGUSTINE, English barrister and author, was born near Liverpool in 1850. He became a barrister (1875), Quain professor of law at University College, London (1896), M.P. for W. Fifeshire (1889–1900); unsuccessfully contested N.E. Manchester (1900). His works include *Obiter Dicta* (two series, 1884, 1887); *Life of Charlotte Brontë* (1885); *Res Judicatæ* (1892); *Men, Women, and Books* (1894); *Sir Frank Lockwood* (1898); *Collected Essays* (1900); *Miscellanies* (1901). He is editor of several official Liberal publications, and in 1904 was president of the National Liberal Federation.

Birs, small riv. in N.W. of Switzerland, joining the Rhine E. of Basel. In 1444, at the leper house of St. Jakob-bei-Birsfelden, a body of confederates, less than 1,500 strong, stood to the death against 30,000 Armagnac free-lances advancing on Basel.

Birsk, tn., Orenburg gov., Russia, 45 m. N. of Ufa, on the Bielaïa, sub-affluent of the Volga; founded in 16th century as an outpost against the Bashkirs. Pop. 9,100.

Birstal (ac. 13,976), par. and tn., stn. Howden Clough on G.N.R., 7 m. S.W. of Leeds, W. Riding, Yorkshire, England; has woollen mills, an iron foundry, coal mines, etc. Pop. of tn. (1901) 6,559.

Birth. For Registration of Birth, see REGISTRATION. For Statistics, see VITAL STATISTICS.

CONCEALMENT OF BIRTH. In England, every person, including the mother, who endeavours to conceal the birth of a child by a secret disposition of its dead body, whether the child died before, at, or after its birth, is guilty of a misdemeanour, and liable to two years' imprisonment (Offences against the Person Act, 1861). In Scotland, if a woman conceals her pregnancy during the whole period of it, and neither calls for nor has assistance at the birth, then if the child is found dead, or is missing, she is guilty of the offence of concealment of pregnancy, and is liable to imprisonment for two years (43 Geo. III. c. 14).

Birth-palsies are those paralytic conditions in infants which are due to injury received at birth. The cause is abnormal pressure of some kind on the brain centres, and in many cases the effects pass off in a few days. See PARALYSIS.

Biru. See WALATA.

Bisaccia, tn., 60 m. E. of Naples, Italy; seat of a bishop. Pop. (1901) 7,954.

Bisacquino, tn., prov. Palermo, Sicily, 11 m. S. of Corleone. Pop. (1901) 10,330.

Bisalnagar, or VISNAGAR, tn., dist. Kadi, Baroda, Bombay Presidency, 50 m. N. of Ahmedabad; cotton manufactures. Pop. 20,000.

Bisalpur, tn., N.W. Provinces (United Provs. of Agra and Oudh), India, 25 m. S.E. of Bareilly. Pop. (1901) 9,851.

Bisanthe. See RODOSTO.

Biscay. See VIZCAYA.

Biscay, BAY OF (anc. *Cantabricum Mare* and *Aquitanus Sinus*, and the Fr. *Golfe de Gascogne*), a bay of the Atlantic; fills the wide angle between the N. coast of Spain and the W. coast of France. Except between the estuary of the Gironde and the mouth of the Adour, where it is lined by low sand-dunes and lagoons, its shores are bold and rocky. Besides the two rivers just named, it receives the Vilaine, Sèvre, Charente, and Dordogne. From the extreme points (Bretagne to Galicia) it measures some 340 m. Along its N.E. shore are the small islands of Belleisle, Noirmoutier, Ré, and Oleron. Its depth along this part of the coast of France is in places as little as 20 fathoms, but increases off the N. coast of Spain to 200 fathoms. Under the impact of N.W. winds it becomes extremely boisterous.

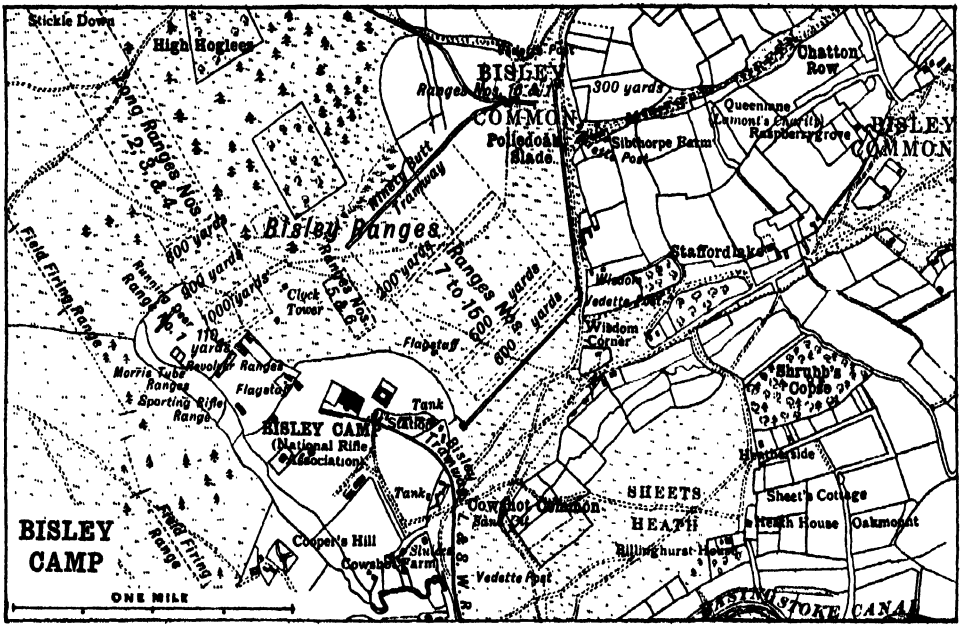
Bisceglie, seapt. and episc. see, prov. Bari, Italy, 21 m. N.W. of Bari. It has a 12th century cathedral, and ruins of an old Norman castle. Pop. (1901) 31,461.

Bischof, KARL GUSTAV (1792–1870), German chemist and geologist, was born near Nuremberg. He became, in 1819, professor of chemistry at Bonn. In 1840 he published in French an able treatise on means to avoid explosions in mines, and greatly improved the safety-lamp. He also made important contributions to geology, chiefly in *Lehrbuch der chemischen u. physikalischen Geologie* (1847–54; 2nd ed. 1863–71).

Bischoff, Theodore Ludwig Wilhelm (1807-82), German physiologist, anatomist, and embryologist, was born at Hanover. In 1844 he was appointed professor of anatomy and physiology at Giessen, where he founded an anatomical museum and a physiological institute. He also held chairs at Heidelberg (1836) and Munich (1855-78).

Bischweiler, tn., Alsace-Lorraine, Germany, in Lower Alsace, 23 m. by rail N.E. of Strassburg; manufactures jute and grows hops. Pop. (1900) 7,897.

Biscuit (Fr. 'twice baked'), flat cakes dried and hardened by baking. Flour, water, and salt are the basis of all kinds of biscuits, these ingredients alone forming ship's bread. The making of biscuits is entirely done by machinery. A measured quantity of flour and water, and the other ingredients required, are supplied to a mixing machine, by which they are kneaded with revolving knives into a stiff dough. The dough is then rolled out between two heavy iron rollers into a long, thin sheet, which is carried on a web of felt or canvas to the cutting machine. Here punches of the required size cut out the biscuits, the scraps being returned automatically to the rolling machine. The biscuits are next conveyed to the oven on a travelling wire-gauze frame. The motion through the oven, which is 30 or 40 ft. long, is continuous; the time of baking varies from five to forty minutes. After leaving the oven the biscuits are packed in tin boxes.



Bisharin, or Beja, a people inhabiting the lower part of the Blue Nile, between about 24° N. lat. and the frontier of Abyssinia. They are probably the descendants of the ancient Blemmyes. Their language belongs to the Ethiopian group of the Hamitic languages. See Hartmann's *Die Bedscha* (or Bisharin) in *Zeit. für Ethnologie* (1882).

Bishnupur, the ancient cap. of Bankura dist., Bengal, India; a municipal town with manufactures of fine cotton and silk cloths. Pop. (1901) 19,090.

Bishop. See Episcopacy.

Bishop, Sir Henry Rowley (1786-1855), British musical composer, pupil of Francesco Bianchi; was early (1810) associated with the Covent Garden house as composer of ballet and incidental music, and afterwards with Drury Lane (1825) and Vauxhall Gardens (1830). He was professor of music in Edinburgh (1841-3) and Oxford (1848). Bishop wrote several operas (*e.g. The Virgin of the Sun*, 1812), but is best known by his settings of songs (*e.g. Should He Upbraid; The Bloom is on the Rye; Home, Sweet Home*). He was knighted in 1842.

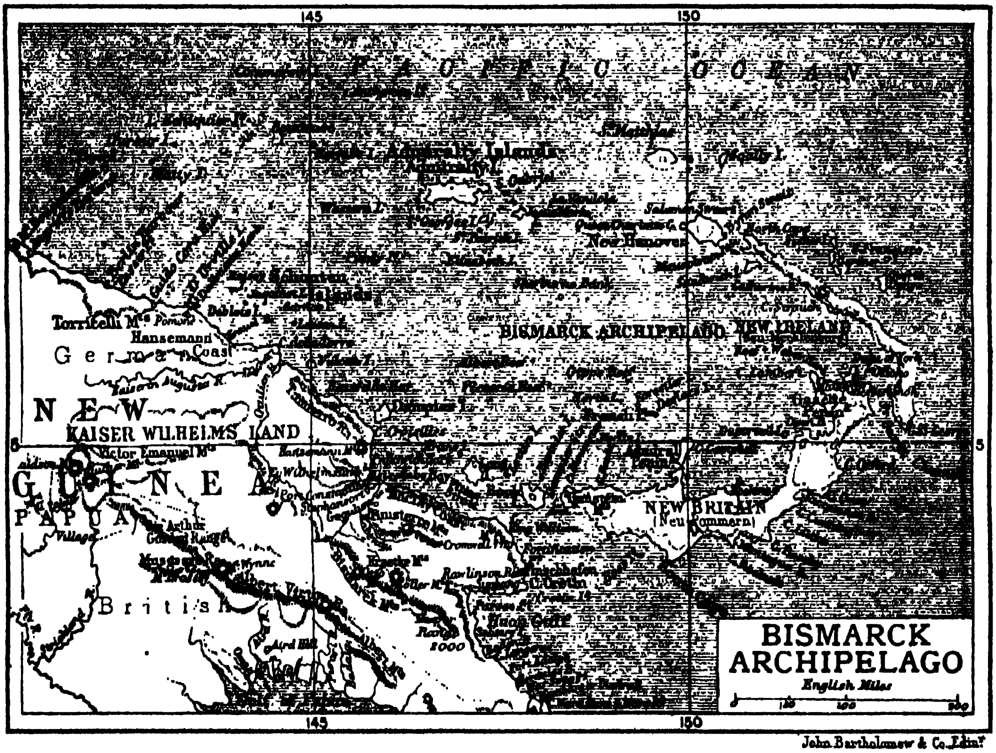
Bishop, Isabella (*née* Bird) (1832-1904), English traveller and author. Canada, Prince Edward Island, and the United States were the scenes of her first journey. She next visited the Sandwich Islands, the Rocky Mountains, and Japan. Her later travels were in China, Siberia, and Korea. Mrs. Bishop always took a warm interest in medical missions, and built five hospitals and an orphanage in the East. She was the first lady to be elected (1892) a fellow of the Royal Geographical Society. Her works include *The Englishwoman in America* (1855), *Six Months in the Sandwich Islands* (1873), *A Lady's Life in the Rocky Mountains* (1874; 4th ed. 1881), *Unbeaten Tracks in Japan* (1880; 5th ed. 1900), *In the Golden Chersonese* (1883), *Korea and her Neighbours* (1898), *The Yangtze Valley* (1899), and *Pictures from China* (1900).

Bishop Auckland (ac. 2,564), par. and mrkt. tn. in Durham, England, 9 m. S.W. of Durham, on the N.E.R., at the junction of the Gaunless and the Wear. Auckland Palace or Castle, the residence of the bishop of Durham, was founded by Bishop Antony Bek during the reign of Edward I. There are large coal mines in the vicinity, and engineering works in the town. Pop. of tn. (1901) 11,966.

Bishops, The Seven. In 1687 James II. published illegally a Declaration of Indulgence, permitting all his subjects to worship in their own way. Primarily intended for Roman Catholics, it also granted liberty of conscience to dissenters. A second and more important Declaration was followed by an Order in Council, commanding all ministers to read the same from their pulpits on two successive Sundays. This order the London clergy refused to obey; and Sancroft, the primate, Lloyd, bishop of St.

Asaph, Ken of Bath and Wells, Turner of Ely, Lake of Chichester, White of Peterborough, and Trelawney of Bristol, drew up a petition against the Declaration. For this the seven bishops were committed to the Tower, and, after one of the most notable state trials which ever took place before the court of King's Bench, they were acquitted.

Bishop's Ring, the corona or halo extending from 20° to 30° from the sun, first observed by Mr. Bishop at Honolulu on Sept 5, 1883, after the great Krakatoa eruption The colour of this halo was bluish white in the centre, shading off to reddish brown This phenomenon, associated with the twilight glows and coloured suns which were conspicuous after the eruption, was a diffraction corona produced by exceedingly small dust particles ejected from the volcano, the heavier particles having been sifted out by gravitation, leaving the remainder so nearly of the same size that they were capable of producing coloured diffraction. Kiessling has produced similar rings by submitting pulverized cement to the action of solar light. The Bishop's Ring reached its maximum brilliancy in the spring of 1884, and gradually declined until June 1886, when it disappeared. See *Eruption of Krakatoa and Subsequent Phenomena*, pp. 232-263.



John Bartholomew & Co. Edinr

Bishop-Stortford (ac. 3,272), par., mrkt. tn., on G.E.R., 12 m. N.E. of Hertford, E. Herts, England; has maltings, breweries, brickfields, and limekilns; named from its position on the Stort, and because it was granted by William I. to Maurice, bishop of London. Pop. (1901) 7,143.

Bishops-Waltham (ac. 7,408), par. and mrkt. tn. on L. & S.W.R., 9¼ m. S.E. of Winchester, Hampshire, England. The ruins of Waltham Palace, built in 1135 by Henry de Blois, bishop of Winchester, lie to the S.W. Pop. (1901) 2,309.

Bishop Wearmouth, formerly a par. and seapt. in Durham, England, on R. Wear, now forms a part of Sunderland.

Bishopweed (*Ægopodium podagraria*), also called GOUTWEED, belongs to the order Umbelliferæ. In Britain it is one of the commonest wayside plants, growing to a height of one to two feet, with compound leaves; the leaflets are broad, triangular, and in groups of three. The leaflet, from its resemblance to a goat's foot, gave origin to the generic name; *gout* is therefore a misnomer. The flowers are small and whitish, in dense compound umbels.

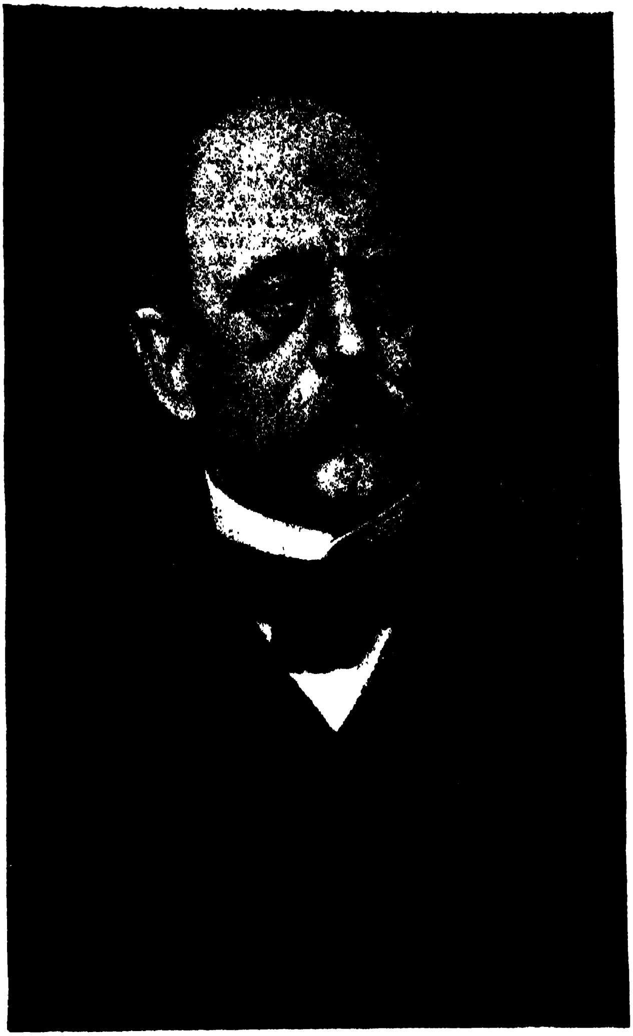
Biskra (the Roman *Ad Piscinum*), tn. and health resort, Algeria, 150 m. by rail S.W. of Constantine; famous for its date palms. There are hot sulphur baths at Hammam Salahin, 3½ m. N.W. of the town. Pop. (1901) [illegible]. See Pease's *Biskra* (1893).

Bisley, a common near Brookwood and Woking, in the co. of Surrey, England, on the L. & S.W.R., where since 1890 rifle ranges have been established, and the National Rifle Association has held its annual meeting, lasting for a fortnight. This was formerly held at Wimbledon, but the adoption of the small-bore rifle necessitated the provision of longer and safer ranges. The competitions are chiefly confined to volunteers, but there are many open to the regular forces, militia, yeomanry, colonial forces, and to civilian members of the N.R.A. The chief competition is that for the 'King's Prize' (formerly the Queen's), founded at Wimbledon by Queen Victoria in 1860, and open only to past and present volunteers. It is divided into three stages, *viz.*:—(1) Seven shots at each of 200, 500, and 600 yards. This decides the 300 best shots. (2) These then fire ten rounds each at 600 and 800 yards. This decides the 'Hundred,' who (3) fire ten rounds at 800, 900, and 1,000 yards. The winner receives the King's Prize of £250 and the N.R.A.'s gold medal and badge. The most important of the other competitions with the service rifle include the St. George's (volunteers; seven shots at 500 and 600 yards, ten at 800), *Daily Graphic* (all comers; seven at 200), *Graphic* (all comers; seven at 500), *Daily Telegraph* (volunteers; seven at 600), Alexandra (all comers; seven at 200 and 600), and the Prince of Wales's (volunteers; ten at 200 and 600); the Elcho Challenge Shield, for the best of the four 'eights' representing the different nationalities of the British Isles (fifteen shots at 800, 900, and 1,000 yards); the Ashburton Challenge Shield, for the best 'eight' from the public school volunteer corps (seven at 200 and 500 yards); and the Humphry Challenge Cup, for Inter-University competition (same shots as in the Elcho Challenge Shield); Kolapore Cup (seven at 200, 500, and 600 yards), for competition between teams representing the mother country and the colonies.

Bismarck, HERBERT, PRINCE (1849-1904), eldest son of Prince Otto von Bismarck, born at Berlin. After 1873 he was engaged in various diplomatic missions. In 1877-81 he assisted his father at the chancellory. In 1882 he was appointed attaché at London; in 1884, at St. Petersburg; and in 1886, secretary of state for foreign affairs, a post which he filled until 1890, when he resigned office along with his father. From 1893 till his death he was a member of the Reichstag.

Bismarck Archipelago, a general name for the Pacific islands lying immediately E. of New Guinea, which for the most part were acquired by Germany in 1884-5. The archipelago embraces the groups and islands of Neu-Pommern (formerly New Britain), Neu-Mecklenburg (New Ireland), Neu-Lauenburg (Duke of York), Neu-Hannover, Matthias, Admiralty, French, Hermit, Shortland, Rook, Dampier, Long, and some smaller ones. The entire area is estimated at nearly 20,000 sq. m., and the total population at approximately 190,000. The inhabitants, except for 268 Europeans in 1903, are indigenous tribes of Melanesian descent, standing at a low stage of civilization, and not yet free from cannibalistic practices. Physically, as well as in their plant and animal life, these islands have a close affinity with New Guinea, but except the coasts they are relatively little known. They are mostly mountainous; partly of coralline formation, and partly volcanic. They have a hot, moist climate, with the N.W. monsoon (Dec. to April). In addition to the usual native fruits and vegetables, the archipelago produces copra, cotton, trepang, mother-of-pearl, and tortoise-shell; the aggregate trade was valued at £100,000 in 1900. The residence of the governor is at Herbertshöhe, on Neu Pommern. The German New Guinea Company is the chief agency for the exploitation of the islands.

Bismarckburg. (1.) District of German E. Africa, touches the E. shore of the S. end of Lake Tanganyika, and includes Lake Rikwa. The native population in the two districts of Bismarckburg and Ujiji is estimated at over 3,000,000 (more than half the total population of German E. Africa). (2.) Capital of the above dist., on the E. shore of the S. end of Lake Tanganyika.



Prince Bismarck.

Bismarck-Schönhausen, OTTO EDWARD LEOPOLD, PRINCE VON (1815-98), commonly spoken of as PRINCE BISMARCK, was the son of a Pomeranian squire. Born on his father's estate of Schönhausen—which name he assumed in after life in addition to Bismarck—he was sent in 1832 to the University of Göttingen, where he distinguished himself chiefly in physical exercises, and in fighting successfully twenty-seven duels. In 1846 he entered the Saxon provincial Diet, and the general Diet of Prussia in 1847. He was appointed representative of Prussia at the Diet of Frankfort in 1851. In March 1859 he was sent as ambassador to St. Petersburg, and in May 1862 to Paris, whence he was recalled in September 1862, to become minister-president and minister for foreign affairs. Bismarck, whose anti-democratic spirit had declared itself from the first, now rode roughshod over the opposition of the deputies and the press, dominating his enemies with unconstitutional severity. After the war of spoliation against Denmark, Bismarck carried out his long-nourished policy for the humiliation of Austria. The sanguinary war of 1866, culminating in the defeat of Austria at Sadowa, extinguished the leadership of Austria in Germany, and Prussia became the dominant power. The unification of Germany now set in. Frankfort received a Prussian garrison, Hanover was incorporated in the Germanic Confederation, and treaties were concluded with Bavaria, Baden, and Würtemberg. In 1867 Bismarck organized the North German Confederation, and for his services was made chancellor of the Confederation and president of the Federal Council. The Luxemburg difficulty between France and Prussia was adjusted by the neutralization of the Luxemburg territory and the dismantling of the fortresses.

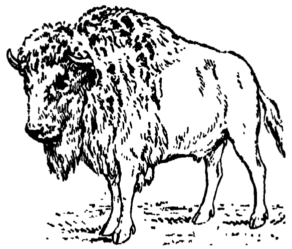
In July 1870 France declared war against Prussia; and on the capitulation of Paris, Bismarck dictated the terms of peace. In January 1871 the king of Prussia was crowned as German emperor at Versailles. Bismarck was appointed chancellor of the German empire, and raised to the rank of prince. He now occupied himself with domestic reform, and with the promotion of the drastic Falk laws against the Roman Catholics—a measure which resulted in the temporary expulsion of the Jesuits and the imprisonment of several bishops. In December 1872 he resigned the presidency of the state ministry, but still continued to advise the emperor, and was reappointed Prussian premier in 1873. The chief object of Bismarck's foreign policy was the preservation of the peace of Europe by the isolation of France, the conciliation of Russia, and the preservation of an alliance between Germany, Austria, and Italy. In 1878 he presided over the Berlin Congress. His efforts to found a German colonial empire have borne fruit, and he did much to spread German trade throughout the world.

After the accession of William II. in 1888, difficulties arose between the new sovereign and his minister. The former was exacting and imperious, and the latter expected to retain all his old power and influence. At length, in March 1890, Bismarck retired into private life, and the emperor created him Duke of Lauenburg. Personal differences between them became more pronounced, and Bismarck frequently enlarged upon his grievances through the press. There was, however, an interchange of courtesies between the sovereign and the ex-minister after the latter's serious illness in 1893. In private life Bismarck was a man of warm affections. Though imperious in character, and sometimes unscrupulous and vindictive, he was cast in a large mould. At one time he wielded an immense personal influence, and as the chief creator of modern Germany he will hold a conspicuous place in history.

The numerous works in connection with Bismarck include: *Life*, by Hezekill, trans. by R. H. Mackenzie (1870); *A Historical Biography*, by C. Lowe (2 vols. 1885); *Our Chancellor* (1884), by Dr. M. Busch; *A Political Biography*, by L. Bamberger, trans. by C. L. Lewes (1869); *Bismarck's Love Letters*, and *Letters to his Wife and others*, both of which have been translated; *Lettres Politiques confidentielles*, by H. de Poschinger, trans. by E. B. Lang (1885); *Histoire du Bismarck* (1887), by E. Simon; *Bismarck's Table Talk* (1895), edited (with notes) by C. Lowe; *Briefe* (1890, 1893, 1899); *Political Life, Labours, and Speeches* (1878), by E. Hahn; and *Bismarck: the Man and the Statesman*, trans. under the supervision of A. J. Butler (2 vols. 1898).

Bismuth (Bi, 208·5) is a metallic element that occurs in many places free, as well as in combination as sulphide, oxide, and carbonate. Bismuth is extracted from the ore by melting the free metal out, the oxides and sulphides being decomposed by the addition of carbon and iron. It is a white, crystalline, brittle metal with a pinkish tinge, has a sp. gr. of 9·8, is a poor conductor of electricity, and is very diamagnetic. It melts at 268° C., and solidifies with expansion. Bismuth burns to oxide in air, and unites with sulphur if heated with it. Its soluble salts are characterized by forming insoluble basic salts on addition of water—a property that is made use of in their detection. Bismuth itself is used in the preparation of fusible alloys, which are useful on account of their low melting points, and for expanding on solidification, thus enabling them to be employed, among other uses, in taking sharp casts of objects that would be damaged by a high temperature. The basic nitrate and chloride of bismuth are used as pigments under the name of 'flake' and 'pearl' white. Bismuth is of value in medicine, and is used chiefly as the subnitrate, acting on inflamed surfaces, as in eczema, and on mucous membranes, as a mild astringent and anodyne; its powdery form also dries a 'weeping' surface. Bismuth is much used in all forms of gastric irritation and pain, including gastric catarrh, gastric ulcer, cancer of the stomach, and the vomiting of pregnancy and hysteria. If combined with beta-naphthol, it is also antiseptic for the stomach and intestines.

Bison, the name applied to two closely allied species of the ox genus Bos — *viz.* the American bison (*Bos americanus*) and the European bison (*Bos bison*), miscalled the 'aurochs' or 'bonasus.' Both differ from the domestic ox (*Bos taurus*) in the elevation of the body at the withers, the presence of a heavy mane, and the beard beneath the chin. It is, further, a singular point of distinction that while the true ox—apparently a descendant of the urus (*Bos primigenius*)—has been introduced by man over the greater part of the globe, no effort has been made to domesticate the bison. As a wild animal the European bison is extinct, but it is preserved in a few forest regions—*e.g.* in Lithuania. It may be said that the American bison is also extinct as a wild animal, or nearly so, in spite of the fact that at the beginning of the 19th century it existed on the prairies in countless numbers. In the Yellowstone Park, and in a few private parks, what are perhaps the last remnants of these hordes are now carefully protected. See J. A. Allen's *The American Bisons* (1876); *The Extermination of the American Bison*, by Homaday (1889); and *American Big-Game Hunting*, by T. Roosevelt and G. B. Grinnell (1893).



American Bison.

European Bison.

Bissagos Islands, a group of low, sandy islands off the W. coast of Africa, opposite the estuary of the Geba, between 11° and 12° N. lat. The largest islands of the group (Bolama, Orango, Gallinhas, etc.) belong to Portugal. Area, about 1,550 sq. m. Chief tn. Bolama.

Bissao, a fort. seapt. of W. Africa, belonging to Portugal, at the E. end of the island of Bissao, in the estuary of the Rio Geba.

Bisschop, CHRISTOFFEL (1828), the painter of Friesland who, with Israels, has revolutionized Dutch painting. He paints sunlit interiors and enclosed spaces luminously warm—*e.g. The Morning Sun, Winter in Friesland, Sunshine in Heart and Home,* etc. See Muther's *History of Modern Painting* (1895–6).

Bissell, GEORGE EDWIN (1839), American sculptor, born at New Preston, Conn., U.S.A.; studied at Paris, Rome, and Florence; has executed the rilievo of Burns and Highland Mary (Ayr, Scotland), the group *The Navy* (New York), President Arthur (New York), and *Hospitality* (Buffalo Exhibition).

Bissen, HERMANN WILHELM (1798–1868), Danish sculptor who studied at Rome (1823) under Thorwaldsen, by whose will he was appointed to complete his master's unfinished works and to take charge of his museum. Returning to Denmark, Bissen fostered there the classical traditions of Thorwaldsen, and he executed, among other works, a frieze for the palace hall at Copenhagen, an *Atalanta, Cupid sharpening his Arrows,* and *Valkyrie.* See *Life* by Plon (1871).

Bisson, ALEXANDRE CHARLES AUGUSTE (1848), writer of French comedy, several of whose plays have been produced in England in adapted form. Among these are *Un Voyage d'Agrément,* by Bisson and Godinet (adapted as *Fourteen Days*), 1881; *Le Député de Bombignac* (*The Candidate*), 1884; *Les Surprises du Divorce,* by Bisson and Mars (*Mamma*), 1890; *Feu Toupinel* (*The Late Lamented*), 1890; *M. le Directeur,* by Bisson and Carré (*The Chili Widow*), 1895; *Le Contrôleur des Wagons-Lits* (*On and Off*), 1898. Of his other plays, some of the more popular are *La Famille Pont-Biquet* (1892); *Les Erreurs du Mariage* (1896); *Jalouse,* by Bisson and Leclercq (1897); *Docteur,* by Bisson and Thurner (1900).

Bistritz (Hungarian, *Besztercze*), a royal free tn., Hungary, Transylvania, cap. of the co. of Bistritz-Naszód, 75 m. N.E. of Klausenburg. In the 15th and 16th centuries it was one of the principal commercial towns of Transylvania. Saw-milling and tanning are the principal industries. Pop. (1900) 10,873.

Bistritz-Naszód, a co. of Hungary, in the N.E. of Transylvania; is spread over the W. face of the Carpathians, and is consequently very mountainous. Timber, maize, fruit, and various minerals are the principal products. Area, 1,550 sq. m. Pop. (1900) 117,649, mostly Roumanians.

Bithur, tn. in N.W. Provinces (United Provs. of Agra and Oudh), India, 12 m. N.W. of Cawnpur, on l. bk. of the Ganges; is much frequented by pilgrims and is devoted to the worship of Brahma. Here, on Aug. 16, 1857, Havelock, on his way to relieve Lucknow, defeated Nana Sahib, who had strongly fortified the town. Pop. (1901) 7,173.

Bithynia, dist., Asia Minor, bounded on the E. by Paphlagonia, S. by Phrygia, W. by Mysia, and N. by the Black Sea. Its inhabitants were immigrants from Thrace. In the 7th and 6th centuries B.C. it was part of the kingdom of Lydia, and then of the Persian empire, until, during its decline, the princes of Bithynia became independent, and, resisting Alexander and his successors, founded a kingdom which lasted until Nicomedes III., in 74 B.C., bequeathed it, on his death, to the Romans, of whose empire it became a province.

Bitlis, tn., Asiatic Turkey, 120 m. N.E. of Diarbekir; lies in a ravine, surrounded by hills above 2,000 ft. high. The people are largely engaged in the manufacture of firearms, and of cotton cloths noted for their bright-red dye. Tobacco of a very fine quality is exported. Here, in 1554, the Persians defeated Solyman the Magnificent. Pop. of vilayet, 398,600; of tn. 38,800.

Bitonto (anc. *Butuntum*), tn. and episc. see, prov. Bari, Italy, 9 m. W. of Bari, on the Apulian plain. The old town, surrounded by walls, and with narrow streets, has a Romanesque cathedral, a castle, and a theological seminary, and is encircled by modern quarters. It manufactures olive oil and good wine. Pop. (1901) 30,652.

Bitsch, a fortified tn., Alsace-Lorraine, Germany, in Lorraine, 24 m. S.E. of Saargemünd. It is commanded by a citadel, partly hewn out of the solid rock, which was unsuccessfully besieged by the Prussians in 1815, and by the Germans in 1870–1. From 1766 to 1871 it was in the hands of the French. Pop. (1900) 3,640.

Bitter Almonds, OIL OF, or BENZALDEHYDE. See ALMONDS, OIL OF.

Bitter Apple, or BITTER CUPS. See COLOCYNTH.

Bitter Ash. See QUASSIA.

Bitterfeld, tn., prov. Saxony, Prussia, 19 m. N.E. of Halle, with lignite mines, manufacture of drain-pipes and roofing felt, iron foundries, engineering shops, and steam-sawmills. Pop. (1900) 11,839.

Bitter Lakes, GREAT and SMALL. The smaller is 6 m. N. of Suez, Egypt; the larger lies between that lake and Lake Timsah. The two lakes form part of the Suez Canal.

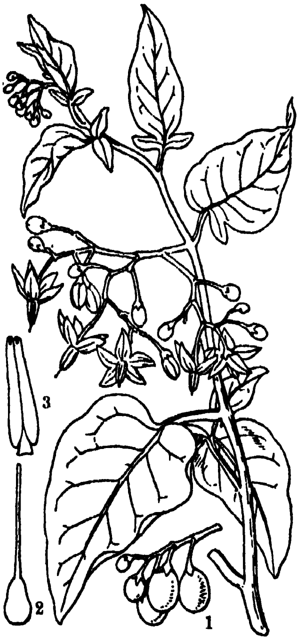
Bittern (*Botaurus stellaris*), a bird allied to the heron, once abundant in Britain, but now occurring only as an occasional visitor. It is a nocturnal bird, which, like its allies, inhabits swampy ground, and is remarkable for the booming cry uttered at the breeding season. The common bittern is widely distributed, and allied species occur in most parts of the globe. In the common bittern the prevailing tint is brown, with black streaks or markings.

Bittern.

Bitter Root, range of mountains on the boundary line between Idaho and Montana, U.S.A.; a part of the Rocky Mountain system, having an altitude ranging between 9,000 and 10,000 ft.

Bitters, a large and important group of drugs, including gentian, calumba, quassia, and others. Certain alkaloids have the general properties of bitters, in addition to their distinctive and more important characteristics. Their action begins in the mouth, where, by medicinal doses, the nerves of taste are stimulated, producing a flow of saliva, and thus assisting the first stage of digestion and increasing appetite. On reaching the stomach the bitter principle (berberine, quassin, quinine, or whichever may be present) acts directly on the gastric nerves, stimulating secretion and causing hunger, or, more accurately, the sense of hunger. Bitters, both in stomach and intestine, have also an antiseptic action, preventing fermentation and decomposition. In overdoses, or if too long used, they irritate rather than stimulate. They are anthelmintics, and for that purpose are used in injections. The stimulating properties of bitters are taken advantage of in the well-known preparations angostura, orange, or the newer peach bitters, etc., which are taken with sherry or spirits before meals. The bitter principle of hops is one of the most important ingredients in beer.

Bittersweet, or Woody Nightshade (*Solanum dulcamara*), a climbing plant common in copse and hedgerow in the north temperate zone. Its stems, which die down every winter, bear lance-shaped leaves with two little wings at the base of each, small purple flowers, and poisonous red berries. An extract from the stem is used for rheumatism and certain affections of the skin.



Bittersweet.
1, Fruit; 2, pistil; 3, stamen.

Bitterwood. See Quassia.

Bitumen, in its popular meaning, includes all those mineral products, of organic origin, which are characterized by a high percentage of carbon and hydrogen, by a powerful and peculiar smell, and by the facility with which they burn, giving off a heavy, sooty smoke. Among these are asphalt, naphtha, petroleum, pitch, elaterite, ozokerite, the so-called mineral resins, and the oils procured from marl and shale. The sp. gr. of bitumens is low; almost all of them float on water.

Bituriges, a powerful tribe in Aquitanian Gaul; their chief cities were Avaricum (Bourges) and Burdigala (Bordeaux). They were conquered by Cæsar.

Bitzius, Albert (1797-1854), was a Swiss Protestant minister who, under the name of Jeremias Gotthelf, wrote a long series of tales illustrating Swiss peasant life. He was minister of Lützelflüh, in the Emmenthal, from 1832 to his death, and his types are mostly taken from that district. His first work was *Bauernspiegel* (1837). Others are *Uli der Knecht* (1841), and its continuation, *Uli der Pächter* (1849); *Anne Bäbi* (1843-4), *Käthi* (1847), and *Geld und Geist* (1842). See new complete ed., with Life by Vetter (1898-1900); and *Life* by Bartels (1902).

Bivalves, or Lamellibranchs, are molluscs or shell-fish in which the shell consists of two valves placed at the right and left sides of the animal. The body is bilaterally symmetrical, and compressed from side to side; there is no distinct head region as in gastropods—*e.g.* the snail, and there are therefore no tentacles, no jaws, no salivary glands, and no radula or tooth-ribbon; the foot is ploughshare-shaped, and may contain a byssus gland; the gill filaments are often fused into plates, hence the name Lamellibranch. Other peculiarities are that the food consists of microscopic particles; there are usually two larval stages—the veliger and trochosphere; and the nervous system consists of three pairs of ganglia. Bivalves occur both in salt and in fresh water, but none are adapted for a terrestrial life. In the oyster, mussel, scallop, cockle, clam, we have forms of considerable commercial importance; while the pearl oyster (*Meleagrina*) is valued on account of the size, brilliancy, and colour of the concretions or pearls formed around minute irritants introduced between the mantle and the shell. Many bivalves are boring animals, and contribute to the disintegration of rocks—*e.g.* Pholas; or, as in the case of the destructive teredo, or shipworm, undermine wooden piers and breakwaters, and attack wooden ships. In tropical regions the bivalves may reach a great size, as witness the giant clam (*Tridacna*), whose valves may measure two feet across. Though the majority are sedentary or slow-moving, the Limas and scallops are capable of swimming by means of rapid jerks.

Several different classifications of bivalves exist, but perhaps the most satisfactory is that based on the structure of the gills, according to which the existing forms fall into four orders:—

1. Protobranchia, those with simple gills, like the gills of gastropods—*e.g.* Nucula.
2. Filibranchia, those with gills consisting of long, reflected filaments only slightly connected with one another—*e.g.* Arca.
3. Pseudo-lamellibranchiata, those with the gill filaments loosely connected to form gill-plates—*e.g.* Pecten, oyster.
4. Eulamellibranchiata. The gills are double flattened plates, the separate filaments being no longer obvious. To this order belong most of the living bivalves—*e.g.* Pholas, Mya, and Anodon.

Biwa Lake (Jap. *Biwa-ko*, 'a guitar'), in prov. of Omi, Japan, 10 m. N.E. of Kioto by river and canal; is drained by the Yodogawa R., which flows into Osaka Bay. It measures 36 m. in length by 12 m. in width, and is justly celebrated for its beauty, especially at the S. end. Lake Biwa Canal, 6 m. in length, connects it with Kamogawa Canal, and is utilized to drive the mills and factories of Kioto. According to the Japanese legend, the lake was produced by an earthquake in 286 B.C., which also upheaved the volcano of Fusiyama.

Bixa Orellana, a plant common in tropical America, and much cultivated in the W. Indies; belongs to the order Bixaceæ, of the violet group of orders. The seeds are protected by a red pulp from which is derived the dye annatto. The S. American Indians paint themselves with it.

Biysk, tn., Siberia, 270 m. S. of Tomsk, on r. bk. of Biya R., near its confluence with the Obi. A pass here crosses the Altai range into China. Pop. (1897) 17,206.

Bizerta (Fr. *Bizerte*; anc. *Hippo-Diarrhytus*), seapt. in Tunis, on the N. coast, 60 m. by rail N.W. of Tunis. The harbour (1894) is a canal 30 ft. deep, connecting the sea and the Lake of Bizerta (31 m. in circuit), and opens into the sea by a tide-dock of about 3,500 ac. formed by two piers. The little native town and the European town both lie to the N. of the canal. Its fisheries are very productive. Bizerta is principally a naval station and port of call, and as a commercial port it competes with Tunis. It was occupied by the French in 1881. Pop. 10,000 (3,000 Europeans).

Bizet, Alexandre César Léopold, called Georges (1838-75), French musical composer, was born at Bougival, near Paris. He studied at the Paris Conservatoire under Halévy, and gained the Grand Prix de Rome in 1857. His operas, *Les Pêcheurs de Perles* (1863), and *La Jolie Fille de Perth* (1867), based on Scott's novel, and produced at the Théâtre Lyrique, exhibited strong traces of Wagnerian influence. *Djamileh* (1872) did not meet with much success, but *L'Arlésienne* (1872) was enthusiastically received. Bizet's great masterpiece, *Carmen*, performed at the Opéra Comique in 1875, and shortly afterwards in Vienna, Brussels, Berlin, and London (1878), was a remarkable success. It had much influence on the development of the lyric opera. See *Lives*, in French, by Pigot (1886) and Bellaigne (1891).

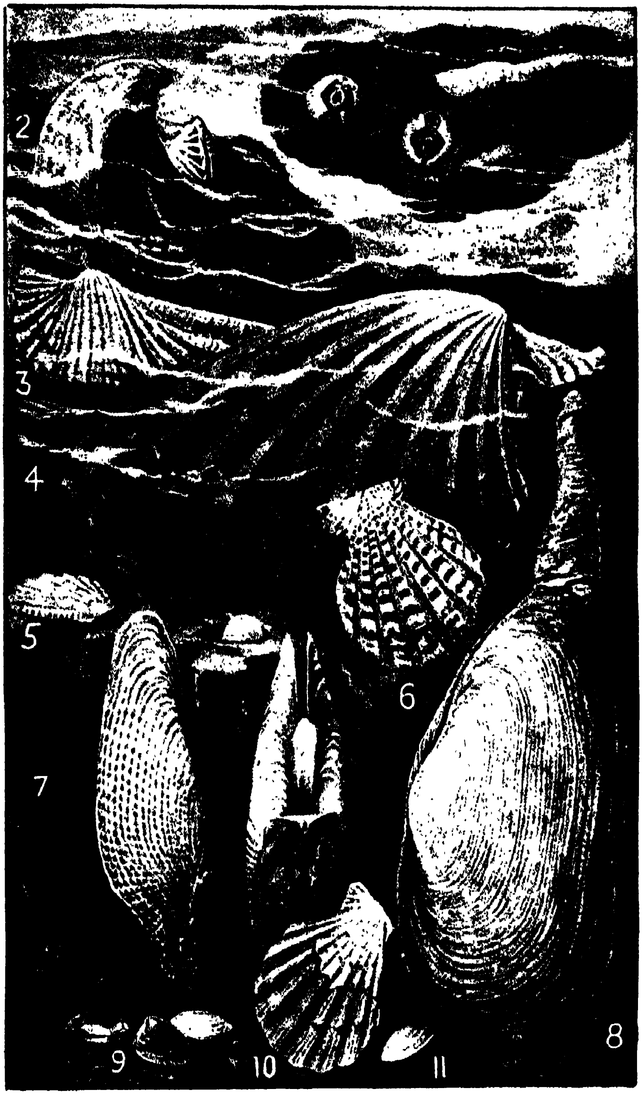
Bjerregaard, Carl Henry Andrew (1845), librarian of the Astor Library, New York, U.S.A., was born at Fredericia, Denmark. He was for two years professor of botany in Fredericia College, but left Denmark for political reasons in 1873, and received his present post in 1879. Among his works are *Mysticism and Nature Worship* (2 vols.), and *Being, and the Philosophical History of the Subject.*

Bjerregaard, Henrik Anker (1792-1842), Norwegian author, studied law, and rose to be one of the chief justices of Norway; author of the Norwegian national anthem, *Sönner af Norge.* His little operetta *Fjældeeventyret* (1825) was the best Norwegian play before the appearance of Björnson and Ibsen. See his *Blandede Digtninger* (1829-30) and *Digtninger* (1848).

Björn of Scardsa, otherwise known as Björn Jonsson (1575-1656), Icelandic historian. His *Annals* are marked by poetic insight and beauty of style. See Vigfusson and Powell's *Corpus Poeticum Boreale* (1883).

Björneborg, seapt., Finland, N.W. Russia, province of Abo-Björneborg, in the Gulf of Bothnia, 100 m. N. of Abo. Imports about £180,000 per annum; exports—wood, beer, oats, iron—at nearly £500,000. The fisheries of Björneborg are important. Pop. (1897) 13,417.

Björnson, Björnstjerne (1832), Norwegian poet, dramatist, and novelist, was born in Osterdalen, and educated at Molde and the University of Christiania. From 1857-9 he was director of the theatre at Bergen. His earliest and best works were his peasant stories *Arne* (1858), *Synnöve Solbakken* (1857), *En Glad Gut* (1860), whose vigour and originality at once established his reputation. His earlier dramas, too (*e.g.* *Halte-Hulda* in 1859, *Mellem Slagene* in 1855), are full of force and beauty, and both tales and plays are distinguished by a terse style in which there is not a word too much. From 1860-2 Björnson lived principally at Copenhagen and Rome. In Italy he composed the drama *Kong Sverre* (1861) and the famous trilogy *Sigurd Slembe* (1862), two of the noblest productions of Norwegian literature. On his return to Norway in 1863 the Parliament granted him an annual pension in recognition of his literary merit; from 1861-7 he was director of the National Theatre at Christiania, and from 1866-71 editor of the *Norsk Folkeblad*, in which capacity he took an active part in politics on the Radical side, being a very eloquent public speaker. He was always a strenuous and somewhat violent partisan, and his anti-Swedish diatribes have done much to accentuate the differences between the Swedes and the Norwegians. For a time (1882-8) he resided at Paris. Of his later works the best are the dramas *Maria Stuart* (1864) and *Sigurd Jorsalfar* (1872), the tales *Fiskerjenten* (1868) and *Brude-Slaatten* (1872), and the poetical romance *Arnljot Gelline* (1870). He has latterly written, though not with altogether complete success, the analytico-psychological romance (*e.g.* *Det Flager i Byen og paa Havnen*, 1884; *Pa Guds Veje*, 1889), using social and religious questions as media for his advanced opinions; and in the same spirit, with more or less success, plays such as *En Fallit* (1874), *Redaktören* (1874), *En Handske* (1883), *Geografi og Kjaerlighed* (1885), *Det ny System* (1879), *Over Ævne* (i. 1883; ii. 1895). But in the little tales



Bivalves.

1. Teredo navalis, in floating wood. 2. Arca zebra. 3. Arca navicularis. 4. Pecten magnificus. 5 and 10. Pecten Crouchi. 6. Pecten sanguinolentus. 7. Pholas dactylus, in rock. 8. Mya arenaria, in mud. 9 and 11. Nucula radiata.

Mors Hænder and *Een Dag* (published in *Nye Fortællinger*, 1894) he once again shows his original power. See his novels, in English, ed. Gosse (1895); Brandes's *Björnson og Ibsen* (1882); and the *Life*, written in Norwegian, by Ch. Collin.

Björnstjerne Björnson, the Norwegian Novelist.

Björnstjerna, Magnus (1779–1847), Swedish statesman, born at Dresden. He fought (1813) in the battle of Leipzig against Napoleon, and countersigned the treaty (1814) uniting Norway and Sweden. He was ambassador to Great Britain (1828-46). He is author of *The British in E. India* (1839), *Hindu Theogony* (1843), both in Swedish, and *Anteckningar*—*i.e.* Notes (1851-2).

Black, Adam (1784-1874), Scottish politician and publisher was born in Edinburgh, where he established the publishing house of A. and C. Black. His firm acquired (1827) the copyrights of the *Encyclopædia Britannica* and Scott's Waverley Novels. He was an uncompromising advocate of polit Twice elected lord provost of Edinburgh (1843-8). He represented that city in Parliament from 1856 to 1865. See Nicolson's *Memoirs of Adam Black* (1885); B. W. Crombie's *Modern Athenians*, ed. Scott Douglas (1882).

Black, John (1783-1855), Scottish journalist, was born near Duns. In 1810 he went to London, walking all the way, and obtained a situation on the staff of the *Morning Chronicle*. He became a parliamentary reporter, and eventually edited the *Chronicle* from 1817 to 1843. He made several good translations from German, French, and Italian works, and wrote, in 1810, a *Life of Tasso*. Charles Dickens was one of his reporters, and he was on intimate terms with James Mill, Palmerston, and Brougham.

Black, Joseph (1728-99), chemist, of Scottish extraction, was born at Bordeaux. He became professor of chemistry at Glasgow (1756), and at Edinburgh (1766). His graduation thesis, on *Magnesia Alba* (1754), published in an extended form in 1756, announced his discovery of the distinction between 'fixed' and common air, and laid the foundation of quantitative analysis. He was the first to propound the theory of 'specific heat,' but he is better known as the discoverer of 'latent heat' in 1761. See Robison's Preface to Black's *Lectures on Chemistry* (1803); Grant's *Univ. of Edinburgh*, vol. ii., p. 395.

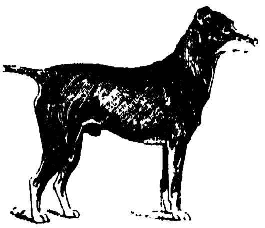
Black, William (1841-98), novelist, was born in Glasgow, where he studied art. In 1864 he removed to London, where he joined the staff of the *Morning Star*. He represented that paper during the Prusso-Austrian war of 1866; was for some time literary editor of the *Examiner*, and editor of the *London Review*; and finally became assistant editor of the *Daily News*. He abandoned journalism entirely in 1874. His first novel, *Love or Marriage*, was published in 1866, and was followed by *In Silk Attire* (1869) and *Kilmeny* (1870). *A Daughter of Heth* (1871; several editions), perhaps the best of his many stories, established his reputation. The most important of his works are *The Strange Adventures of a Phaeton* (1872), *A Princess of Thule* (1873), *Madcap Violet* (1876), *Macleod of Dare* (1878), *White Heather* (1885), *In Far Lochaber* (1888), *Briseis* (1896), and *Wild Eelin* (1898). A monograph on *Goldsmith* appeared (1887) in the 'English Men of Letters Series.' As a novelist his strength lay in descriptions of Highland scenery, fishing, and yachting. A lighthouse to his memory was erected at Duart Point on the Sound of Mull in May 1901. See Wemyss Reid's *Life* (1902).

Black Act, an act passed in 1722, punishing, as felons, marauders who (*e.g.* in Epping Forest) with blackened faces went about robbing and blackmailing. It was repealed in 1827. The name Black Acts is also applied to acts of the Scottish Parliament (1424-1594) printed in black letter,

Blackadder, JOHN (1615-86), Scottish divine, became minister of Troqueer in Galloway (1652). Deposed on the introduction of episcopacy (1662), and outlawed for preaching to conventicles (1674), he fled to Rotterdam (1678); but, returning, was arrested (1681) and sent to the Bass Rock, where he died. See A. Crichton's *Memoirs*, (2nd ed. 1826).

Black Agnes, daughter of Thomas Randolph, Earl of Murray, and Countess of March, who defended Dunbar Castle for nineteen weeks against the English under the Earl of Salisbury in 1339. So called because of her complexion.

Black - and - Tan Terrier, sometimes known as the Manchester terrier, is bred in two varieties—the ordinary, which weighs up to twenty pounds; and the toy, which must be under seven pounds. Formerly its ears were always cropped. Points: head long and narrow, flat from the base to the nose, with no bumps at the sides or cheeks; muzzle long and tapering, but not weak; eyes small and black; correct carriage of ears debatable, but drop-ear favoured; neck light and graceful; shoulders sloping; chest rather narrow, yet deep, and the body slightly arched, with good back ribs; fore legs quite straight, with well-arched toes and jet-black nails; hind quarters rather powerful, with hocks well let down; tail very fine, and carried straight; coat short and close; colour black, with rich tan markings along the jaws, breast, on the insides of the hind legs, under the vent, and on the fore legs up to above the pastern joint. The toes, however, have black lines, called pencilling, running up them, and there is a black spot, the 'thumb mark,' just along the pastern joint, in front of the limb. Points for the toy variety precisely the same. Round skulls and apple heads are a great defect. The toy black and tan terrier is very difficult to rear.



Black-and-Tan Terrier.

Black and White, the first illustrated weekly to challenge the monopoly long enjoyed by the *Illustrated London News* and the *Graphic*. It was founded in 1891 by Mr. Charles Norris Williamson. Between 1895 and 1897 it was edited by Mr. J. Nicol Dunn, the former editor of the *Morning Post*, and latterly it has been conducted by Dr. M'Kew. It began as an artistic paper, but afterwards practically led the way in the reproduction of photographs of events of the day. Among the artists who have drawn for *Black and White* are Herkomer, Max Cowper, Linley Sambourne, and G. F. Watts; while among its literary contributors have been Algernon Charles Swinburne, Bret Harte, Rudyard Kipling, Robert Louis Stevenson (who wrote letters from Samoa), and Barry Pain.

Black Art. See MAGIC.

Black-Ash. See SODIUM CARBONATE.

Black Assizes, a pestilence which appeared at the conclusion of the assizes at Oxford, July 6, 1577. Between that date and the 12th August following, 300 people, including the high sheriff and other officials, died.

Blackband, a name given by Scottish miners to an ironstone of intensely dark colour, mined in thin seams in certain coal fields, and formerly much used as a source of iron. The black colour is due to a mixture of coal; and as less fuel was therefore consumed in calcining the mineral, the ore was highly valued. It is now nearly exhausted.

Blackberry. See BRAMBLE.

Blackbird (*Turdus merula*), a common British song-bird, of which the male only is black. The female is of a brown colour, paler beneath, and lacks the bright orange beak of the adult male. Though subsisting largely on worms, the blackbird consumes large quantities of fruit during the summer months. The birds are very prolific, as many as four broods in a season being sometimes produced. They are passerine birds, belonging to the same genus as the thrushes, and occur in Britain both as migrants and as residents. A more or less uniform black tint is not uncommon among birds, and the name blackbird is therefore applied to various other birds—*e.g.* to members of the family Icteridæ in N. America, where *Turdus merula* is absent.

Blackbirds, FIELD OF, or KOSSOVO POLJE, a small plain in Turkey in Europe, now the vilayet of Kossovo, stretching S. from Pristina; was the scene of two great battles—(1) in 1389, when Sultan Murad I. defeated the Servians and overthrew their ancient empire, Lazar, their emperor, perishing in the battle; (2) in 1448, in which John Hunyady of Hungary was defeated and captured by Sultan Murad II. and George Brancovics, prince of Servia.

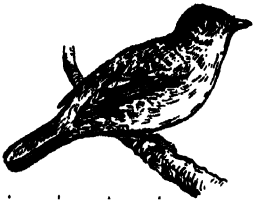
Black Bulb Thermometer (also called *in vacuo* or radiation thermometer) is a sensitive maximum registering thermometer, having the bulb and a portion of the stem covered with lampblack, the whole being enclosed in a glass tube from which all moisture and air have been removed. The instrument is fixed horizontally four feet above the ground, at a distance from walls or trees which may obstruct the full rays of the sun. The difference between the maximum temperature which it registers in the sun and the corresponding maximum in shade gives a rough measure of the amount of solar radiation.

Blackburn (ac. 48,281), par., munic. and co. bor., Lancashire, England, on L. & Y.R. and L. & N.W.R., 9 m. E. of Preston and 21 m. N.W. of Manchester, and on Leeds and Liverpool Canal. From 1650 it was famous for Blackburn 'checks,' and afterwards, till 1764, for Blackburn 'grays.' After that year it began to take a foremost place in cotton-weaving, and is now the centre of the Lancashire cotton spinning and weaving industries, with 140 mills and over 55,000 looms. Here, in 1764, Hargreaves invented his 'spinning jenny.' The grammar school was founded by Queen Elizabeth in 1567. The Corporation Park and the Queen's Park are well laid out and extensive. At the sewage works precipitation is accomplished by means of ferozone, and the sediment is made into manurial cakes. Besides cotton mills there are engineering works, breweries, etc. Blackburn returns two members to the House of Commons. Pop. (1831) 36,629; (1871) 76,337; (1891) 120,064; (1901) 127,527.

Blackburn, COLIN, BARON (1813-96), judge, was born in Selkirkshire, Scotland; called to the bar in 1838, and in 1859 promoted to a puisne judgeship in the Court of Queen's Bench. He was knighted in 1860, and made a lord of appeal and a life peer in 1876. He is recognized as an authority on common law, and is the author of *Contract of Sales* (1845).

Blackburne, FRANCIS (1782-1867), lord chancellor of Ireland, was born in Co. Meath. Called to the English bar in 1805, he was appointed in 1830 attorney-general for Ireland. He became Master of the Rolls in 1842, chief-justice of the Queen's Bench in 1846, and helped to prepare a code of general orders for the Court of Chancery. He was lord chancellor in 1852, and a commissioner of national education. In 1856 he was appointed lord justice of appeal, and again acted as lord chancellor for a brief term in 1866. See *Life* by Ed. Blackburne (1874).

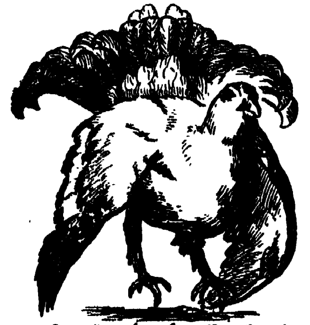
Blackburne, Lancelot (1658-1743), Archbishop of York, was created bishop of Exeter (1717), and Archbishop of York (17[illegible] the latter, according to pop[illegible] report, for having married George I. to his mistress, the Duchess of Munster. See Walpole's *Last Ten Years of George II.* (1846); Walpole's *Letters* (1891).



Blackcap.

Blackcap (*Sylvia atricapilla*), a small British song-bird, and one of the sweetest and cleverest of feathered songsters, the male of which has a black head. The blackcap is closely allied to the thrushes, and is usually placed in the family Turdidæ. It is a migrant.

Blackcock, also Heathcock, a name strictly applicable to the male only of the true or black grouse (*Tetrao tetrix*), the female being called grayhen, but the term is now frequently applied to both sexes. The black grouse ranges through N. Europe and Asia, is common in Scotland and the wilder parts of England, but absent from Ireland. The male is remarkable for the lyrate tail and peculiar courting display, which is carried on in the early morning, and is accompanied by a drumming noise. The diet is varied, but is chiefly vegetable.



Blackcock, 'drumming.'

Black Country. See Staffordshire.

Black Death. See Plague.

Black Earth, soil of the nature of loess; is fine-grained, charged with black humus, rich in phosphoric acid, ammonia, and potash; having a considerable organic ingredient (up to 16 per cent.); reaching a thickness over 18 ft. It is extremely fertile, yielding the richest crops without manuring. It lies spread over wide areas in the regions of the Dnieper, Don, Volga, and Vistula. Similar kinds of soil are known also in Siberia and in Texas.

Blackfeet, two N. American tribes, often confused in popular writings. (I.) The Blackfeet of Cooper's novels, whose tribal name is Siksika, but who are also known as 'Blood' and 'Piegan' Indians. They are a branch of the Algonquin family, who formerly ranged over the plains and lower slopes of the Rocky Mts., about the Anglo-American frontiers. They were fierce nomads, always at war both with the other western Algonquins and with the Dakotans; but all are now reduced, and since about 1890 confined to various 'Blackfoot Reserves' in Montana (pop. 1,810), and in Alberta, Canada, with the Sarcees and Assiniboines (pop. 4,930). Total pop. (1900) about 7,000. (2.) The Siouan Blackfeet, whose tribal name is Sihasapa, are a branch of the Tetons, and are now mostly in Cheyenne Reservation, S. Dakota, the rest in Standing Rock Reservation, N. Dakota. Total pop. (1900) about 1,500 full-blood; 1,200 mixed Blackfeet and Minneonjons. See E. Petitot's *Vocabulaire Pieganiw* (1885), and Grinnell's *Blackfoot Lodge Tales* (1892).

Black Flux, used in assaying as a reducing agent, is obtained by burning together a mixture of one part of potassium carbonate with three parts of argol.

Black Forest (Ger. *Schwarzwald*), a mountainous wooded region in S.W. Germany; stretches through the grand-duchy of Baden for a distance of 100 m., with a breadth of 20 to 40 m., along the r. bk. of the Rhine, parallel to the similar range of the Vosges on the l. bk. It is a region of lovely valleys winding among wooded heights (highest alt. 4,900 ft., in the Feldberg), and is inhabited by an industrious race of woodcutters and lumbermen, and makers of wooden clocks, barrel organs, musical boxes, and straw hats. The Black Forest is one of the favourite summer resorts of the Germans, and is also of great strategic importance as a barrier to the direct passage of troops east or west between S. Germany and Alsace and France, the principal bulwark being the intrenchments (1704) of Kniebis (3,180 ft.). In 1796, however, Moreau twice forced his way through its network of narrow valleys. In German legend and literature, too, the Black Forest plays no inconsiderable part. It is the home of many quaint legends. Auerbach made it the scene of his peasant stories (*Schwarzwälder Dorfgeschichten*, 1843-53), and its scenery and life form the substance of J. P. Hebel's dialect poems, *Alemannische Gedichte* (1803).

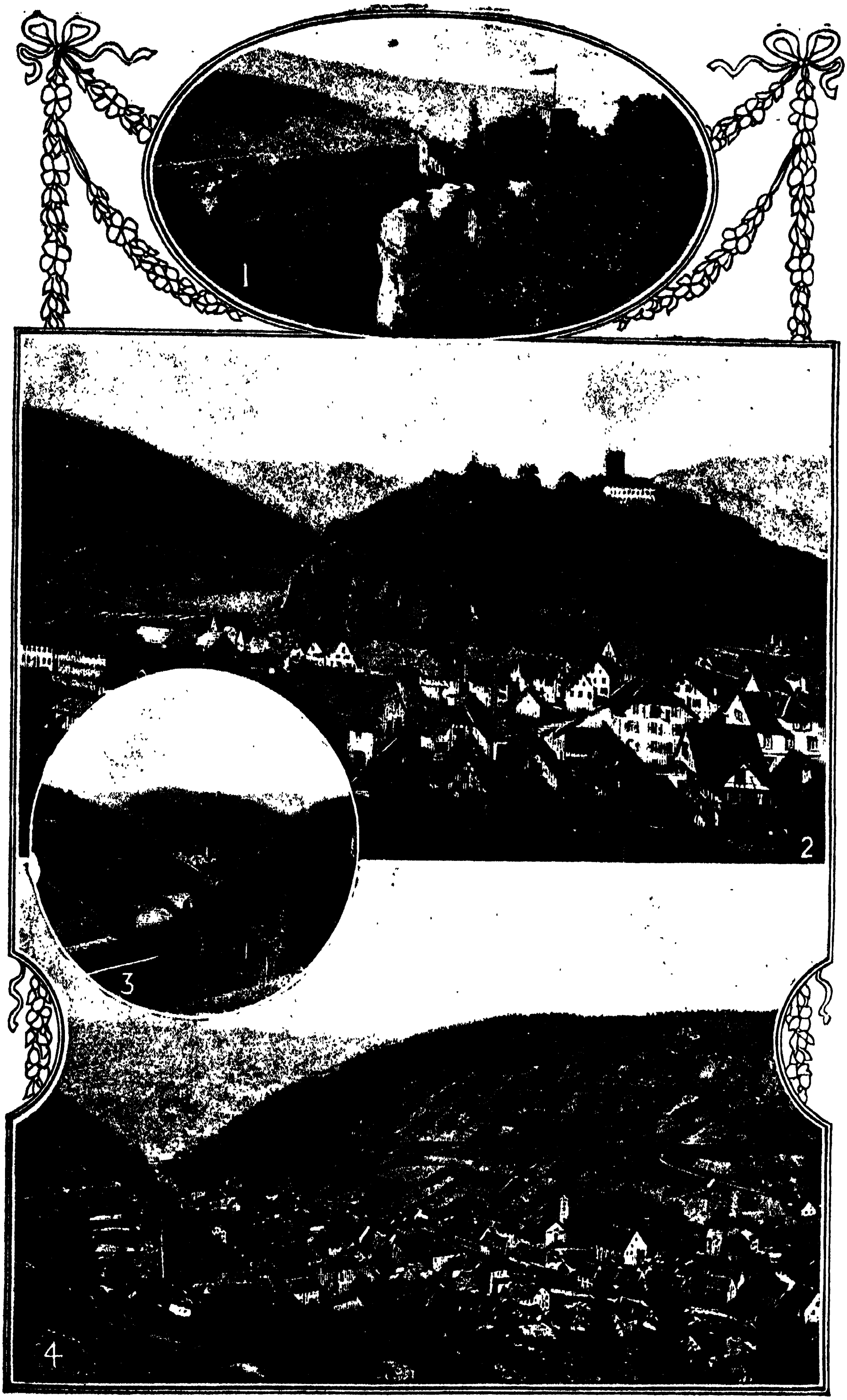
Blackfriars Bridge, London, was built from the designs of J. Cubit, the foundation-stone being laid (1865) and the bridge opened (1869) by Queen Victoria. The old Dominican or Blackfriars monastery, dating from 1276, which gave name to the bridge, stood near its north end.

Blackheath, an elevated common in Kent, England, 5 m. S.E. of London, and near Greenwich Park; 70 acres. On it stands Morden College, founded in 1695 for decayed merchants who had been engaged in the Levant trade. The Danes encamped on it in 1012, and here Wat Tyler (1381) and Jack Cade (1450) assembled their followers. In the end of the 18th century the common was much frequented by highwaymen. Golf was first played on the common about 1608.

Black Hills, group of mountains mainly in the W. part of S. Dakota, U.S.A. It is an elliptical uplift, about 6,000 sq. m. in area, from the summit of which the more recent stratified beds have been eroded away, in the W. part down to the underlying Carboniferous rocks, in the E. part to the underlying granites. The remains of those younger beds surround the mountain group quite continuously in the form of ranges of hog-backs. The highest summit, Harney Peak, has an altitude of 7,216 ft.; average elevation, 2,500 to 3,000 ft. The region is one of the richest gold-producing districts in the United States, and contains also numerous other metals. The group obtains its name from the black pine forests, with which it is extensively covered.

Black Hole. See Calcutta.

Blackie, John Stuart (1809-95), Scottish author and professor, was called (1834) to the Scottish bar, but soon devoted himself to literature, executing a translation, in verse, of Goethe's *Faust* (1834). From 1841-52 he held the chair of humanity in Marischal College, Aberdeen, and from 1852-82 that of Greek in Edinburgh University. He was an ardent student of many subjects—political, scholastic, philological, and moral; and his striking figure was almost as familiar in London as in Edinburgh. All Scottish questions interested him deeply, and he succeeded (1874-6) in raising £12,000 for the foundation of a Celtic chair at Edinburgh. Blackie was a voluminous writer. His chief works were a metrical translation of *Æschylus* (1850);



Scenes in the Black Forest.

1. Altes Schloss, Baden-Baden. 2. Hornberg. 3. Nussbach. 4. Triberg.

Songs and Legends of Ancient Greece (1857); *Discourse on Beauty* (1858); *Homer and the Iliad*, in 4 vols. (1866); *Horæ Hellenicæ* (1874); *The Natural History of Atheism* (1878); *Self-Culture—Intellectual, Physical, and Moral* (1877); *War Songs of the Germans*, a translation (1870); *Lays of Highlands and Islands* (1872); *The Language and Literature of the Highlands of Scotland* (1876); *The Wisdom of Goethe* (1883); *Life of Robert Burns*, in the 'Great Writers Series' (1888); *Scottish Song* (1889); *Essays on Subjects of Moral and Social Interest* (1890); *Christianity and the Ideal of Humanity* (1893); and some volumes of verse (1860, 1876, etc.). See *Life* by Anna M. Stoddart (2 vols. 1895).

Blacking. The use of blacking and other polishes for leather dates back to the times of the ancients, but the compound now known to us as such was introduced from Paris in the reign of Charles II. The manufacture is now of considerable extent, the chief seat of the industry being London.

Black Isle, peninsula separating Cromarty Firth from Beauly and Moray Firths, Ross-shire, Scotland. A branch of the Highland Ry. traverses it in a N.E. direction from Muir of Ord to Fortrose.

Black Lead, Plumbago, or preferably Graphite, an allotropic form of carbon, found in mica-schist, gneiss, granite, meteoric iron, argillite, etc., in beds, sheets, detached masses, and crystals, in Siberia, Ceylon (chief source of black lead in commerce and the arts), New Brunswick, Canada, New Zealand, and Germany. At Borrowdale (Cumberland) fresh discoveries were made in 1875. It is a stove and grate polish, and a lubricant in machinery, but black lead is most used in the manufacture of pencils and crucibles. The black lead of Alibert, Siberia, is the monopoly of Faber, the pencil-maker of Nuremberg. It is also used as an inner covering of electrotype moulds, and for conductors of electricity. It can be obtained artificially by crystallizing any form of carbon from its solution in molten iron, and is prepared commercially by heating coke in the electric furnace. Graphite is a soft, dark gray, opaque solid, of a greasy metallic lustre. It crystallizes in hexagonal plates, and is volatile only at the temperature of the electric arc. It is a fair conductor of heat and electricity, and, though it can be burnt to carbon dioxide, is less combustible than diamond. On oxidation with nitric acid and potassium chlorate it yields graphitic acid.

Black Letter, a name invented in the 17th century for the types imitated from the handwriting in use in England in the 15th century, as contrasted with those founded on the Roman or Italian hand revived by the Italian scholars of the renaissance. All Caxton's books are printed in black letter, and his immediate successors only used the Roman types for books in Latin. Except for large Bibles, for proclamations, and cheap broadsides, in which it lasted nearly a hundred years longer, black letter gradually died out during the 16th century, the last important book of secular literature printed in it being the 1602 edition of Chaucer. It is now chiefly used in headlines and in fancy printing, but was revived by William Morris in many of the books printed at the Kelmscott Press. It is now known to practical printers as Old English or Elizabethan. See Duff's *Early English Printing* (1896).

Black List, the name in Great Britain of printed lists—*e.g.* Stubbs—abstracted from public records, of English, Scottish, and Irish bankruptcies, insolvencies, liquidations, bills of sale, protested bills, assignments, trust deeds, judges' orders, decrees in absence, judgments for debt, compositions, dissolutions of partnership, warrants of attorney, and other information affecting the financial standing of firms and individuals, issued weekly, some bi-weekly, and circulated in private for guidance in mercantile transactions. The Scottish trade protection societies, from the middle of the 18th century, were among the first to supply such information. In the United States similar institutions (commercial agencies) are established in all commercial centres. By the Licensing Act of 1902, sec. 6, a list of convictions for habitual drunkenness is to be kept by the authorities of the police area in which the court is situated; and no person on that list can obtain, nor publican or club supply to him, any intoxicating liquor within three years after the date of conviction. This list is also familiarly termed 'the black list.'

Blacklock, Thomas (1721–91), Scottish poet, born at Annan; lost his sight by smallpox while still an infant. He is remembered chiefly for the fact that a letter of his induced Robert Burns to abandon his intended emigration to Jamaica. Four volumes of his poems were published—one in 1746; a second in 1754; a third in 1756, with Life by Joseph Spence, the friend of Pope; and a posthumous volume in 1793, with Life by Henry Mackenzie.

Blackmail. See Threats.

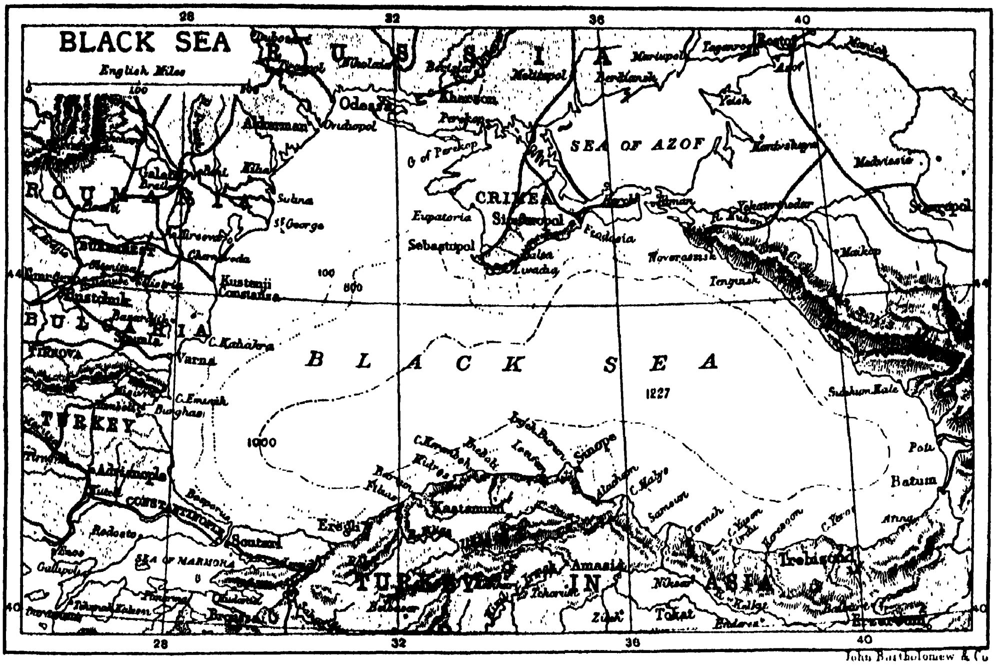
Blackmore, Sir Richard (d. 1729), English court physician and author, was born in Wiltshire. He became physician-in-ordinary to William III. and Queen Anne, and was knighted (1697). He was a voluminous writer of poetry and prose, of medical treatises and controversial divinity. *Prince Arthur*, a tedious compilation of verse, appeared in 1695. His *Satyr against Wit* (1700) provoked many enemies; and in 1705, a second epic, *Eliza*, was received with indifference. But his *Creation* (1712), a philosophical poem, was praised by Addison and Johnson. He also published *Modern Arians Unmasked* (1721), *National Theology* (1728), *Discourse on the Plague* (1720), and *Treatise on the Smallpox* (1723). See Johnson's *Lives of the Poets* (1779–81). He is not unjustly ridiculed by Pope in the *Dunciad*.

Blackmore, Richard Doddridge (1825–1900), English novelist. *Clara Vaughan*, his first novel, appeared in 1864, succeeded in 1865 by *Cradock Nowell*, a work distinguished by its beautiful studies of New Forest scenery. *Lorna Doone*, a romance of Exmoor, and the author's most popular work, appeared in 1869, and has since passed through many editions. The characters are cast in the true heroic mould, and the story is told in a masterly manner. The *Maid of Sker* (1872) is scarcely less vigorous. It was followed by *Alice Lorraine*, a tale of the South Downs (1875); *Cripps the Carrier*, a woodland tale (1876); *Erema*, a strong and weird story (1877); *Mary Anerley* (1880); *Christowell*, a tale of Dartmoor (1882); *Springhaven*, with glimpses of Nelson (1887); *Kit and Kitty* (1889); *Perlycross*, a story of the western hills (1894); *Fringella*, some tales in verse (1895); *Tales from the Telling House* (1896); and *Dariel*, a romance of Surrey (1897). Blackmore's novels are distinguished for their remarkable fidelity in the delineation of nature, and their intimate acquaintance with the people and customs of the west and south of England. For many years he carried on the business of market gardening.

Black Mountains, a short range of mountains in N. Carolina, U.S.A., a part of the Appalachian system. The highest peak, Mount Mitchell, has an altitude of 6,711 ft.

Blackness, seapt. vil. in par. of Carriden, Linlithgowshire, Scotland, on S. shore of Forth, 3½ m. E. of Bo'ness and 5¼ m. N. of Linlithgow, of which it was formerly the port. The castle was a state prison in Covenanting times.

Blackpool (ac. 2,952), wat.-pl. and munic. bor. (incorporated in 1876, extended in area in 1879) in Lancashire, England, between the mouth of the Ribble and Morecambe Bay, 8 m. s.w. of Fleetwood, on L. & N.W.R. Its excellent bathing facilities and beautiful promenade, with electric tramway, have given it the name of the 'Brighton of the North.' There are three piers—the North, the Central, and the New Victoria. The town possesses winter gardens, theatres, an aquarium, and a steel Eiffel tower 500 ft. high, built in 1893–6. Blackpool attracts large numbers of visitors—sometimes as many as 100,000 daily during the holiday weeks of the surrounding districts in Lancashire and Yorkshire. Pop. (1901) 47,346.



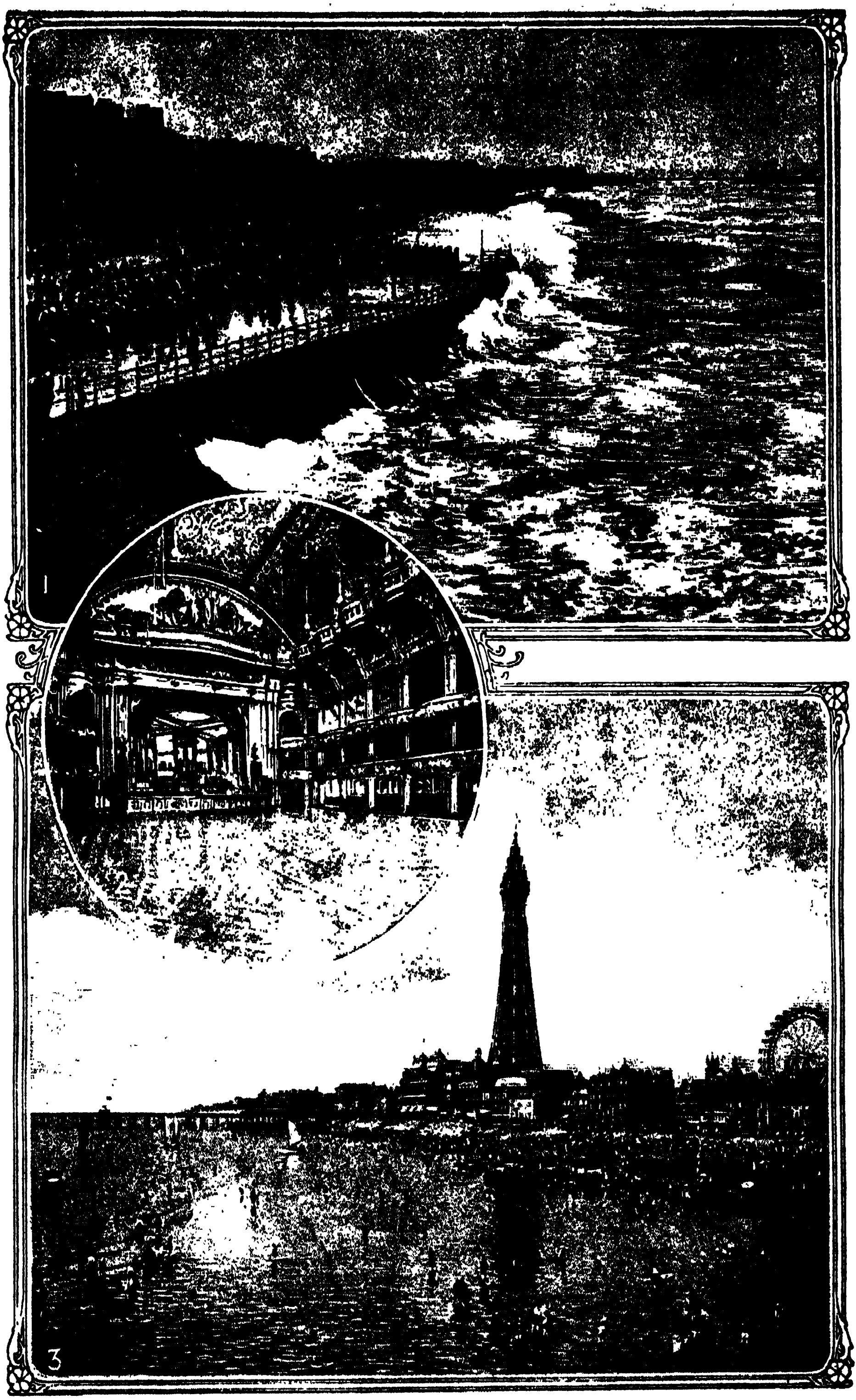
John Bartholomew & Co

Black Prince, Edward, the (1330–76), eldest son of Edward III. of England; created Duke of Cornwall (1337) and Prince of Wales (1343); commanded the van at Crécy (1346); said to be so called the Black Prince from the colour of the armour he wore at this battle; defeated and took captive John, king of France, at Poitiers, and brought him to London; created Prince of Aquitaine and Gascony (1362); defeated Henry of Trastamare at Najara (1367); relinquished the principality of Aquitaine and Gascony (1372). He was buried in Canterbury Cathedral, where his helmet, shield, surcoat, gauntlets, and other relics, are preserved.

Black Prince, a British first-class cruiser (13,550 tons), built in 1903 by the Thames Ironworks and Shipbuilding Co. This ship-name was introduced into the navy about 1648. The first *Black Prince* left England with Prince Rupert, and was driven ashore by Blake's squadron in 1650.

Black Rod. The gentleman usher of the Black Rod is usher of the Order of the Garter. His symbol of office is a black rod surmounted by a gold lion. He is also an officer of the House of Lords. He, or his deputy, the yeoman usher, acts as messenger when the Lords desire the attendance of the Commons. He has the custody of persons committed for breaches of privilege or contempt, and assists at the introduction of peers and at other ceremonies. See May's *Parliamentary Legislation* (1881).

Black Sea (anc. *Pontus Euxinus*), an enclosed sea in the s.e. of Europe, having Russia on the n. and e., Asia Minor on the s., and Turkey, Bulgaria, and Roumania on the w. Its shores are high where they abut upon the Caucasus region, and upon the slopes of the Istranja Mts. in Turkey. It measures some 700 m. from e. to w., and 350 m. from n. to s., and its area is estimated at 139,300 sq. m. It is a steep-sided basin with a nearly flat bottom. Immediately e. and w. of the peninsula of the Crimea, which projects into it from the n., its waters are shallow for some distance from the shores, owing to the large deposits of sedimentary matter there laid down by the rivers—the Kuban and the Don pouring into it through the Sea of Azov, and the Dnieper, Bug, Dniester, and Danube entering on the n.w. In other parts of the sea the 100-fathom line runs close to the shores, and parallel with them. Between the 100-fathom line and the 800-fathom line the slope is in general very steep, and from the 800-fathom line the depth increases very gently down to the maximum of 1,227 fathoms in the centre of the basin. During the summer there is a thin stratum of relatively warm surface water (55·4° f. in May to 78·8° in August) resting upon an almost equally thin layer of colder water (mean temp. 47·7°), below which, again, there is the bulk of the sea with an almost uniform temperature throughout of 48·2°. The Black Sea is not only subject to annual fluctuations of level, ranging from 3½ to 6½ in. above the mean level of the year in May and June down to 2½ to 4 in. below that level in October and in February, but it also seems to fluctuate over unequal periods, in close dependence upon the volumes of rainfall which come down over its drainage basins. The restriction of the circulation to the thin upper strata is, on the whole, inimical to marine life, and is conducive to the formation in the deep parts of the sea of vast quantities of



Blackpool, the 'Brighton of the North.'

1. The Promenade, looking south from the Central Pier. 2. The Tower Ball-room. 3. The Promenade, looking north from the Central Pier.

(Photos by Dearden, Blackpool.)

sulphuretted hydrogen, as well as of chemical precipitations on its floor. The only forms of life which thrive in these waters belong to very lowly species. The Black Sea is practically destitute of islands, and seldom freezes, even along the shores. A scheme has been proposed (1904) for uniting the Black Sea and the Baltic by establishing canal connection between the Dnieper and W. Dwina, by means of the rivers Lutscheza and Orschiza and a canal 12 m. long. The treaty of Paris (1856) provided for the neutralization of the Black Sea by excluding from it ships of war of every flag, and Russia and Turkey agreed to abstain from establishing maritime arsenals on its coasts. The latter provision was abrogated in 1871, and it was then declared that while the established principle of closing the straits (recognized by treaty in 1841) is maintained, power should be given to the Sultan to admit, in time of peace, the warships of friendly or allied powers if the Porte should consider such a course necessary, in order to secure the stipulations of the treaty. In the 18th protocol of the treaty of Berlin (1878) Lord Salisbury made a declaration which apparently reserved liberty to British ships of war to enter the straits with the consent of the Sultan. See Sir John Murray, 'On the Deposits of the Black Sea,' in *Scot. Geog. Mag.*, 1900, pp. 673-702; and consult also *Geog. Jour.*, 1893, pp. 49-51, and *Petermann's Mitteilungen*, 1891, pp. 33-37.

Black Sea Government, or CHERNOMORSKAYA, a narrow strip of country in Transcaucasia lying along the north-east coast of the Black Sea. The country is mountainous. The temperature is high and the rainfall heavy. Novorossisk is the one great port. Area, 2,837 sq. m. Pop. 54,228, chiefly Russians.

Blackstone, SIR WILLIAM (1723-80), writer on English law, the son of a London citizen, was educated at Charterhouse and Pembroke College, Oxford, obtaining a fellowship at All Souls College, Oxford (1744). Although called to the bar in 1746, he was not very successful in practice. His first appearance as an author was in a tract on the law of consanguinity (1750), occasioned by a dispute as to the limits of the claims of founder's kin at All Souls. In 1759 he published an edition of the Great Charter, with a valuable introduction. With great courage he began to deliver voluntary lectures on English law at All Souls, and his enterprise was rewarded with the newly-founded Vinerian professorship in 1758. The publication of his famous *Commentaries*, based upon his Oxford lectures, followed in the year 1765-70. They had an immediate and overwhelming success. Their great merit is the admirable way in which the author handles an immense mass of materials, and unloads it gently upon the reader, in such quantities as the average man can bear. After having acquired reputation as a lecturer, Blackstone returned to practice, and soon gained a lucrative position. He refused the chief-justiceship of the Irish Common Pleas in 1761, being made principal of New Inn Hall in that year. In 1763 he became solicitor-general to the queen; he was already a member of Parliament, but did not distinguish himself in that capacity. In 1770 he was made a justice of the Common Pleas in England; and though he was removed to the King's Bench almost at once, he returned after a short time. He was an indifferent judge, hesitating and formal. Blackstone's only works of permanent value are the *Commentaries of the Laws of England*, the last verbatim edition of which appeared in 1844, but which has been 'adapted' by various editors, and is still used by candidates preparing for the solicitors' examinations; and *Reports*, prefixed to which is a Life by J. Clitherow (1813).

Blackthorn, or SLOE (Lat. *Prunus spinosa*), belongs to the plum division of the rose order. In March and April it produces miniature white, hawthorn-like sprays of flowers in profusion before the leaves expand; its branches form hard thorns; its bark is black, hence the name; and in September or October its fruits or sloes ripen: they are elliptical, black, with a plumlike bloom on the skin, and sour.

Black Thursday, the name given in Victoria, Australia, to a terrible bush-fire which occurred on Thursday, Feb. 6, 1851.

Black Vomit. See YELLOW FEVER.

Blackwall, dist. of London, par. of Poplar, containing the E. India Docks and large shipbuilding yards. Blackwall Tunnel affords communication between Blackwall and E. Greenwich. It is 6,200 ft. in length, 1,220 ft. being beneath the river; the external diameter is 27 ft.; the roadway 16 ft. wide, with sidewalks of 3 to 5 ft.; the headway at the centre of the roadway is 17 ft. 6 in. The contract price for construction was £871,000. Begun March 1892, the tunnel was completed and formally opened by the King (then Prince of Wales) on May 22, 1897.

Black Water. See SHEEP.

Blackwater, the name of fifteen rivers and streams in the United Kingdom, the most important of which are:—(**1.**) River in Munster, Ireland; rises on borders of Cork and Kerry, and after a course of 100 m. falls into Youghal harbour. It is navigable to Cappoquin, 16 m. from the mouth. Next to the Shannon it is the largest river in Ireland. (**2.**) River in Ulster, Ireland; after a course of about 50 m. falls into Lough Neagh. (**3.**) River in Essex, England; rises near Saffron Walden, and enters the North Sea after a course of about 40 m.

Blackwater Fever is a disease of a malarial type, which has been described under many different names, generally suggested by prominent signs or symptoms—*e.g.* hæmoglobinuria, hæmatinuria, bilious hæmaturic fever, hæmorrhagic malarial fever, yellow remittent fever, bilious remittent fever, and melanuric fever.

It is an acute infectious fever, accompanied by rapid and great destruction of red blood corpuscles, starting very often, like most fevers, with general malaise, followed by a severe rigor and rise of temperature, which may soon reach as high as 105° or 106°. Great nausea is characteristic, with a vomit which passes from yellow to dark green. The urine is quickly red, passing to the darkness of porter. Meanwhile pain appears in the hypochondriac region and the loins; and on palpation the liver and spleen are found to be swollen and tender. The skin and the conjunctivæ rapidly assume a jaundiced yellow colour. Constipation is usual, but diarrhœa is not uncommon. Very often in a few hours there are profuse perspiration and a fall of temperature, with clearing of the urine, or free flow if it has been suppressed; but generally a few hours more will bring another rise of temperature, and an aggravation of all the symptoms. A paroxysm may occur every few hours for a few days, or one a day may be the rule, or there may be intervals of one or two days between the attacks. Within a week the patient may be rid of it; or his strength may fail, sometimes quickly, sometimes in five or six days, with fatal result. Relapses, even months after the first attack, are very common.

Blackwater fever is prevalent all through tropical Africa, in S. America, Madagascar, Sicily, Sardinia, the Greek Archipelago, and in India. Indeed, it may apparently be looked for wherever there are low marshy districts with a tropical climate. It so frequently follows on malaria that it has been considered essentially the same disease, but in suitable districts it seems likely to attack any whose health is below par from any cause whatever without any previous malarial attack. Some, again, have held it to follow on the excessive use of quinine, and to be, in fact, a quinine poisoning.

Treatment.—No quinine should be given. The patient should take to bed, have hot fomentations over the liver and spleen, copious hot alkaline drinks, and a free purge. No solid food should be taken during the attack, and no alcohol unless for extreme weakness. In E. Africa and in Dahomey it has lately been ascertained that the natives use decoctions of cassia with considerable success. See Sambon's article in the *Encyclopædia Medica;* Cantlie's and Gilman Thompson's in the *Medical Annual*, 1901.

Blackwell, Alexander (d. 1747), Scottish adventurer, was born in Aberdeen about 1704. Having failed (about 1734) as a printer in London, he became a practical agriculturist, and in 1741 published *A New Method of improving Cold, Wet, and Clayey Grounds.* Next year he appeared in Sweden as a physician, where he received a royal appointment; but he was obliged to return to farming. By the publication of *An Essay on the Improvement of Swedish Agriculture* he procured the directorship of a model farm at Allestad in 1745. Two years later he took part in an abortive plot to alter the succession to King Frederick, and was beheaded.

Blackwell, Elizabeth (fl. 1737), botanical delineator, wife of the above, and daughter of an Aberdeen merchant. About 1735 her husband was imprisoned for debt, and in two years she earned his release by her talent and devotion. She made drawings of 500 medicinal plants, engraved them on copper herself, and then coloured the prints. The work appeared in 1737, in 2 vols. folio, as *A Curious Herbal.* Her husband supplied the letterpress. The work was republished at Nuremberg (1757-73).

Blackwell, George (?1545-1613), archpriest of the Roman Catholic Church, born in Middlesex, and elected perpetual fellow of Trinity College, Oxford, in 1566; was appointed archpriest over the secular Catholic clergy in England by Cardinal Cajetan (1598), and held that office until 1608, when he was deprived for advising Catholics to take the new oath imposed on them by James I. in 1606. See T. Flana-n's *History of the Church in* [illegible] 7).

Blackwell, Thomas (1701-57), classical scholar, born in Aberdeen; was appointed professor of Greek at Marischal College in 1723, and principal in 1748. He published anonymously, in London, *An Enquiry into the Life and Writings of Homer* (1735), and *Letters concerning Mythology* (1748). His unfinished *Memoirs of the Court of Augustus* appeared in 3 vols. (1753-64).

Blackwood, Adam (1539-1613), Scottish writer, born at Dunfermline; studied at Paris, and as reward for his *De Vinculo* (1575), a justification of religious intolerance, was appointed judge of the parliament of Poictiers. He wrote an *Apologia pro Regibus* (1581) against George Buchanan, and, after Queen Mary's death, a *Martyre de la Royne d'Escosse* (1587), and religious works in Latin. See *Works*, ed., with Life, by Gabriel Naudé (1644); D. Irving's *Scottish Writers* (1839).

Blackwood, Vice-Admiral the Hon. Sir Henry, Bart. (1770-1832). As first lieutenant of the *Invincible*, he took part in Howe's battle of June 1, 1794; and he was made a commander in the same year. In Bridport's action of 1795 he commanded the *Megæra.* Being posted soon afterwards, he took part in an action against two French frigates of superior force in 1798. In 1800, when attached to the squadron which was blockading Malta, he distinguished himself in the *Penelope* in the attack upon the *Guillaume Tell*, which was captured. At the battle of Trafalgar he rendered important service in the *Euryalus*, and brought home the dispatches announcing that victory. In Sir J. Duckworth's fleet he commanded the *Ajax* in 1807, but his ship took fire and blew up a few days before the passage of the Dardanelles. In 1827 he was appointed commander-in-chief at the Nore.

Blackwood, John (1818-79), Scottish publisher, was born at Edinburgh, and assumed superintendence of the London branch of the business in 1840; became editor of *Blackwood's Magazine* (1845), and head of the publishing business after 1852. He recognized the first Lord Lytton's genius, and discovered George Eliot, all of whose novels save one were published by him.

Blackwood, William (1776-1834), founder of the celebrated Edinburgh publishing house, came of an old Scottish family which has been traced back to the 15th century. One of the family was lord provost of Edinburgh from 1711 to 1713, and, in spite of loss by the Darien speculation, was able to purchase the Fifeshire estate of Pitreavie. From a nephew or a grandnephew of this Blackwood the publisher was descended. He started as an Edinburgh bookseller in 1804. The first number of *Blackwood's Magazine* was issued in April 1817. William Blackwood undertook the editorship, and gathered round him a staff of distinguished contributors, including Scott, Lockhart, Hogg, Wilson (Christopher North), De Quincey, Galt, Maginn, Thomas Aird, and Dr. Moir (Delta). See Mrs. Oliphant's *Annals of a Publishing House* (1897-8).

Bladder. The bladder is the reservoir for the urine. It is a musculo-membranous sac, situated in the pelvis, behind the pubes and in front of the rectum, in the male; in the female, the uterus and vagina lie between it and that intestine. In infancy it is conical in shape; in the adult, when empty, it is a small triangular sac lying deeply in the pelvis, flattened from before backwards. When slightly distended, it is rounded in shape; when greatly distended, ovoid, and rises from the pelvis into the abdominal cavity. When moderately full it contains about a pint, but is capable of great distention, and has been known to hold twenty pints. It has three openings into it—those of the two ureters from the kidneys, and that of the urethra. The bladder is composed of four coats, which are, from without inwards, the serous peritoneum, the muscular, the submucous, and the mucous.

Diseases.—Inflammation or cystitis, usually a chronic affection, and in the majority of cases due to the introduction of micro-organisms from without. When the vitality of the mucous membrane of the bladder is lowered and micro-organisms are present, pus is formed, and there is suppurative cystitis. If the urine, though containing bacteria, is free from pus, the condition is catarrhal cystitis. If the irritant is a calculus or stone, or uric acid or oxalate of lime crystals, simple cystitis may occur. Examined with the cystoscope, the mucous membrane of the bladder then appears much congested. Any obstruction to the escape of urine predisposes to cystitis. The treatment of cystitis is to remove the cause and to give urinary antiseptics, such as boric acid, salol, benzoic acid, naphthalin, benzonaphthol, benzoates of soda and ammonia. Absolute rest, hot baths and fomentations, laxatives and bland fluids are all helpful in acute cases, and sometimes opiates are needed. Alcohol must be avoided. Washing out the bladder is an effectual method of treating chronic cystitis. Tubercular disease of the bladder is usually a secondary affection, due to extension of the same condition from the kidneys, prostate, or seminal vesicles. The treatment is mainly constitutional. Ulceration of the bladder may occur in the course of chronic cystitis. Calculus, or stone in the bladder, may occur at any age, and is treated surgically. The nuclei of most calculi form in the kidney and pass down into the bladder, where they increase in size by successive deposits from the urine. Climate and the nature of the drinking water influence their formation. Calculus is especially frequent in Norfolk in England, and in Egypt. In the bladder, calculi are generally from a half to one and a half inches in diameter, and are mainly phosphatic. They give rise to pain, sudden interruption in the flow of urine, hæmaturia, and frequent intense desire for micturition; they are removed by a crushing operation (lithotrity), or by a cutting operation (lithotomy). Rupture occurs from a blow when the bladder is full; immediate surgical operation gives the best chance of recovery. The bladder is frequently the seat of tumours, such as papilloma, sarcoma, and carcinoma or cancer, which may be removed by surgical operation, but are liable to return.

Bladder Nut. The *Staphyleas*, or bladder-nut trees, are hardy, deciduous shrubs, all of which do well in ordinary good soil in the open air of England. The best known is *S. colchica*, which is often forced into bloom in early spring. In the open air it blooms in June and July, its white flowers being borne in large terminal racemes. It commonly attains to a height of about four feet. Job's tears (*S. pinnata*) is a much tallergrowing species, and its early summer flowers are followed by white nuts with pistachio flavour. *S. trifolia* is another tall species (about ten feet), blooming in early summer. The two remaining species, *S. Bolanderi* and *S. Bumalda*, are both late summer bloomers—the former being a native of N. America, whilst the latter belongs to Japan. All the species are readily propagated by suckers or cuttings taken in August.

Bladder-plum, or POCKET-PLUM, is a malformation of the fruit of plum, caused by the attacks of a fungus (*Exoascus pruni*), which also occurs in other species of the same genus, such as bird cherry and blackthorn. See M. Ward's *Disease in Plants.*

Bladder Seed (*Physospermum cornubiense*) is an umbelliferous plant with bladder-like fruits. It occurs in the south of France and Spain, whence it has reached the woods of Tavistock and Bodmin in England.

Bladder Senna (*Colutea arborescens*) is a leguminous shrub with yellow flowers. It prefers a dry, sandy soil, is a native of S. Europe, and is sometimes grown in shrubberies in Britain. Its pods are inflated like those of the bladder nut, and its leaves have been used for mixing with true senna.

Bladder-worms, the larval stages of tapeworms; sometimes more dangerous parasites than the adults, owing to the great destruction of tissue which they can produce in such organs as brain, liver, etc. In the case of one of the tapeworms of man, *Tænia solium*, the eggs of the parasite leave the body of the host with the excreta, and are eaten by the omnivorous pig. Within the alimentary canal of the pig the embryos hatch from the shelled eggs, and bore their way into the muscles, where they become encysted and form bladder-worms. A bladder-worm consists of a head or scolex, and a distended bag of fluid, the so-called bladder. If imperfectly-cooked pork containing these bladder-worms is swallowed by man, the bladder-worms lose the bladder, and the head or scolex attaches itself to the wall of the alimentary canal, and grows into a tapeworm. Man may become infected with bladder-worms owing to imperfect cleanliness, and especially to close companionship with dogs whose health is not carefully looked after, for the dog is peculiarly liable to tapeworm. One of the most dangerous bladder-worms found in man is *T. echinococcus*, a common tapeworm in the dog. The bladder-worm of *T. cœnurus*, again, which is also found in the dog, is peculiarly fatal to sheep, producing the disease known as sturdy. Bladder-worms were known in man and the domestic animals before their relation to tapeworms was discovered, and they are therefore sometimes still designated by names which are different from the names applied to the adult forms: *e.g.* the bladder-worm of *T. cœnurus* is called *Cysticercus cerebralis*, and that of *T. solium* receives the name of *C. cellulosa.*

Bladderwort (*Utricularia*), a genus of water plants which are rootless and grow suspended in the water. Although widely distributed, there are only four British species, all found in the pools of marshy districts. The common bladderwort (*U. vulgaris*) has a stem the thickness of whipcord, and this is fringed with fine leaves which are repeatedly divided with linear segments. Some of the leaf divisions form intricate bladders, which have an aperture protected by bristles and fitted with a trap-door. Larval crustaceans and other water animals take shelter inside the bladders, but the trap-door prevents their return; they die, and the dissolved substances of their bodies provide the plant with food.

Bladderwort.
1. Bladder, enlarged.

Bladensburg, vil., Maryland, U.S.A., on E. branch of Potomac R., 5 m. N.E. of Washington. Here, on Aug. 24, 1814, the British defeated the Americans, and as a result captured the town of Washington. Pop. 463.

Blaeberry. See VACCINIUM.

Blaeu, or BLAEUW, JAN, Dutch cartographer, died 1673, author of *Magnum Theatrum Urbium Belgicæ* (1649), *Atlas Magnus* (1650-62), and *Theatrum Civitatum Italiæ* (1663). The *Atlas Magnus* includes 49 maps of Scotland prepared by Timothy Pont. Blaeu's father, WILLEM JANSZOON (1571-1638), pupil of Tycho Brahé, published a map of the heavens, and *Novus Atlas* (1634-62).

Blagden, SIR CHARLES (1748-1820), English physician, followed the army medical service until 1814. In 1784 he was elected secretary to the Royal Society. He was the author of many papers on freezing—*e.g. The Cooling of Water below its Freezing-Point*, read to the Royal Society, Jan. 31, 1788. See Weld's *Hist. of the Roy. Soc.* (1884).

Blagodat, mt. (1,260 ft.) on E. slope of Urals, Russia, N.E. of Perm; source of supply (some 50,000 tons annually) of magnetic iron ore worked at Kushvinsk and Goro-Blagodat iron works. Pop. of dist. 50,000.

Blagoveshchensk, the only town in the Amur prov., Asiatic Russia, situated on the Amur near the confluence of the Zeya, at a distance of 823 m. from Khabarovsk. It is the centre of a gold-mining district, and has a ship-building yard. Pop. (1897) 32,606.

Blaine, JAMES GILLESPIE (1830-93), American statesman, born at Brownsville, Pennsylvania, of Scoto-Irish parentage; was successively teacher, journalist, and newspaper editor. In 1858 he was elected to the state legislature as a Republican; then to Congress in 1862, where he served for seven successive terms, and was for three sessions Speaker of the House. He became secretary of state under President Garfield (1881), but resigned after the latter's assassination. He again accepted that office under President Harrison (1888), and finally retired in 1892. Three times he stood, unsuccessfully, as a candidate for the Republican nomination for the presidency. As a senator he strongly opposed the issue of 'greenbacks' during the civil war, the Bland Silver Bill of 1878, and the unrestricted immigration of Chinese, but was an advocate for the subsidizing of various industries. When secretary of state he took up a firm position regarding the seal fisheries disputes with Great Britain, and energetically worked for closer commercial relations with the South American states, and for reciprocity treaties with foreign nations. He wrote *Twenty Years of Congress* (2 vols. 1884-6) and *Political Discussions* (1887). See *Biography* by G. Hamilton (1895).

Blainville, HENRI MARIE DUCROTAY DE (1777-1850), French naturalist, professor of anatomy and zoology at Paris University (1812); succeeded (1832) to the chair at the Collège de France vacated by Cuvier. His works include *De l'Organisation des Animaux* (1822), *Physiologie Générale et Comparée* (1833), *Actinologie* (1834), and *Ostéographie* (1839).

Blair, HUGH (1718-1800), Scottish divine and author, born in Edinburgh, and became minister successively of Collessie, Fifeshire (1742); Canongate Church, Edinburgh (1743); Lady Yester's Church (1754) and the High Church (1758). In 1759 he began a course of lectures on rhetoric under the auspices of Edinburgh University, and these were so popular that a professorship was founded, to which he was appointed in 1760. His *Lectures on Rhetoric and Belles Lettres* were subsequently issued in 2 vols. (1783). He was much admired as a preacher, and his *Sermons*, published at various times from 1777 onwards, the first volume mainly by the influence of Dr. Johnson, procured him (1780) a pension of £200 from George III. He wrote, besides, *A Critical Dissertation on the Poems of Ossian* (1763). A Life by J. Finlayson is prefixed to the fifth volume of his *Sermons* (1801).

Blair, ROBERT (1699-1746), Scottish divine and poet, was born in Edinburgh, the eldest son of the Rev. Robert Blair. Was in 1731 presented to the living of Athelstaneford, E. Lothian, where he remained till his death. His well-known poem, *The Grave*, although of unequal merit, rises in places to a dignity almost Shakespearean. The best account of his life is given in Dr. William Anderson's edition of *The Grave*.

Blair, ROBERT (d. 1828), Scottish astronomer, was born at Merchiston, near Edinburgh, and was appointed to the chair of practical astronomy in Edinburgh University in 1785—a post which he held for forty-three years. He made valuable improvements in the astronomical telescope, and advocated successfully the use of lime-juice in the British navy as a prophylactic against 'scurvy.' In 1827 he published a small volume of *Scientific Aphorisms*.

Blair Atholl, or BLAIR ATHOLE, par. and tn. in N. Perthshire, Scotland, on the Garry, 3½ m. N.W. of Pass of Killiecrankie, on Highland Ry. Cattle fairs. Near it is Blair Castle, the seat of the Duke of Atholl. Pop. of par. (1901) 1,722.

Blairgowrie, par. and tn. on the r. bk. of Ericht, E. Perthshire, Scotland, 5 m. N.W. of Coupar-Angus; terminus of branch of C.R. Six annual fairs. Flax-spinning and jute mills. Connected with Rattray by bridge. Pop. of par. (1901) 4,464.

Blake, a British first-class cruiser launched in 1891, named after Robert Blake. Since 1808 there have been three ships of the name, which is associated with the bombardment of Flushing (1809).

Blake, ROBERT (1598-1657), English admiral, was born at Bridgwater, Somersetshire, and was engaged in commercial pursuits until the civil war. He sat for Bridgwater in the Short Parliament of 1640. Joining the Parliamentary forces, he became colonel, distinguished himself at the defence of Bristol (1643), held Lyme against the royalists (1643-44), and captured and defended Taunton (1644-5). In 1649, after unsuccessfully blockading Prince Rupert at Kinsale, Blake, in conjunction with two other officers, Deane and Popham, was appointed to command the fleet, and in the following year destroyed most of Prince Rupert's squadron at Malaga, in the south of Spain. In 1651 he captured the Scilly Isles and Jersey from the royalists. In 1652, being appointed to the chief command of the fleet against the Dutch, he, assisted by Rear-admiral Bourne, defeated Van Tromp in the Downs, and then De Witt and De Ruyter off the mouth of the Thames, but himself sustained a reverse at the hands of Van Tromp off Dungeness. In the following year, after fighting, along with Deane, Monck, and Penn, an indecisive action with Van Tromp off Portsmouth, Blake met the same antagonist once more off the Dutch coast, and finally routed him, Van Tromp being killed in the action. On his return to England he was summoned to Parliament by Cromwell, and after a period of peace was sent in 1655 with an expedition to teach a lesson to the pirates of Tripoli, Algiers, and Tunis. This he successfully accomplished. In 1656, when war broke out with Spain, Blake took charge of the blockading squadron off Cadiz; but hearing of the presence of a Spanish treasure fleet at Teneriffe, he sailed thither, and finding a naval force at Santa Cruz strongly protected by shore batteries, sank or burnt the former and silenced the latter. Blake then returned to his station off Cadiz; but failing health compelled his return to England, and he died on Aug. 17, 1657, on board his flagship the *George*, within sight of Plymouth Sound. He was buried in Westminster Abbey, but after the restoration his body was shamelessly dug up and flung into a hole in the churchyard of St. Margaret. Blake was supremely honest, brave, patriotic, and self-sacrificing, and ranks high among the very greatest of Englishmen. See Hepworth Dixon's *Robert Blake* (1852); a *Life* by Dr. Samuel Johnson (1777); D. Hannay's *Life of Blake* (1886); *The First Dutch War* (Navy Records Society, 1899-1900).

Blake, WILLIAM (1757-1827), English mystic, poet, painter, and engraver, was born at 28 Broad Street, Golden Square, London, the son of a hosier whose real patronymic is said to have been O'Neil. From the age of four to the end of his life Blake had times of exaltation, when he saw visions—a real or fancied prophetic power which affected all his future work. When he was ten he began to study art under a Mr. Par, in the Strand, and at fourteen he was apprenticed to the engraver Basire. In 1782 he married Catherine Boucher, a woman of humble rank, whom he taught to be the skilful assistant of his art labours. For some years (1784-7) he had a print-seller's shop; but engraving was the practical business of his life, although his soul was in poetry and creative art. In 1799 appeared his first original work as an artist—two engravings from his own water-colour drawings; and in 1783 his earliest poems were published. Thereafter he began the wonderful series of publications with which his name will ever be associated, and in which poetry and art united to give expression to his daring and unique genius. As painter and as poet Blake has been idolized and he has been reviled. His works, however, show him to be a true poet, a seer as well as a visionary, instinct with melody, and yet often as indifferent as his disciple Walt Whitman to the music of verse. As a draughtsman and a designer he was full of masterly power; nevertheless his Wiertz-like conceptions and barbaric colouring seem at times the inspirations of sheer frenzy. After a long life of toil and neglect, Blake died in London, where he had mostly lived. His greatest works were the *Songs of Innocence* (1789) and *Songs of Experience* (1794), and the 'prophetic' series — *Thel* (1789), *The Marriage of Heaven and Hell* (1790), *The Gates of Paradise* (1793), *The Vision of the Daughters of Albion*, and *America* (1793), *Europe* and *The Book of Urizen* (1794), *The Song of Los* and *The Book of Ahaniah* (1795); and his many pictorial designs and engravings (dissociated from his poetry), of which the most notable were his illustrations to the Book of Job (1826), Young's *Night Thoughts* (1777), and Blair's *The Grave* (1804-5). Mr. W. Rossetti's edition of his *Poems* (1857) in the Aldine series contains his best poetic work. See his *Life*, by A. Gilchrist (1863 and 1880); *William Blake*, by A. C. Swinburne (1868); *Works*, very fully analyzed by E. J. Ellis and W. B. Yeats (1893); and Dr. Garnett's *William Blake* (1895).

Blakesley, Joseph Williams (1808-85), dean of Lincoln, born in London; in 1831 was elected fellow, and in 1839 tutor, of Trinity College, Cambridge. He took orders in 1833, was appointed classical examiner at London University (1850), and became canon of Canterbury (1863) and dean of Lincoln (1872). He was a member of the revision committee on the New Testament; he also produced an edition of *Herodotus* (1852-4).

Blakey, Robert (1795-1878), English miscellaneous writer, was born at Morpeth. After an unsuccessful period as editor and proprietor of the *Northern Liberator and Champion*, he proceeded to France and Belgium to prosecute his philosophical studies. Appointed professor of logic and metaphysics in Queen's College, Belfast (1848), he received a pension of £100 from the civil list in 1860. His principal productions are the *History of the Philosophy of Mind* (1848), and his *Historical Sketch of Logic* (1851). See *Memoirs* (ed. by Miller, 1879).

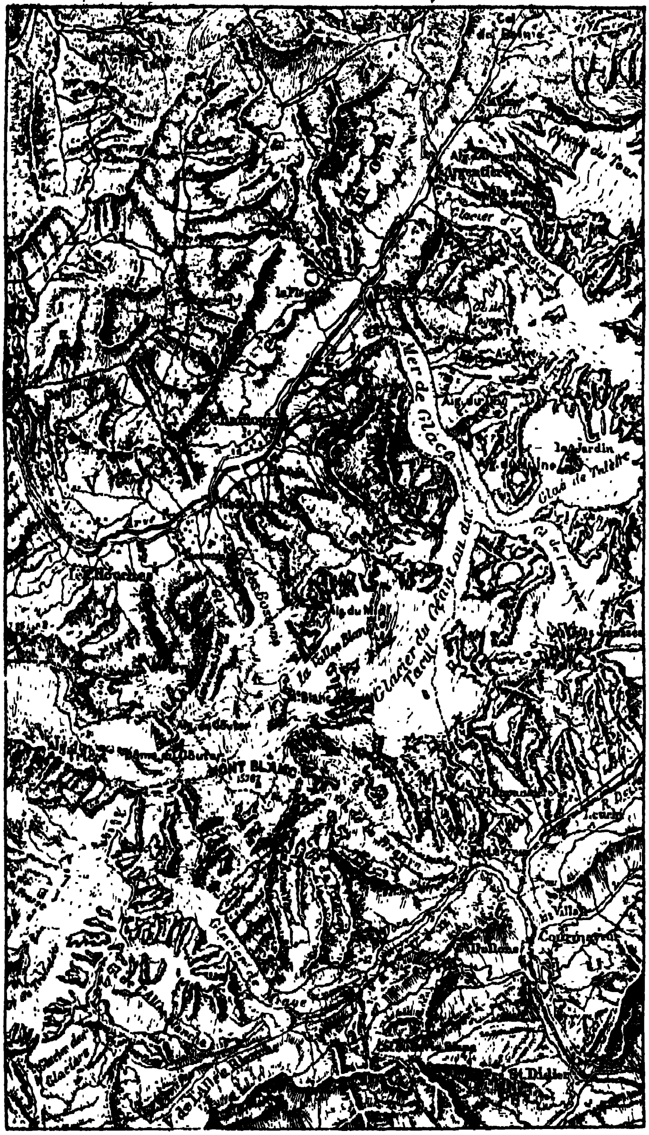
Blakiston, Thomas Wright (1832-91), English explorer and ornithologist. In 1861 he sailed up the Yangtse-kiang for 1,800 m., and published an accurate map (1861) and an account of the voyage—*Five Months on the Yang-tsze* (1862). Settling in Japan, he studied its birds, and published numerous papers on the subject.

Blamire, Susanna (1747-94), English poetess, born at Cardew Hall, near Carlisle. As many of her poems were written in conjunction with Catharine Gilpin of Scaleby Castle, the authorship is sometimes difficult to determine. The best of her songs—*e.g. What ails this heart o' mine? The Soldier's Return*, and *Ye shall walk in silk attire*—are written in the Scots dialect. See *The Poetical Works of Susanna Blamire, the 'Muse of Cumberland,'* ed. by P. Maxwell and H. Lonsdale (1842).

Blanc, François, French financier. In 1863 the Casino of Monte Carlo was leased to him for fifty years. After his death the lease was taken up by the Société Anonyme des Bains de Mer et Cercle des Etrangers, with a capital of thirty million francs.

Engraving by Blake: 'The morning stars sang together' (Job 38:7).

Blanc, Mont, the loftiest mountain (15,782 ft.) in the [illegible] of the Alps. It rises [illegible] s.w. end of the chain [illegible] gives its name, to the s. of Chamonix (France) and to the N.W. of Courmayeur (Italy). By the treaty ceding Savoy to France in 1861 it was agreed that the highest summit should become wholly French. It was originally named simply Les Glacières, or the Montagne Maudite, the first certain occurrence of the name Mont Blanc being found in an Italian document of 1694. Great glaciers stream from it on all sides, the Italian slope being by far the steepest and grandest. [illegible] first ascended in 1786 by [illegible] Chamonix men—Dr. Paccard and Jacques Balmat. The third ascent (1787) was made by the famous Genevese naturalist, H. B. de Saussure (statue at Chamonix), and a week later the first Englishman, Colonel Beaufoy, achieved the ascent. Now the ascent is frequently made in summer from Chamonix by way of the Grands Mulets (inn) and the Bosses du Dromadaire (shelter hut), the easiest route. The first winter ascent was made by Miss Isabella Straton in January 1876. Plans have been projected (1905) for a railway connecting Chamonix and Aosta through a tunnel of 8½ m. under Mont Blanc. See Charles Durier's *Le Mont Blanc* (1st ed. 1877; 4th ed. 1897); Charles E. Mathews's *The Annals of Mont Blanc* (1898); P. Güssfeldt's *Der Mont Blanc* (1894)—also in French. The best map (scale 1–50,000) is that by Imfeld and L. Kurz, published in 1896.



Chain of Mont Blanc.

The Chain of Mont Blanc stretches from the Col de Balme (7,221 ft.), on the N.E., to the Col du Bonhomme (8,147 ft.) and the Col de la Seigne (8,242 ft.), on the s.w., and is mainly divided between Italy and France. The chief passes (all glacier) are the Col de la Brenva (14,217 ft.), the Col d'Argentière (11,536 ft.), the Col de Miage (11,077 ft.), the Col du Géant (11,060 ft.), and the Col du Tour (10,762 ft.). See L. Kurz's *Guide de la Chaîne du Mont Blanc* (1892; and in English, same date), and his *Carte de la Chaîne du Mont Blanc* (1896).

Blanc, Jean Joseph Louis (1811–82), French historian and revolutionist, was born at Madrid, his father, a Frenchman, being in the service of King Joseph. He was educated at Paris, where in 1839 he founded the *Revue de Progrès*, printing in it his important work on socialism, the *Organisation du Travail*. This treatise, which attracted wide attention, was the first exhaustive manifesto of state socialism as opposed to individualism. About this time Blanc was the victim of a murderous attack, of which his brother had a distinct presentiment, and which suggested to Dumas the plot of the *Corsican Brothers*. A pamphlet on *Idées Napoléoniennes* was succeeded in 1841 by Blanc's *Histoire de Dix Ans 1831–40*, which created an immense sensation, and by its revelations shook the throne of Louis Philippe. In 1847 appeared the first two volumes of his *Histoire de la Révolution Française*. Upon the revolution in 1848, Blanc was elected a member of the provisional government. He enjoyed great popularity with the working-classes, and in March 1848 a procession of 200,000 workmen, organized by Blanqui, offered him the dictatorship, which he refused. But his colleagues and the wealthy men of Paris were jealous of his power; and he further suffered considerable obloquy by reason of the lamentable failure of his scheme to institute national workshops. He was falsely charged with complicity in the disturbances of May, June, and August; and being condemned by a large majority, he sought refuge in Britain, where he remained for

Mont Blanc from Sallanches.

upwards of twenty years. He was now chiefly engaged on his *Histoire de la Révolution Française* (completed in 1862), his *Histoire de la Révolution de 1848* (1870), and his correspondence to the *Temps*, collected and published as *Dix Années de l'Histoire d'Angleterre* (1879-81). Returning to Paris on the downfall of the empire, he afterwards opposed Thiers, and denounced the conclusion of peace with loss of territory. Until his death at Cannes, in 1882, he was a deputy for Paris. Blanc was a sincere political idealist, an eloquent advocate of toleration, and personally a man of estimable character. See Edmond's *Louis Blanc, Celebrities of the Century* (1882), and the *Annual Register* for 1882.

Blanchard, SAMUEL LAMAN (1804-45), English author and editor, was born at Great Yarmouth. In 1828 he published his *Lyric Offerings*, with a dedication to Charles Lamb. After his death Bulwer-Lytton collected his prose essays, under the title of *Sketches from Life* (3 vols. 1846), and Blanchard Jerrold did the same for his poetical works (1876). Most of Blanchard's work as an editor was connected with the *True Sun* and the *Courier*. See Memoir in *Sketches from Life*.

Blanche, a British third-class cruiser (1,580 tons) launched in 1889. The name commemorates the capture of the French *Blanche*, which was added to the navy in 1779. The ship-name is associated with the capture of the *Pique* (1795), the action with the *Cérès* (1796), the bombardment of Copenhagen (1801), the operations at Curaçoa (1804), the engagement with the *Topaze* and consorts (1805), and the capture of the *Guerrière* (1806).

Blanche, DENT, one of the grandest peaks (14,318 ft.) of the Alps, near Zermatt, to the W. of which it rises, nearly opposite and N. of the slightly higher Matterhorn. This difficult climb was first made in 1862, by T. S. Kennedy and W. Wigram.

Blanch Holding, an ancient tenure of the law of Scotland (like the *feudum francum* of the Lombards) under which the vassal has to pay to the superior a merely nominal yearly duty, as a penny Scots, a rose, a pair of gilt spurs, etc., and only if demanded within the year. Compare the English tenure by peppercorn rent.

Blanching of Vegetables. By the exclusion of light certain changes take place in the metabolism of plants. This fact is made use of by the gardener in growing certain vegetables which under normal conditions are tough, bitter, and harmful, yet when etiolated or blanched are tender and pleasant. Among the plants treated in this way are celery, seakale, lettuces, cardoons, and endive. In gardens, seakale may be blanched by placing over each crown in February a mound of sand, or, if this is not obtainable, a six-inch flower-pot or drain-pipe, the open end being well covered and the lower end pressed well into the soil. Celery is commonly blanched by successive earthings up, care being taken not to bury the summit of the leaves. Two long boards, with one edge of each resting along the ground, the other meeting its fellow just below the crowns of the plants, are also sometimes used. Cos lettuces are usually tied up with pieces of bass, so that the outer leaves serve to exclude light from the hearts; and a similar method is often adopted with endive. Inverted flower-pots with the bottom holes stopped, or proper blanching-pots, are, however, somewhat more convenient for this purpose. Cardoons are blanched by tying each plant compactly together, so that it presents a long, oval shape. They are then earthed up, or a drain-pipe, placed over each, is filled with sand. The process occupies about three weeks.

Blanco, CAPE, on the W. coast of Africa, in about 20° 50′ N., at the W. extremity of the Sahara.

Blandford Forum, par., munic. bor., and tn. on r. bk. Stour, 16 m. N.E. of Dorchester, Dorsetshire, England; ancient camps and barrows in the neighbourhood. Pop. (1901) 3,649.

Blane, SIR GILBERT (1749-1834), Scottish physician, was born in Ayrshire. With Rodney's help he effected great sanitary reforms in the W. Indies fleet (1779-83), and the disappearance of scurvy from the navy is due to his efforts. From 1783 he practised in London. His most important works are *Observations on the Diseases of Seamen* (1785), and *Elements of Medical Logick* (1819).

Blanford, WILLIAM THOMAS (1832), English geologist and zoologist, served on the Geological Survey of India (1855-82), as geologist to the Abyssinian expedition (1867-8), and with the Persian Boundary Commission (1872). His researches are published in his *Geology and Zoology of Abyssinia* (1870), *Eastern Persia* (1876), and contributions to the *Manual of the Geology of India* (1879) and *Fauna of British India* (4 vols. 1888-98).

Blankenberghe, seaside resort of Belgium, prov. W. Flanders, 9 m. N.W. of Bruges and 13 m. N.E. of Ostend; has quite recently developed out of a fishing village into a popular summer resort visited by nearly 30,000 persons annually. Pop. (1900) 5,048.

Blankenburg. (1.) Town of the German duchy of Brunswick, on the N. edge of the Harz Mts., 12 m. S.W. of Halberstadt; is a favourite summer resort, has a ducal castle, and grows fruit and vegetables. It stands amidst the fantastic sandstone region of the Teufelsmauer and of Regenstein. Pop. (1900) 10,173. (2.) Town in the principality of Schwarzburg-Rudolstadt, Germany, at the N. foot of the Thüringer Wald, 27 m. S.W. of Jena. Here Froebel opened his first kindergarten school in 1840. Pop. (1900) 2,805.

Blanket, one of the coverings of a bed. The best blankets are wholly composed of wool. Their manufacture is similar to that of other woollen goods, but the soft fluffy matting on the surface, which is more characteristic of English than of Scotch blankets, is obtained by a process called 'teaseling,' scratching it with teaseling-cards or brushes made of wire. In large manufactories this operation is performed by a machine called a gig mill, consisting of a cylinder bristling with teasels, and made to revolve rapidly while the cloth is drawn over it. Scotch blankets, though not so comfortable as English blankets, are more durable. The principal seat of the English blanket manufacture is in Yorkshire, at Dewsbury, Keighley, and Liversedge; but blankets are also extensively made at Witney and Bath. The manufacture in Scotland is mainly confined to Ayrshire, Berwickshire, and Markinch in Fife.

Blanketeers, a band of Lancashire Radical reformers who, at a meeting in St. Peter's Field, Manchester, Mar. 10, 1817, determined to march to London, joining others from Derby, to present a petition for parliamentary reform. They were so called because each man carried a blanket for camping out at night.

Blank Verse, a term which signifies, etymologically, all verse in which the rhymes are 'blank' or lacking, but which is generally restricted in ordinary usage to the unrhymed iambic decasyllable, the common medium in English of narrative and dramatic poetry. This measure was first used in our language, in the translation of the second and fourth books of the *Æneid*, by the Earl of Surrey (1516-47), and was almost certainly copied from the *versi sciolti*, or unrhymed verse of eleven syllables of the Italians — Surrey's immediate example being probably F. M. Molza's translation of Virgil, published in Venice (1541). Surrey's metre was used by Nicholas Grimald in two pieces published in Tottel's *Miscellany* (1557), which, while worthless as poetry, show a curious anticipation of some of Milton's most characteristic rhythms. It was again used by Gascoigne in his satire *The Steele Glas* (1576), but was not employed in any other considerable non-dramatic work until the publication of Milton's *Paradise Lost* in 1667. As a vehicle of dramatic expression it was first used in Sackville and Norton's *Gorboduc* (1561), and continued in 'scholarly' dramas, such as Gascoigne's *Jocasta* (1566) and Thomas Hughes's *Misfortunes of Arthur* (1587; new ed. 1874); until, being adopted by Marlowe in his tragedy *Tamburlaine* (1587), it attained such an immediate popular success that dramatists like Peele and Greene, who had previously been writing in rhymed verse, were forced to abandon their own medium and to employ the new measure. Except for a brief period after the restoration, when the couplet and the 'heroic' play reigned supreme, its position as the only suitable dramatic verse has never been disputed; and even Dryden himself, the high priest of the heroic school, reverted to blank verse in his later plays, confessing himself 'grown weary of his long-loved mistress, rhyme.' The special adaptability of the measure for dramatic purposes is generally attributed to the fact that it approaches nearer the language of ordinary speech than any other English form of verse. But this is simply to place the emphasis at the wrong end of the scale; and, as a matter of fact, the measure holds its position principally because the absence of rhyme frees the poet from the necessity, inherent in all forms of rhymed verse, of occasionally inserting lines and phrases merely for the sake of securing metrical balance, and thus leaves him at liberty to employ only the words absolutely necessary for expressing his thought, and to follow without hindrance the most abrupt transitions of passionate feeling. Moreover, the obvious artificiality of rhyme requires the maintenance of a certain height of poetic feeling in order to justify its presence; while blank verse, depending as it generally does for its music on subtle modifications of pause and emphasis, raises no fettering expectations of regularity of movement in the hearer's mind, and may be applied with equal suitability to the loftiest or to the humblest themes. The extreme flexibility of the medium is shown at a glance by the widely varied effects it has produced in the hands of individual dramatists. Nothing can be more unlike than the rhythm of Marlowe—regular, grandiose, and slightly monotonous—and the tripping, unrestrained, and rather undignified movement of Fletcher. In the matter of metrical development these two poets exercised a preponderating influence on Shakespeare, who in his own person summarizes the history of dramatic blank verse. Shakespeare's earliest manner (after he has once got rid of his fondness for rhyme) is very similar to that of Marlowe. The end of each line is very strongly marked, and usually coincides with a grammatical pause; double (or 'feminine') endings are comparatively infrequent; and there is a tendency—more strongly marked, however, in Marlowe—to adapt the blank verse to something resembling the older stanzaic arrangement. In his middle manner, as represented by the *Merchant of Venice*, there is a steady decrease in the number of lines which close with a grammatical pause, the sense is more frequently carried forward from one line to another, and double endings become more common, amounting in this case to some 15 per cent. of the whole. His final manner, of which the *Tempest* may be taken as the type, shows a metrical system largely assimilated to that of Fletcher, a proportion of double endings amounting to 33 per cent. of the whole, the sense carried on into the next line in about a third of the total; while nearly 5 per cent. of his lines have 'weak' or 'light' endings—*i.e.* endings such as 'his,' 'for,' 'and'—on which the reader can scarcely make any pause.

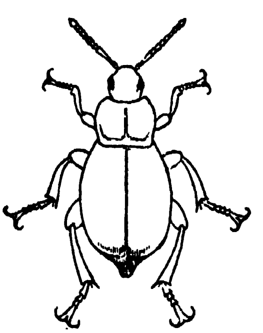
Dramatic blank verse had quite ceased to be written when Milton produced the first original example of narrative blank verse in his epic of *Paradise Lost* (1667). To the second edition of this work Milton, at the request of his publisher, prefixed a brief preface, in which he defended his use of the measure, and pronounced rhyme 'no necessary adjunct or true ornament of poem or good verse, in longer works especially, but the invention of a barbarous age to set off wretched matter and lame metre.' By this declaration Milton links himself with such renaissance scholars as Ascham, who had declaimed against rhyme (see *Schoolmaster*, ed. Mayor, p. 176). But Milton was very far from sharing the scholarly objection to the whole recognized system of accentual verse, as his reference to 'lame metre' would alone suffice to show; and in his preface he goes on to define the chief beauty of verse as lying in 'apt numbers, fit quantity of syllables, and the sense variously drawn out from one verse into another.' In other words, he clearly perceived that rhyme was only one method of procuring the measured effect essential to poetry, and that, for narrative poetry at all events, a greater effect, combined with greater ease of manipulation, could be produced by deliberate variations of cadence alone. This discovery of the poetical value of a studiously varied cæsura is of first-rate importance in the history of English prosody; and whatever may be thought of the actual originality of Milton's verse, it can scarcely be denied that he was the first to observe clearly the scientific basis on which the harmonies of blank verse depend. For the rest, his metrical excellences are the result of admirable poetic criticism, and wise selection of devices already exemplified by the dramatists, rather than of actual invention. He availed himself to the full of the dramatic liberty of trochaic, spondaic, and anapæstic substitutions for the normal iambs of the verse, and did not hesitate to employ the most daring of Shakespeare's metrical licences—*viz.* following an overflow line by a line containing a cæsura after the first syllable. In the matter of double endings he seems to have made a distinction between epic and dramatic verse, using them more freely in the latter than in the former; while his fondness for the device increased with his years. In *Paradise Lost* the double endings amount to between 1 per cent. and 2 per cent. of the whole, and in *Paradise Regained* to between 3 per cent. and 4 per cent. On the other hand, *Comus* and *Samson Agonistes* contain 9 per cent. and 16 per cent. respectively. The double endings that occur in the epics, moreover, are more numerous in the speeches and debates than in the purely narrative parts. Where, however, Milton can best claim an absolute originality is in the paragraph form into which he threw his verse. Without this arrangement blank verse becomes monotonous beyond measure, and it is the absence of such division that makes a great part of Wordsworth so hard to read.

Milton's blank verse was received with little favour by his own generation, his most considerable follower being Lord Roscommon, who published a paraphrase of Horace's *Art of Poetry* in 1684. The blank verse of Lee the dramatist shows also a strong Miltonic influence; and John Philips (1676-1708) wrote a clever and not ill-natured imitation of his manner in his *Splendid Shilling* (new ed. 1808). The measure languished even more while the influence of Pope prevailed, but it revived in Young's *Night Thoughts* (1742) and Thomson's *Seasons* (1726-30), and was continued in Akenside's *Pleasures of the Imagination* (1744) and Cowper's *Task* (1785) into the period of romantic revival proper. The gloomy but powerful *Grave* (1743) of Robert Blair is Shakespearean rather than Miltonic in versification, and abounds in double endings. There are few of the 19th century poets who have not employed blank verse in some of their compositions; but while they may have widened its range of application—as Wordsworth, for example, in his *Lines on Revisiting the Wye* applied it to meditative lyric, or as Tennyson in his *Tears, Idle Tears* applied it to the lyric of pure emotion—none of them have innovated to any marked degree in the technique of the metre, and the verse remains substantially the old Miltonic blank verse. Meanwhile, in the dramas that continue to be written, British poets have reverted to the versification of the minor Elizabethans, as one may find exemplified in the influence of Ford on Shelley's *Cenci*, or of Webster on Mr. Swinburne's *Rosamund* (1899). See J. Addington Symond's *Blank Verse* (1895); J. B. Mayor's *Chapters on English Metre* (1886); Guest's *English Rhythms* (ed. Skeat, 1882).

Blanqui, JÉROME ADOLPHE (1798-1854), French political economist, born at Nice. A student of J. B. Say, he succeeded (1833) him in the chair of political economy at the Conservatory of the Arts and Crafts. A free trader, he edited the *Journal of Commerce, Courier*, etc.; was director of the School of Commerce (1830), and deputy of the Gironde (1848). His *Hist. de l'Economie Politique en Europe* was published in 1838.

Blanqui, LOUIS AUGUSTE (1805-81), French revolutionist, was born near Nice. From the beginning to the close of his career he was the 'stormy petrel' of French politics. He was wounded at the barricades in 1827, and was decorated for his services in the revolution of 1830. He was imprisoned for the illegal manufacture of gunpowder in 1837; helped to organize extreme revolutionary societies in 1839, in which year he was condemned to death—the sentence, however, being commuted to imprisonment for life. Released by the revolution of 1848, he became leader of the extreme socialistic party. He led several popular movements, but for his communistic tendencies was sentenced to ten years' imprisonment. Released in 1859, he was sentenced again in 1861 for four years. On the downfall of the empire in 1870 he resumed his revolutionary propaganda, and founded his paper, *La Patrie en Danger*, which advocated a communal government, the secularization of churches, etc. He was one of the principal movers in the conspiracy against the Government of Defence. Arrested by order of Thiers, he was brought to trial in 1872, and was imprisoned at Clairvaux, but released in 1879. The same year he was returned for a division of Bordeaux; but the election was annulled. In 1885 one of his followers published *Critique Sociale*, which Blanqui left in MS. A biographical sketch of Blanqui is given in L. Combes's *Portraits Révolutionnaires* (1872). See also G. Geffroy's *L'Enfermé* (1897).

Blantyre. (1.) HIGH BLANTYRE, vil., par. of Blantyre, Lanarkshire, Scotland, on C.R., 2 m. N.W. of Hamilton. Coal and iron works. Pop. of par. (1901) 14,145. (2.) BLANTYRE WORKS, or LOW BLANTYRE, vil., par. of Blantyre, Lanarkshire, Scotland, on l. bk. of Clyde, opposite Bothwell, and 1½ m. N.E. of High Blantyre. Dye-works and weaving-mills, and centre of an important colliery district. Dr. Livingstone, the African explorer, was born here in 1803. Pop. (1901) 1,683. (3.) Mission stn. and settlement on the Shire Highlands, British S. Africa, at an alt. of 3,300 ft., between the Shire R. and Lake Chilwa. It was founded in 1876, and named after the birthplace of Livingstone.



Blaps mortisaga.

Blaps, the name of a genus of beetles belonging to the large family Tenebrionidæ. The dark-coloured *Blaps mortisaga*, widely distributed throughout Europe, is in some parts of the Continent regarded as the harbinger of death—a superstition frequently associated with several different beetles.

Blarney, vil., Cork, Ireland, 4 m. N.W. of Cork; contains an old castle, which stands on a limestone rock, and occupies the site of an older stronghold, built in 1446 by Cormac M'Carthy. The famous Blarney stone, built into the castle some twenty feet from the top, is supposed to confer wonderful powers of persuasion on those who kiss it.

Blasewitz, vil., kingdom of Saxony, on the Elbe, near Dresden; has important shipbuilding yards. Pop. (1900) 7,344. Schiller lived here a short time in 1786.

Blashfield, EDWIN HOWLAND (1848), American painter, born at New York, and studied at Paris under Bonnat and Gérôme. On his return to America (1881) he became noted for decorative work, examples of which may be seen on the great central dome of the library of Congress, the ceiling of the Astoria ball-room, and the supper-room of Vanderbilt's New York house. Among his canvases the most memorable are perhaps *The Angel with the Flaming Sword* and *Christmas Bells*. He has also written, in conjunction with his wife, *Italian Cities* (1900), and ed. Vasari's *Lives* (1897).

Blasius, ST., bishop of Sebaste, Cappadocia, martyred 316. Having saved a boy from being choked with a bone, he became guardian saint against throat diseases, for relief from which his blessing is still invoked on his day (Feb. 3).

Blasphemy. In law there are two views, both supported by authority, as to what constitutes blasphemy. They are thus stated by Stephen in his *Digest of Criminal Law*:—(1.) Every publication is blasphemous which contains matter relating to God, Jesus Christ, the Bible, or the Book of Common Prayer, intended to wound the feelings of mankind, or to excite contempt and hatred against the Established Church, or to promote immorality; but not publications intended in good faith to propagate opinions on religious subjects which the writer regards as true. (2.) Every publication is blasphemous which contains (*a*) a denial of the truth of Christianity in general, or of the existence of God, whether the terms used are decent or not; (*b*) any contemptuous reviling or ludicrous matter relating to God, Jesus Christ, or the Bible, or the formularies of the Established Church, whatever may be the occasion of the publication thereof, and whether the matter published is or is not intended in good faith as an argument against any doctrine or opinion, unless the publication is made under circumstances constituting a lawful excuse. Chief-justice Coleridge held the first view, and Mr. Justice Stephen thought the second view more accurately expressed the law. At the present day the first view would probably prevail. In Scotland, blasphemy is criminal both by common law and by statute; it consists in ascribing anything inconsistent with the divine attributes, or in cursing, reviling, or throwing contempt on religion.

Blass, FRIEDRICH (1843), German classical scholar, born at Osnabruck; became professor of classical philology at Kiel (1881) and at Halle (1892). He has published or revised the text of all the important Greek orators;

his principal works are *Die Attische Beredsamkeit* (3 vols. 1868–80; new ed. 1887–92); *Die Griechische Beredsamkeit in dem Zeitraum von Alexander bis auf Augustus* (1865); also the text of the newly-discovered book of Aristotle, *The Republic of the Athenians* (1892).

Blasting Gelatin is an explosive made by dissolving about 10 per cent. of collodion-cotton, or soluble nitro-cellulose, in warm nitro-glycerin, and well kneading the product. It is an elastic, pale yellow, jelly-like solid, from which nitro-glycerin does not exude even on immersion in water or with moderate heating. When set on fire it burns, but requires to be heated to about 200° C., or to have a powerful detonator fired in contact with it to explode it. It is extremely insensitive to pressure and shock unless frozen, especially if mixed with about 4 per cent. of camphor; and it is about 25 per cent. more efficient than kieselguhr dynamite. A milder preparation, gelatin-dynamite, is obtained by adding a smaller proportion of collodion-cotton, and mixing the syrupy liquid formed with about 20 per cent. of an absorbing powder, such as a mixture of wood pulp and sodium nitrate. A still greater proportion of the absorbent is used in 'gelignite.'

Blastoderm, the primitive layer of cells formed by the subdivision of the fertilized germ cell. See EMBRYOLOGY.

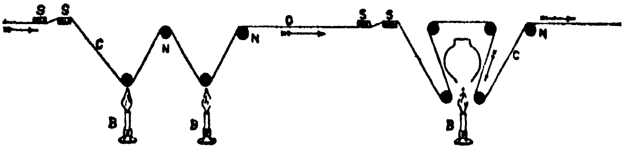
Blastoids, a class of Echinodermata comprising small calcareous fossils resembling a bud, whence their name. They are most abundant in the Carboniferous limestone. Pentremites is the commonest genus. Their chief features are the absence of the arms so characteristic of echinoderms, and the presence of hydrospires—five convoluted calcareous tubes communicating with the exterior, through which a current of water passed to aerate the blood. The rest of the skeleton consists of small, closely articulating calcareous plates. See K. von Zittel's *Palæontology* (1899); H. A. Nicholson's *Palæontology* (1889); Ray Lankester's *Zoology* (1900).

Blatchford, ROBERT ('Nunquam') (1851), journalist, began his literary career in 1882. He made a name by his articles on slum life in the *Sunday Chronicle* of Manchester, but his socialistic tendencies led to his severance from that journal in 1891. He was one of the founders of the *Clarion*. His works include *Merrie England*, *A Son of the Forge*, *Tommy Atkins*, *The Story of a Man*, *Impressionist Sketches*, *Dismal England*, *A Bohemian Girl*, and *Britain for the British* (1902).

Blatta, the name given to a genus of cockroaches, a group of insects which constitute the family Blattidæ. The common cockroaches of Britain were formerly included in this genus.

Blavatsky, HELENA PETROVNA HAHN-HAHN (1831–91), commonly known as MADAME BLAVATSKY, theosophist, was born at Ekaterinoslav, Russia, and died in London. At the age of seventeen she travelled in Asia Minor, India, Central Asia, S. America, and Africa. On her return from her Eastern travels in 1858 she asserted her initiation into esoteric Buddhism, and that through her astral agents she was in constant communication with the unseen world. With a number of 'adepts' or believers, the chief of whom was Colonel Olcott, she founded, in 1875, the Theosophic Society in America. Latterly she resorted to trickery and deceit in the effort to win further converts, but was exposed by the Society for Psychical Research in 1884. Her works include *Isis Unveiled* (1877) and *The Key to Theosophy* (1889). See Solovyoff's *Modern Priestess of Isis* (trans. by W. Leaf, 1895), and A. Lillie's *Madame Blavatsky* (1895).

Blavet, riv., France; rises in the W. of dep. Côtes-du-Nord, and falls into the Atlantic at Port Louis after a course of 87 m.



Bleaching: Diagram of Singeing.

S, Stretchers or beamers; N, nap-rollers; B, burners; C, cloth.

Blaydon, tn. (area, 9,349 ac.), Durham, England, on river Tyne, 5 m. W. of Gateshead, and connected with Newcastle by a bridge. It has manufactures of bricks, bottles, etc.; also collieries and iron foundries. Pop. (1901) 19,628.

Blaye (anc. *Blavia*), tn., dep. of Gironde, France, on r. bk. of Gironde, 20 m. N. of Bordeaux; trade in wine, brandy, oil. Pop. (1901) 4,775.

Blazon, BLAZONRY, BLAZONING, the art of describing a coat of arms by defining in technical language its component figures, their positions, and their tinctures. The rules of blazoning aim at securing complete explicitness, combined with terseness. Nothing is expressed which should, by the rules, be understood. Thus, in commencing a blazon, the first object referred to is the *field*. It is unnecessary, therefore, to say, for example, 'a field azure,' but simply 'azure.' If the field be divided by one of the partition lines, the blazon would begin thus: 'party per pale or and azure,' or, more simply, 'per fess argent and gules.' After the field, the ordinary, if there be one, is mentioned; if none, then the charge nearest the centre of the field, then any charges which may surround it, and, lastly, any charges on the ordinary or other charges. Unlike the other ordinaries, the chief is mentioned last, except any charges which may be placed upon itself. The names of the tinctures invariably follow those of the charges to which they refer; but where several charges, blazoned consecutively, are of the same tincture, it is mentioned only after the last. Again, where several charges of the same tincture cannot, from their positions, be named consecutively, and to avoid ambiguity the name of the tincture must be appended to each, periphrasis is resorted to, to avoid using the same word more than once. Other rules of blazoning will be found under HERALDRY.

Bleaching. Raw cotton contains, on an average, about 5 per cent. of natural impurities, consisting of fatty substances, two colouring matters, and a peculiar wax called 'cotton wax.' The complete removal of these is effected by bleaching operations. In cotton pieces, however, there are other impurities present in addition to these, such as oil and grease from the looms, size, starch, tallow, soap, paraffin wax, etc.; the bleaching of cotton pieces is, therefore, much more complicated than that of cotton yarn. Cotton yarn loses about 5 per cent. during bleaching, while cloth loses from 20 to 30 per cent., or even more.

Singeing.—If after weaving the cloth is carefully examined, it will be found to be covered with loose hairs protruding from the surface; these are known as the 'nap,' and are partially or completely removed by singeing. The process is carried out in three ways—by gas, by plate, and by revolving rollers. Gas singeing is used principally for goods where the surface is of an uneven character. It consists in running the pieces, under tension, over rollers, so as to force out the nap as much as possible, and the cloth is at the same time brought into contact with the flames from a row of bunsen burners. In plate singeing, the pieces, stitched end to end, are drawn at a rapid rate over two arched red-hot copper plates. The disadvantage of this method is that the cloth is apt to be singed unevenly, owing to the cooling of the plates. This difficulty is now overcome by substituting for plates a hollow cast-iron cylinder, which, when heated to a uniform temperature, is made to revolve in an opposite direction to that in which the pieces travel.

Gray Wash.—After singeing, the goods are thoroughly washed in the washing-machine, and then allowed to steep or lie in a heap all night; here a fermentation sets in, which acts upon certain insoluble substances in them.

Lime-Boil.—This operation consists in submitting the goods in kiers to the action of lime-water, generally at a high temperature, and under pressure. The pieces are passed through lime-water of such a strength that the material takes up about 5 per cent. of its weight of lime. They are then packed into the kiers, which, after the necessary amount of water has been run in, are closed, and the boiling is continued under pressure. Some kiers work at 35 lbs. pressure; other low-pressure kiers at only 8 to 10 lbs. After the lime-boil the goods are washed in water and submitted to the

Gray Sour.—This consists in running the goods through sulphuric or hydrochloric acid at 1° to 2° Tw. (Twaddell hydrometer), and then through water, in order to prevent them from being made tender by the acid.

First and Second Lye-Boil.—Here the goods are boiled under pressure from three to five hours, first with soda ash and resin, and then with soda ash alone. In the first lye-boil about 5 to 6 per cent. by weight of soda ash and 1 to 2 per cent. resin are used; in the second, about 1 to 2 per cent. soda ash. After the lye-boils the goods are again well washed in water, at which stage all impurities, other than the natural colouring matters of the cotton, are removed.

Bleaching, or 'chemicking,' consists in passing the goods through a clear solution of bleaching powder at ½° to 2° Tw.

White Sour follows the chemicking, and decomposes completely the bleaching powder that remains on the fibre. It consists in running the material through either hydrochloric or sulphuric acid at 1° to 2° Tw.

The process of bleaching is thus completed, except for the final washing in the washing-machine to remove every trace of acid, and the opening out and drying over copper cylinders.

Theory of the Bleaching Process.—The object of the lime-boil is to decompose the fatty, resinous, and waxy impurities, by converting them into lime soaps, which, still being insoluble, stick to the fibre, but are easily removed. Caustic alkalis would also bring about a similar reaction, and at the same time soluble decomposition products would be formed; but lime is cheaper, and attacks the resinous matter more vigorously. In the souring, the acid decomposes the lime soaps with the formation of the lime salt of the acid used, and of the free fatty acids, in an insoluble form. These fatty acids are converted into sodium soaps in the lye-boils, which, now being soluble in water, are easily removed in the washing operations. A special feature of this method of bleaching, called the 'madder bleach,' is the use of resin soap; but the part it plays has not been satisfactorily explained. Practical experience has shown that, better than any other substance, resin soap removes certain impurities which cause uneven results in dyeing. Scheurer has also proved that saponification takes place quicker with resin soap and alkali than with alkali alone.

Market Bleach.—This is used principally for goods which are to be sold in the white state; the essential difference between this and the madder bleach is the absence of resin soap in the lye-boil.

Turkey-red Bleach.—This is the simplest bleach, and consists usually of one or two lye-boils in caustic soda, then souring with weak sulphuric acid, and finally washing and drying.

Lunge's Improvement.—In this method, acetic acid, or any other organic acid, is mixed with the bleaching powder in order to increase its bleaching action. The free hypochlorous acid liberated splits up into oxygen and hydrochloric acid; and the latter, acting upon the calcium acetate, liberates the amount of acetic acid necessary to start the reaction, which thus becomes continuous.

Linen Bleaching.—Linen is bleached in a similar way to cotton, but the process is slower. It is, however, assisted by the exposure of the moist fabric to light and air—fermentation and the formation of traces of hydrogen peroxide being probably the active agencies in this operation.

Bleaching of Wool.—The natural impurities of raw wool are much greater than those of cotton, and may amount to from 30 to 80 per cent. They are of two kinds—(1) fatty and waxlike bodies soluble in benzene, petroleum, ether, etc., to which the name 'yolk' or 'wool-fat' is given; (2) bodies soluble in water, known as 'suint.' The removal of these impurities takes place in the scouring; if this be neglected, the wool appears uneven or stripy when dyed. The choice of the scouring agent depends entirely upon the quality of the wool. For the finest qualities a good neutral soap is used; but for coarser and poorer qualities the soap is mixed with a small quantity of sodium carbonate or ammonia, though, owing to the ease with which wool is destroyed by alkalis, great care must be exercised in their use. The temperature of the scouring bath varies from 30° to 50° C. The waste scouring liquors are collected in some works and used for the manufacture of lanolin. In order to remove the faint yellow tint of the wool after scouring, it is bleached, the agent universally employed being sulphur dioxide. There are two methods of bleaching—*e.g.* gas and liquid bleaching. In the former, the wool, in the wet state, is placed in specially designed brick chambers and submitted to the action of sulphur dioxide, which is produced by burning the necessary amount of sulphur in an iron pot in one corner of the chamber. In liquid bleaching the material is steeped for several hours in a solution of sulphurous acid or a solution of sodium bisulphite, to which the requisite amount of hydrochloric acid has been added. The best results, however, are obtained by the use of peroxide of hydrogen or sodium peroxide, but the high price of these prevents their general application.

Scouring with Volatile Liquids.—An immense number of experiments have been tried to avoid the use of soap in the washing of wool, substituting volatile liquids, which have a solvent action on the fatty and waxy bodies of the raw material. Of all substances carbon disulphide has been most successfully applied, but owing to mechanical difficulties, and the risk of fire and explosion, it has not been extensively used in the industry.

Bleaching of Silk.—Silk consists principally of two substances—fibroin, the fibre proper, and a gumlike body, sericin. The latter is removed in the scouring operation, which consists in working the silk in a solution of soap at 90° to 95° C., and afterwards in hot water which contains a small amount of sodium carbonate. The waste soapy liquors, containing large quantities of sericin, are collected and extensively used in dyeing, under the name of 'boiled-off liquor.' After scouring or 'boiling off,' the silk is bleached by means of sulphur dioxide in a manner similar to that described in the case of wool. Hydrogen peroxide is now almost exclusively used for bleaching silk, especially tussur or tussah silk, and, when used in alkaline solution, gives by far the most satisfactory result.

Bleaching Powder, a compound formed by passing chlorine gas over cold slaked lime. When freshly made it consists of an oxychloride of calcium, but by the absorption of moisture it is gradually converted into a mixture of chloride and hypochlorite of calcium. It is commonly known as chloride of lime, and is used as a source of chlorine for bleaching purposes, also as a disinfectant.

Bleak, a Cyprinid fish allied to the bream. The common bleak (*Alburnus lucidus*) is a small silvery form common in fresh water in the more northern parts of Europe, usually about 5 to 6 in. in length, and with a protruding lower jaw. It is a social fish, occurring in great shoals in, for example, the tributaries of the Rhine. The scales are used in the manufacture of artificial pearls.

Bleda, a 5th-century king of the Huns, brother of Attila.

Bleeding, or BLOOD-LETTING, is commonly resorted to in surgical practice for the relief of congestion; and in this sense the term covers many different methods by which blood may be removed from the body—*e.g.* venesection or phlebotomy, cupping, and the use of leeches. Bleeding, after having been terribly misapplied for many generations and then practically abandoned, is now advocated in certain cases of acute inflammation in suitable subjects, or to relieve an overburdened heart. It is by no means the only example of an old practice in medicine or surgery which has been dropped and then taken up again with greater moderation. Practically any form of counter-irritation or depletion, even if it does not remove blood, or all the constituents of the blood, from the body, but merely withdraws some of them, or draws the blood away from a definite spot, may be considered as a modified form of bleeding. Hence dry-cupping, poulticing, blistering, and strong purges are modifications of the same principle. See HÆMORRHAGE, WOUNDS.

Bleek, FRIEDRICH (1793-1859), German Biblical scholar, born at Ahrensbök in Holstein. He became professor of theology at Berlin (1823), and at Bonn (1829). His commentary on *Der Brief an die Hebräer* (1828-40) ranks among the foremost exegetical studies. His *Introduction to the Holy Scriptures* (1860-2), of numerous editions, has been done into English—the Old Testament by Venables (1869), the New Testament by Urwick (1869); as also has his *Lectures on the Apocalypse* (1875). His other works include *Synoptische Erklärung der drei ersten Evangelien* (1862), *Vorles. über die Briefe an die Kolosser*, etc. (1865), and *Der Hebräerbrief erklärt* (1868).

Bleek, WILHELM HEINRICH IMMANUEL (1827-75), son of the preceding, S. African linguist, was born in Berlin. He took part (1854) in Baikie's Niger expedition, and (1855-6) spent eighteen months in the interior of Natal. Keeper of the Grey Library in Cape Town, he wrote *Languages of Mozambique* (1856); *Handbook of African, Australian, and Polynesian Philology* (1858-63); the unfinished but important *Comparative Grammar of S. African Languages* (1862-9); *Origin of Language* (1869), in which the Darwinian theory is applied; and *Reynard the Fox in S. Africa* (1864).

Bleiberg, vil., Carinthia, Austria, 9 m. w. of Villach; valuable lead mines, the most extensive in Austria. Pop. (1900) 3,435.

Bleibtreu, GEORG (1828-92), German painter of battle scenes, born at Xanten, on the Rhine; was the pupil of Hildebrandt. In 1849 he attracted much attention by *The Battle of Bau, in Schleswig*. Afterwards he painted a series of pictures from the war of independence (1813-15), of which the most celebrated are *The Attack on the Grimma Gate at Leipzig* and the *Battle at Waterloo* (1858). From 1864 he painted incidents of the Prusso-Danish and Austro-Prussian wars, the best being *The Passage of the Prussians to Alsen* and *The Battle of Königgrätz*, both in the National Gallery at Berlin. Again he painted episodes of the Franco-German war, such as *The Capitulation of Sedan*, *The Bavarians under General von Hartmann before Paris*, *King Wilhelm after the Battle at Gravelotte*, etc. His *Napoleon retiring after Waterloo* is also worthy of notice. His paintings are vigorous and powerful, and his colouring brilliant.

Bleibtreu, KARL (1859), German man of letters, has written, with a good deal of turbulent force, descriptions of battles (*Dies Iræ .... Sedan*, 5th ed. 1902; *Cromwell bei Marston Moor*, in 1889; *Waterloo*, in 1902), books about Napoleon (1888, 1891), Frederick the Great (1888, 1892), Byron (1886, 1897), English literature (1887-8), etc.

Blekinge, picturesque co. in S. Sweden with an area of 1,164 sq. m., 35 per cent. of which is forest. The salmon fishery, especially in the R. Morrum, is considerable. For practically eight centuries it belonged to Denmark, but was ceded to Sweden in 1658 by the peace of Roskilde. Chief town, Carlscrona. Pop. (1900) 146,302.

Blemmyes, ancient people of Hamitic origin, who lived in the south of Egypt. Some hold that the Bisharin are their descendants. See Revillout's *Mémoire sur les Blemmyes* (1874).

Blende, a name given to sphalerite or zincblende by the early miners.

Bléneau, tn., dep. Yonne, France, on R. Loing, 29 m. s.w. of Auxerre. Here, in 1652, two battles were fought on successive days between the French under Turenne and the Spaniards under Condé, in which the latter were finally defeated. Pop. (1901) 2,009.

Blenheim, a British first-class cruiser launched in 1890, named after the victory of the Duke of Marlborough over the French on Aug. 13, 1704. The ship-name dates from 1709, and is associated with Howe's relief of Gibraltar (1782), the action off C. Spartel (1782), Hotham's action off Genoa (1795), the battle off C. St. Vincent (1797), the action with the *Marengo* and *Belle Poule* (1806), China (1841), and the Baltic (1854-5).

Blenheim, or BLINDHEIM. (**1.**) Village near l. bk. of Danube, Bavaria, Germany, 23 m. N.W. of Augsburg. Near here, at Höchstädt, on Aug. 13, 1704, the Duke of Marlborough and Prince Eugene, commanding the combined armies of the allies (England, Germany, Holland, and Denmark), defeated the French and Bavarians under Tallard, Marsin, and the elector of Bavaria. The battle has been celebrated in verse by Southey (1798) and Dennis (1705). (**2.**) Chief tn. of Marlborough provincial dist., New Zealand, 18 m. s. of its port, Picton, with which it is connected by railway; rich agricultural and fruit-producing district. Pop. (1901) 3,230.

Blenheim Park, par. (2,253 ac.) near Woodstock, on the Glyme R., Oxfordshire, England. Henry II. and Fair Rosamond were connected with Woodstock palace. In romance it will always have a place as long as Sir Walter Scott's *Woodstock* is read. The name of the park (13 m. in circumference) was changed when Queen Anne granted it to John Churchill, Duke of Marlborough, as a reward for his famous victory at Blenheim in 1704. Parliament made a grant of almost £500,000 for the erection of a palace. This was designed by Sir John Vanbrugh, and when completed, in 1715, its walls were decorated with many valuable paintings, including several by Rubens. These, however, with the collections of gems, etc., were sold in 1885 and succeeding years.

Blenkinsop, JOHN (1783-1831), inventor of what may be considered the first commercially successful locomotive steam-engine, a cog-wheeled engine which was employed on Hunslet Moor, near Leeds, to draw coals up to a load of thirty tons (1812 *et seq.*). George Stephenson saw Blenkinsop's engine at work before building his famous *Rocket*.

Blennerhasset, LADY CHARLOTTE (1843), German biographer and essayist, born Countess Leyden; married Sir Rowland Blennerhasset. Her most notable productions have been lives of *Frau von Staël* (1887-9) and *Talleyrand* (1894; Eng. ed. 1894), and numerous essays, mostly in *Deutsche Rundschau*, on *Tennyson* (1899), *George Eliot* (1885), *Queen Victoria* (1887), *Taine* (1886), *D'Annunzio* (1898), etc.

Blenny, a name given to the members of the family Blenniidæ, which includes a large number of small littoral fishes, all having the ventral fin formed of less than five rays, and jugular in position, as in the cod family. In many cases these ventral fins are reduced to rods, which are used by the fish in travelling over the sea bottom. For examples, see articles SHANNY, WOLF-FISH, etc.

Bles, HENDRIK (?1480-1550), Flemish painter, called *met de Bles* ('forelock') and *civetta* ('owl'), because he used an owl as signature. His pictures are found in the Uffizi, Florence (landscape), Venice Academy (*Tower of Babel*), Berlin (portrait), the Pinacoteca, Munich (*Adoration of the Magi*), and the National Gallery, London (*Christ on the Cross* and *The Reading Magdalen*). *The Good Samaritan* at Dinant is his only dated (1511) work. See Wilmot-Buxton and Poynter's *German, Flemish, and Dutch Painting* (1880).

Blessington, MARGUERITE, COUNTESS OF (1789-1849), Irish novelist and writer, was an intimate friend of Lord Byron; held a little court for many years at Gore House, Kensington; but her equivocal connection with Count d'Orsay cut her off from society and overwhelmed her with debt. The couple were obliged to flee to Paris (1849), where Lady Blessington died in poverty in June 1849. She was the author of *The Idler in France* (1841), *The Idler in Italy* (1841), and *Conversations with Lord Byron* (1834). She also wrote a number of novels, the best known of which are *Grace Cassidy, or The Repealers* (1833), *The Victims of Society* (1837), *The Follies of Fashion* and *The Confessions of an Elderly Lady* (1838). See her *Life and Correspondence*, by Madden (2nd ed. 1855); Chorley's *Life* and *Autobiography* (1874); and Willis's *Pencillings by the Way* (1835).

Bletchingley, par. and vil., Reigate div., S.E. Surrey, England, 4½ m. E. of Reigate. Pop. (1901) 2,023.

Bletchley, vil. and par., Buckinghamshire, England, an important junction on the L. & N.W.R., 6 m. N.W. of Leighton Buzzard and 46½ m. N.W. of London. Bletchley now forms part of Fenny Stratford. Pop. (1901) 698.

elds. See BLUEFIELDS.

icher, STEEN STEENSEN -1848), Danish novelist and poet. From 1819 he led the life of a poor parson, till his growing needs forced him to produce those works which have made him one of the favourite novelists of the Danish nation. Beginning with *En Landsbydegns Dagbog* (1824), he wrote a whole series of masterly tales of Danish, especially Jutish, peasant life, culminating in *E Bindstouw* (1842), written in the Jutland dialect, and incomparably his best work. What Hardy has done for Wessex, Blicher has done for Jutland, but in a spirit of bright and pleasant humour. See his own *Autobiography* prefixed to his *Samlede Noveller* (new ed. by P. Hansen, 1882); Kristensen and Lund, *Blicher's Liv og Gjerning* (1882).

Blickling Homilies. The unique MS. of the Blickling Homilies is at Blickling Hall, near Aylsham, in Norfolk. They belong to the time between Ælfred and Ælfric; they are not homogeneous in character, and may cover a wide period of time. The date 971 occurs in one passage. These homilies, full of legendary, apocryphal, unscriptural matter, form a striking contrast to those of Ælfric, who, as is clear from several passages, intended some of his own homilies as a corrective to them. See J. Earle's *A.S. Literature* (1884) and Wülker's *Grundriss zur Geschichte der A.S. Litteratur* (1885). The homilies have been edited by Rev. R. Morris for the Early English Text Society (1874).

Blida, fort. tn., Algeria, 23 m. S.W. of Algiers, at foot of the Atlas Mts. It is famous for its orange groves. There is also some trade in copper, lead, and cotton. Pop. (1901) 29,057.

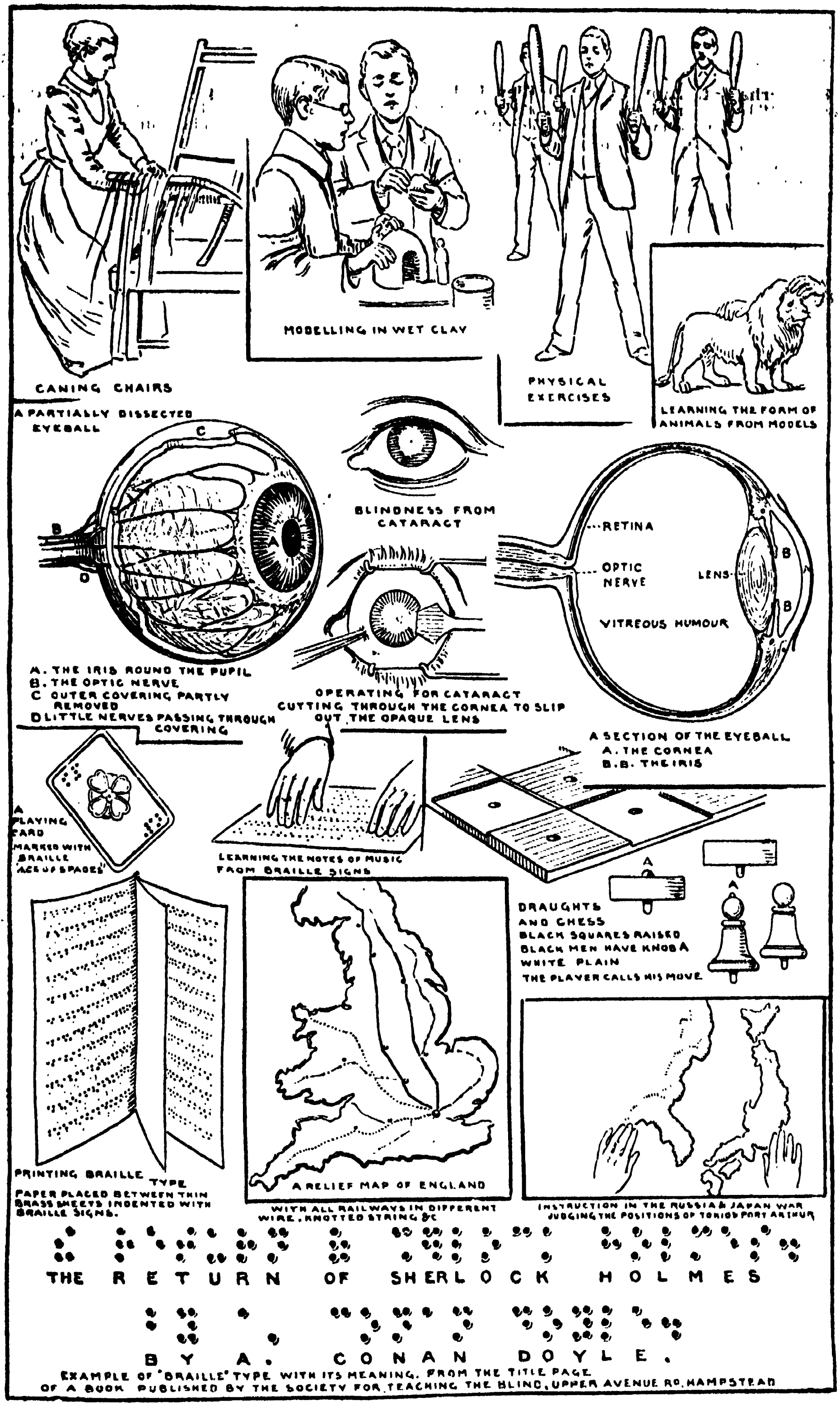
Bligh, WILLIAM (1754-1817), English admiral, born in Cornwall; entered the navy, and saw service under Captain Cook in his second voyage (1772-4). As a lieutenant he took part in the action off the Dogger Bank in 1781, and in Howe's relief of Gibraltar (1782). In 1787 he took command of the *Bounty*, and, after his adventures on that voyage, was posted in 1790, and as a captain commanded the *Warrior* (1794) off Ushant, the *Director* at Camperdown in 1797, and the *Glatton* at Copenhagen in 1801. He became captain-general and governor of New South Wales in 1805, but, owing to his tyrannous conduct, was deposed in 1808, and imprisoned until 1810, when he was sent back to England. Undoubtedly a brave man and a first-rate seaman, he was one of the worst of tyrants in days when tyrannical naval commanders were only too numerous.

Blight is a popular term applied to the unhealthy condition of a plant due to a variety of causes, such as attacks of insects, fungi, noxious gases, unsuitable soil, frost, lightning. See Marshall Ward's *Diseases in Plants* (1901).

Blimbing, a pulpy, yellowish, acid fruit, about the size of a hen's egg, and found on the cucumber tree (*Averrhoa bilimbi*) of the order Oxalidaceæ; the acidity is due to an oxalate of potassium. It is eaten by natives of India and E. Indies, and is also used in the form of pickles.

Blind. In medical terminology the expression 'blindness' means absolute sightlessness; what is popularly termed 'partial blindness' is known medically as amaurosis or amblyopia. Blindness cannot always be accounted for. In general, blindness may be said to arise from inflammatory or degenerative changes in some part of the path between the cornea without and the visual centre (or that part of the gray matter of the brain especially concerned in sight) within. The eye is so delicate an organ that inflammation of any part may easily spread to the others, and skilled assistance should be called in whenever its safety is concerned. The various forms of eye disease, such as cataract, keratitis, iritis, and retinitis, are briefly touched on under their several headings. One, however—*viz.* ophthalmia neonatorum (sore eyes of the new-born)—is mentioned here because of its special importance. The disease starts with superficial inflammation of the eyes, caused by contagion during birth. It leads to ulceration and rapid destruction of the eyes, and is very contagious, being readily transmitted from the child to any one having to do with it. But the mischief may be prevented by carefully washing the eyes *at birth* with one part of corrosive sublimate to 6,000 parts of water; and then the eyes should be sponged every few hours with the same solution until skilled advice is obtained. Children are sometimes several months old before it is discovered that they are blind. By the third month the healthy child shows signs of recognition on seeing a familiar face; but even after a few weeks it will take pleasure in a bright light, and its perception of it can be tested by moving a candle before the eyes and noting whether they follow it. When over two months, the child with normal sight will blink when an object is suddenly thrust near its eyes.

TRAINING OF THE BLIND.—The first effort to ameliorate the condition of the blind was made in the latter part of the 18th century.


CANING CHAIRS
MODELLING IN WET CLAY
PHYSICAL EXERCISES
LEARNING THE FORM OF ANIMALS FROM MODELS
A PARTIALLY DISSECTED EYEBALL
C
B
D
A
A. THE IRIS ROUND THE PUPIL
B. THE OPTIC NERVE
C OUTER COVERING PARTLY REMOVED
D LITTLE NERVES PASSING THROUGH COVERING
BLINDNESS FROM CATARACT
OPERATING FOR CATARACT
CUTTING THROUGH THE CORNEA TO SLIP OUT THE OPAQUE LENS
RETINA
OPTIC NERVE
LENS
B
B
VITREOUS HUMOUR
A SECTION OF THE EYEBALL
A. THE CORNEA
B.B. THE IRIS
A PLAYING CARD MARKED WITH BRAILLE 'ACE OF SPADES'
LEARNING THE NOTES OF MUSIC FROM BRAILLE SIGNS
A
A
DRAUGHTS AND CHESS
BLACK SQUARES RAISED
BLACK MEN HAVE KNOB A
WHITE PLAIN
THE PLAYER CALLS HIS MOVE
PRINTING BRAILLE TYPE
PAPER PLACED BETWEEN THIN BRASS SHEETS INDENTED WITH BRAILLE SIGNS.
A RELIEF MAP OF ENGLAND
WITH ALL RAILWAYS IN DIFFERENT WIRE, KNOTTED STRING &C
INSTRUCTION IN THE RUSSIA & JAPAN WAR JUDGING THE POSITIONS OF TOKIO & PORT ARTHUR
THE RETURN OF SHERLOCK HOLMES
BY A. CONAN DOYLE.
EXAMPLE OF 'BRAILLE' TYPE WITH ITS MEANING. FROM THE TITLE PAGE OF A BOOK PUBLISHED BY THE SOCIETY FOR TEACHING THE BLIND, UPPER AVENUE RD. HAMPSTEAD

The Blind: Education and Work.

Previous to that period they were a helpless pauper class, for whom neither education nor training was provided. The degraded state of the masses of the blind in France is shown by the following incident. In 1771, at an annual fair in Paris, an innkeeper had a group of blind men attired in a ridiculous manner, decorated with peacocks' tails, asses' ears, and pasteboard spectacles without glasses, in which condition they gave a burlesque concert for the profit of their employer. Among those who gazed at this outrage to humanity was the philanthropist Valentine Haüy (1746–1822). After he had gathered all the information possible respecting the blind, he began teaching a blind boy who had earned his living by begging at a church door. Encouraged by the success of his pupil, Haüy collected other blind persons, and in 1784 founded in Paris the first school for the blind (the Institution Nationale des Jeunes Aveugles), and commenced the first printing in raised characters. In 1786 he exhibited before Louis XVI. and his court at Versailles the attainments of his pupils, and published an account of his methods, entitled *Essai sur l'Education des Aveugles.* As the novelty wore off, contributions almost came to an end, and the blind school must have ceased to exist had it not been taken in 1791 under the protection of the state.

The work of Haüy, the great apostle of the blind, was taken up by Mr. Gall of Edinburgh, Mr. Alston of Glasgow, Dr. Howe of Boston, Mr. Friedlander of Philadelphia, and others. The following were the first schools for the blind in Great Britain and Ireland:—School for the Indigent Blind, Liverpool (1791); Royal Blind Asylum and School, Edinburgh (1793); Bristol School (1793); School for the Indigent Blind, Southwark, London, now moved to Leatherhead (1799); Norwich Asylum and School (1808); Richmond Asylum, Dublin (1810); Glasgow Asylum and School (1827); Belfast School (for deaf and dumb and blind, 1831); Wilberforce School, York (1833); Henshaw's Asylum, Manchester (1839); School for the Blind, Birmingham (1848); Belfast Workshops (1871).

In 1868 Dr. T. R. Armitage founded the British and Foreign Blind Association, for the purpose of promoting the education and employment of the blind. By careful investigation he ascertained that of the blind musicians who had been trained in Great Britain not more than one in 200 became self-sustaining. To provide a higher education and improve the musical training of the blind, the Royal Normal College and Academy of Music was established at Upper Norwood in 1872. Its object was to afford the young blind a thorough general and musical education, to qualify them to earn a living by various intellectual pursuits, especially as organists, pianists, teachers, and pianoforte-tuners. Of all who have completed their course of training in the college, 89 per cent. are now self-sustaining men and women.

A practical system of education, which has for its object to make the blind independent and self-sustaining, must be based upon a comprehensive course of physical development. As a rule, the vitality of the blind is much below that of seeing persons, and it is the lack of energy and determination, not the want of sight, that causes so many failures among the blind.

Besides regular gymnastic training, we should endeavour to give young blind children that spontaneous activity and love of play which is the universal impulse of all healthy seeing children. The first requisite is a suitable playground, specially adapted to meet the wants of the blind. Besides a free space where they can run and play, it should have a supply of swings, tilts, jumping-boards, stilts, char-à-bancs, skittle alleys, etc. The pupils should be encouraged to enter various competitions, as walking, running, jumping, leapfrog, sack-racing, *barre-à-pied*, shot-pitching, and tug-of-war. Cycling, rowing, swimming, and roller-skating are also beneficial.

The school curriculum must be varied according to the age and capacity of the pupils, but the teacher's object should be to develop the powers of observation, train the reasoning faculties, strengthen the memory, cultivate the power of clear and concise expression, and stimulate a love of reading and literature. All children of average intelligence should be taught typewriting. From the earliest years manual dexterity should be cultivated by kindergarten work, modelling, sewing, knitting, and *slöjd.* Early manual training cultivates the perceptive faculties, gives activity to the body, and prepares the hands and fingers for pianoforte-playing, pianoforte-tuning, and handicrafts.

Music in its various branches, when properly taught, is the best and most lucrative employment for the blind. The musical instruction, in its several branches of harmony, pianoforte, organ, and vocal culture, must be addressed to the *mind,* not merely to the *ear.* If the mental faculties have not been developed and thoroughly disciplined, the blind musician, however well he may play or sing, will be a failure as a teacher. The musical instruction must be more thorough, more analytical, more comprehensive than corresponding instruction given to seeing persons.

Pianoforte-tuning is an excellent employment for the blind. Many can be trained to become successful pianoforte-tuners when they have reached an age that renders training for the profession of music impossible. The seeing who excel in the business go through a long apprenticeship, and one must give the blind even more careful preparation.

A national scheme of education for the blind which has for its object to make the blind a self-sustaining class, should include properly-planned, well-regulated kindergarten schools for children from five to eight years of age, preparatory schools for children from eight to eleven, intermediate schools for children from eleven to thirteen. At thirteen years of age the future career of the children can usually be determined, and the pupils should be sent, according to ability and future requirements, either to handicraft schools or to colleges where they will be prepared for the university examinations, or receive a good secondary education combined with high-class musical training; in connection with the latter there should be a pianoforte-tuning school.

In every school or class there will be a certain number of young blind children who are feeble in body and defective in intellect; such children are a great burden in any class or school, and require special treatment and instruction. Educational authorities throughout the country should unite and have one or two schools in a healthy locality for mentally defective blind children.

Types and Printing.—The earliest authentic record of reading for the blind describes a plan of engraving the letters upon blocks of wood, the invention of Francesco Lucas, a Spaniard, in the 16th century, who dedicated it to Philip II. of Spain. In 1640, Pierre Moreau, a writing-master in Paris, cast a movable leaden type for the use of the blind; but being without means to carry out his plan, he abandoned it. Pins inserted in cushions were next tried, and large wooden letters. After these came a contrivance of Du Puiseaux, a blind man, who had metal letters cast, and set them in a small frame with a handle. While these experiments were going on in France, attempts had also been made in Germany. Weissenburg of Mannheim, who lost his sight when about seven years of age, made use of letters cut in cardboard, and afterwards pricked maps in the same material. By this method he taught Mdlle. Paradis (1759-1824), the talented blind musician and the friend of Valentine Haüy. To Haüy belongs the honour of being the first to emboss paper (1784) as a means of reading for the blind. His books were embossed in large and small italics, from movable type set by his pupils.

In 1827 Mr. Gall of Edinburgh embossed some elementary works, and published the Gospel of St. John in 1834. His plan was to use serrated lines and replace curves by angles. In 1832 the Edinburgh Society of Arts offered a gold medal for the best method of printing for the blind, and it was awarded (1837) to Dr. Edmond Fry of London, whose alphabet consisted of ordinary capital letters without their small strokes. In 1836 Rev. W. Taylor of York, and Mr. Alston, in Glasgow, began to print with Fry's type. Almost simultaneously, in 1833, printing for the blind was commenced in Boston, U.S.A., and Philadelphia. Dr. S. G. Howe, in Boston, used small English letters without capitals, angles being employed instead of curves; while Mr. Friedländer, in Philadelphia, used only Roman capitals. About 1838 Mr. Lucas of Bristol, a shorthand writer, and Mr. Frere of Blackheath, each introduced an alphabet of simpler forms, and based their systems on stenography. In 1847 Dr. Moon of Brighton brought out a system which partially retains the outline of Roman letters. This type is easily read by the adult blind, and is still much used by the Home Teaching Societies. The preceding systems are all known as line types, but the one which is now in general use is a point type.

In 1829, Louis Braille, a blind pupil in the Institution des Jeunes Aveugles, Paris, invented an alphabet in which the characters are formed by an arrangement of dots. Its signs are purely arbitrary, and consist of varying combinations of six points (⠿) placed in an oblong, of which the vertical side contains three and the horizontal two points. There are sixty-two possible combinations of these six points. The Braille system for literature and music was brought into general use in England by the late Dr. T. R. Armitage. Unfortunately, the American institutions have adopted two modifications of the point type, and books are being printed for the English-speaking people in three different methods of point type. The original Braille is used by the institutions for the blind in the British empire, in European countries, and in Mexico, Brasil, and Egypt.

Apparatus.—For writing the point alphabet a simple and ingenious frame has been constructed. Recently Mr. F. Hall, superintendent of the School for the Blind, Jacksonville, Illinois, U.S.A., has perfected a Braille typewriter and also a stereotype-maker by which brass plates can be embossed and any number of copies printed. Mr. Stainsby of Birmingham has brought out a Braille shorthand writer modelled on the Hall machine.

Many ciphering boards have been constructed from time to time to enable the blind to work arithmetical problems. One of the earliest was that invented by Nicholas Saunderson, the blind professor of mathematics at Cambridge. The most recent, and the one now used in the United Kingdom, was introduced by the late Rev. W. Taylor. The board has star-shaped openings, in which a square pin fits in eight different positions. The pin has on one end a plain ridge, on the other a notched ridge, and sixteen characters can be formed with the two ends. This board can be used for algebra. Books are prepared with raised geometrical diagrams. Geography is taught by means of relief maps.

Chiefly owing to the unremitting energy and liberality of the late Dr. T. R. Armitage in connection with the British and Foreign Blind Association, all school appliances for the blind have been greatly improved and cheapened during the last thirty years.

STATISTICS.—Taking the census as a guide, the number of blind in proportion to the population has been steadily on the decrease since the year 1851, when statistics in regard to the blind were first scheduled. For instance, the figures show that in 1851, in England and Wales, there was one blind person to every 979; in 1861, one to every 1,037; in 1871, one to every 1,052; in 1881, one to every 1,138; and in 1891, one to every 1,235. This result is probably due to improved ophthalmic surgery, and to especial attention being paid to the inflammation of the eyes of new-born babes, a disease which can be prevented and, if taken in time, cured.

There are in England and Wales 25 resident schools, 33 workshops, 46 home-teaching societies; in Scotland, 5 schools and workshops (combined), 9 home-teaching societies; in Ireland, 1 resident school (deaf, dumb, and blind), 5 workshops, 3 asylums (females), 2 home-teaching societies.

The trades usually taught to males are the making of baskets, brushes, mats, sacks, ropes, ship-fenders, brooms, mattress-making, upholstery, wire-making, chair-caning, wood-chopping, etc. Females are taught to make fancy baskets, brushes, chair-caning, knitting, netting, sewing (machine and hand), crocheting, etc.

Large sums have been left for granting pensions to the blind. The principal charities for this purpose are Day's, Hetherington's, the Clothworkers', the Cordwainers', National Blind Relief, and Royal Blind Pension Societies. In 1882 the late Henry Gardner left a bequest of £300,000 to the blind of England and Wales; a portion is given in pensions, but the larger part is devoted to education and training.

Parliament in 1893 passed an act granting elementary education to blind and deaf children, and extended the age limit to sixteen. The education provided by the school authorities is inadequate.

In the United States, each state government makes liberal provision for the education and training of the blind. Although it costs much more *per capita* —from £40 to £60 per annum— the blind are as amply provided with the means of education as children that see. The general government of the United States appropriates $10,000 per annum for printing embossed books for the blind. France, Germany, Austria, Russia, Norway, Sweden, Denmark, Belgium, Switzerland, Spain, and the English colonies provide by taxation for the education of the blind.

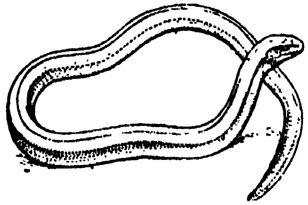
See Levy's *Blindness and the Blind* (1872); Wilson's *Biography of the Blind;* Armitage's *Education and Employment of the Blind* (2nd ed. 1886); Blair's *Education of the Blind* (1876); H. J. Wilson's *Information in Regard to Institutions, Societies, and Classes for the Blind in England and Wales* (1887); Guillié's *Instruction and Amusements of the Blind;* W. Harris's *Guide to Institutions and Charities* (new ed. 1884); Moon's *Light for the Blind* (3rd ed. 1877); Meldrum's *Light on Dark Paths* (1883); *Life of Miss E. Gilbert; Life of Professor H. Fawcett; Life of Dr. Moon;* Roth's *Prevention of Blindness* (1885), and *Physical Education of the Blind* (1885); *Report of Royal Commission (1889);* Reports of Conferences in England, America, and Europe; Reports of leading Institutions for the Blind; De la Sizeranne's *J. Gaudet, his Life and Works, The Blind in Useful Avocations, The Blind in France, True Mission of Smaller Schools* (all in French); *Ten Years' Study and Work for the Blind* (1890); *The Blind as seen through Blind Eyes* (trans. by Dr. Park Lewis, 1893); Mell's *Encyklopädisches Handbuch des Blindenwesens* (1900).

Blind, KARL, German author and revolutionist, born ([illegible]) in Mannheim. Condemned, for taking part in the revolution of 1848, to eight years' imprisonment, he was freed by the people and soldiery. Member of the embassy of Baden and Bavaria to Paris, he was there, on the charge of participating in Ledru-Rollin's rising, imprisoned, and then banished from France. He went in 1852 to London, and there formed intimate relations with the leaders of European democracy—Mazzini, Garibaldi, Louis Blanc, etc. He furthered the Schleswig-Holstein movement, and fought in the war of 1870-1. His writings range over Germanic history, literature, and folklore, as well as politics.

Blind Spot IN THE EYE. This is that part of the retina which is insensible to light, and is the point pierced by the optic nerve. If, having closed one eye, one fixes the other on a black spot on a white ground, any small black object, gradually drawn away sideways from that spot, will at one point disappear, but will presently reappear after having been further removed. The limits of the blind spot can be found by performing the same experiment in different directions. The blind spot is unnoticed in looking at objects in the ordinary way, for more than one reason. It lies outside the field of distinct vision—*i.e.* it is always at a point remote from that on which the eyes are fixed. Again, the same point of any object does not fall on the blind spots of both eyes at the same time. Lastly, the blind spot causes blankness, and not a perceptible darkness, which can only be distinguished by those parts which can also distinguish *light*.

Blindstory, in architecture, the middle story of a large church, over the pier arches and under the clerestory windows. The technical name is 'triforium,' as the gallery or open space between the vaulting of the nave and the roof of the aisles generally opens on the nave by triple apertures. The ornamental arrangement of the triforium varies considerably. In the Norman style it is often formed of a single complete arch, or of an arch subdivided into smaller ones, supported on diminutive shafts. In the Early English style a range of small arches is not uncommon, and sometimes two or more larger arches subdivided are used. In the Decorated and Perpendicular styles the space occupied by the triforium is often much reduced. In ancient times the triforium was appropriated to the use of females. Excellent specimens of the triforium are to be seen at Winchester, Canterbury, Westminster, and Beverley.

Blind-worm, or SLOW-WORM (*Anguis fragilis*), a harmless lizard which differs from its allies in the absence of limbs. Eyes are present, so that both parts of the common name are misnomers. The specific name refers to the fact that the tail is very brittle, as in so many lizards. The food consists chiefly of earthworms and slugs, and the animal is more or less nocturnal in habit. It is usually yellowish brown in colour, but varies to some extent with the surroundings. It is widely distributed throughout Europe, and is viviparous.



Blind-worm, or Slow-worm.

Bliss, FREDERICK JONES (1859), American archæologist and explorer, born at Mount Lebanon, Syria, and educated in America. From 1890 to 1900 he was explorer to the Palestine Exploration Fund, chiefly at Tell-el-Hesy and Jerusalem, and wrote *Excavations at Jerusalem, 1894-7* (1898), and *A Mound of Many Cities* (1894).

Bliss, PHILIP (1787-1857), English antiquary, edited Wood's *Athenæ Oxonienses* (1813-20) and *Autobiography*(1848), and Hearne's *Reliquiæ Hearnianæ* (1857). From 1824 53 Bliss was registrar of Oxford University.

Bliss, PHILIP PAUL (1838-76), born at Clearfield, Pa., U.S.A. He composed numerous hymns (*Hallelujah! 'tis done, Pull for the shore, Hold the fort*, etc.), which became exceedingly popular when utilized by Moody and Sankey in their evangelistic services.

Blister, a vesicle caused by a deposition of serous fluid beneath the skin, in consequence of a burn, the application of a vesicant, or disease, or friction. The same name is given to the therapeutic medium by which the blister is produced. The colour of a blister shows the nature of its contents, amber colour indicating serum, opalescence pus, and red an admixture of blood. The treatment in general is to puncture, so as to allow the contents of the vesicle to escape slowly, and then to cover with boracic lint. Vesicants, or substances which cause blistering, are cantharides, glacial acetic acid, liquor ammoniæ, liquor epispasticus or blistering fluid, 'Corrigan's button' or 'hammer,' a small flat iron or button heated and applied to the skin.

Blistering is the application of a vesicant near an inflamed part; it should not be directly over it, nor where the skin is loose, nor over any prominence of bone. The cantharidine of a blister may be absorbed and affect the kidneys injuriously, but this should be prevented by sprinkling powdered camphor over the blister before applying it to the skin. A blister left on too long may produce dangerous sloughing; six or eight hours are generally sufficient, when it should be replaced by a warm dressing or poultice. A blister should be opened by pricking the most dependent parts with a disinfected needle. The part should then be dressed with sterilized cotton wool or boracic lint. In the case of children, blisters must be used with special caution, being kept on only for an hour or until the skin is reddened, and then replaced by an aseptic poultice. A blister first acts as a local stimulant; if kept on long enough it causes a large discharge of serum, and so acts as a depletive and depressing agent. A blister over the heart will stimulate its action. Blisters are of service in many brain affections that are attended with congestion, in pleurisy with effusion, in pericarditis, and in effusion in joints. In the acid vomiting of gouty patients a blister over the epigastrium may give relief, and some forms of neuralgia will yield to a vesicant over the seat of pain.

Blister Beetles, a name applied to the members of the family Cantharidæ. See CANTHARIDES and OIL-BEETLES.

Blitung. See BILLITON.

Blizzard. In the United States, the winter north wind in Montana and the Dakotas is at times exceedingly cold and strong. It is called the 'blizzard,' and is accompanied by a rapid fall of temperature to a point below 0° F.; the gale drives before it ice-needles instead of snow, the flakes being virtually ice dust about one-twentieth of an inch in diameter. In severe blizzards the wind will blow at the rate of fifty miles an hour, with the thermometer at 62° below freezing-point; and it has been known to blow for 100 consecutive hours at the rate of over forty miles an hour. No one can live in these winds for any length of time; the painful effect of the blast loaded with ice-needles rouses a kind of frenzy, and many of those who have died from exposure have torn off all their clothing before being overcome. The blizzard also extends from Texas to Illinois, but is not there nearly so severe as in the west and north-west. The name has been in common use since the winter of 1880-1.

Bloch, CARL HENRIK (1834-90), a leading modern representative of Danish national painting; studied at the Copenhagen Academy (of which he was appointed professor in 1871), and painted Zealand and Jutland peasant life—*e.g. The Dinner, The Fishermen's Home*—between 1854 and 1859. In Rome (1859-65) this many-sided artist painted the humorous side of monastic life, and became a historical painter. His chief works (*e.g. Christian II. a Prisoner in the Castle of Sonderburg*, and *Samson and the Philistines*) are in the gallery of the royal palace of Christiansborg at Copenhagen; while a fine piece, *The Deliverance of Prometheus*, went to Athens. He was also a fine etcher. See Muther's *History of Modern Painting* (1895-96).

Bloch, JEAN DE (1836-1902), Polish banker, railway constructer and administrator, was born of Jewish parents, and educated at Warsaw. He wrote, in Russian, *Influence of Railways on the Economic Condition of Russia* (5 vols.), *The Finances of Russia* (4 vols.), and in 1898 *The War of the Future* (6 vols.), of which part has been translated into English under the title *Is War now Impossible?* (1899). The thesis of the last work, which has provoked considerable discussion, is that war between the great powers, such, for example, as between the Dual and Triple Alliance, is no longer possible as the arbiter of international disputes. Bloch points out (1) that the two great alliances are nearly equal in combined numbers, wealth, discipline, and moral qualities; (2) that modern weapons and tactical methods have so developed that the defensive force has gained an immense increment of strength which enables small bodies of men to defend a widely-extended front against superior numbers of the enemy for a protracted period; and (3) that the frontiers are now fortified on a most complete scale, and behind them are vast plains which the spade and magazine rifle can turn into impregnable fortresses. From these considerations he deduces that modern wars will be long wars, and must necessarily result in economic exhaustion, entailing starvation and the dislocation of the social fabric. At best they will result in a 'kind of stalemate,' with no decisive issue. The recent African war (to which Bloch's theory did not specifically apply) justified his theory as to the strength of the defence and the necessity for an overwhelming superiority of force on the part of the attack, and further corroborated a variety of his minor conclusions. These points, however, many military men hold to be more commonplaces. His pamphlet, *Lord Roberts's Campaign and its Consequences*, predicted the long guerilla war which followed the fall of Pretoria, and suggested the blockhouse scheme which ultimately brought about the reduction of the country district by district. It is, perhaps, too early (May 1905) to test his theories in the case of the Russo-Japanese war; but this much may be said—the losses on both sides due to the use of modern weapons have been unprecedented, the fighting line has been enormously long (100 miles in the case of the Japanese before Mukden), the resisting power of a modern fortress is exceedingly great, close formations entail murderous destruction, and the cost of warfare is so vast that the possibility of economic exhaustion on the part of one or other of the combatants must not be lost sight of.

Block. See PULLEY.

Block, MAURICE (1816-1901), political economist and statistician, was born in Berlin, but became a naturalized Frenchman. In 1862 he was under-secretary to the statistical bureau of the minister of agriculture, and in 1880 was elected member of the Academy of Sciences. Author of *Dictionnaire de l'Administration Française* (1892), *Petit Manuel d'Economie Pratique* (1890), *Progrès de la Science Politique depuis Adam Smith* (1890), *Annuaire de l'Economie Politique et de la Statistique* (1856 *et seq.*), and *Petit Dictionnaire Politique et Social* (1896).

Blockade. The object of a blockade is to prevent an enemy from communicating, or conducting commerce, with the outside world by sea, in order to damage his resources. A blockade may be in consequence either military or commercial—the former when it affects a fortified town or fleet, the latter when it affects commerce. Commercial blockades are perhaps the more important in their far-reaching effects. The most extensive blockade ever conducted was carried out by the Federals during the civil war in the United States. It extended from the Potomac to the Rio Grande, along the Atlantic coast, and over the Gulf of Mexico, for a distance of 3,000 miles, and lasted four years.

A blockade being an act of war, may be instituted by any recognized belligerent. Differing, as it does, from a siege in the way in which it affects neutrals, certain rules concerning it are adhered to by the leading nations. In a siege or blockade by land, the investing force is in occupation of territory of which it is in possession; whereas a blockading fleet occupies the sea, which is the highway of all nations. The rules which are accepted by Great Britain, the United States, and Germany are that a blockade may be a blockade *de facto*, or a blockade after notification. In the former case a neutral is not expected to be aware of the existing blockade, and, after a warning from the blockading squadron, has to leave the neighbourhood; in the latter case a vessel is subject to capture, ignorance of the blockade being no excuse. The system followed by the French, Italian, Spanish, and Swedish governments is to give a general notification, and a particular one to each ship from one of the vessels of the blockading squadron. It is probable that this system will be superseded, for the reason that the existence of the telegraph almost precludes any possibility of ignorance, and because it would be dangerous, in these days of vessels of high speed, to allow them to approach for inquiry or warning. As Judge Field observed, the greatest facilities would be afforded to elude the blockade.

Various opinions have been held as to what constitutes an effective blockade. In 1742 France and Denmark agreed that at least two vessels were necessary, or a battery on shore. At a later date Holland and Sicily agreed that six vessels just out of gunshot were necessary, or else batteries on shore that were able to prevent ships from entering the port. The Declaration of Paris of 1856, by giving a greater elasticity, has probably brought the matter nearer to practical solution by laying down that blockades to be obligatory are to be effective that is to say, maintained by a force sufficient to shut out the access of the enemy's ships and other vessels in reality. In 1862, in a note to the United States, the government of Great Britain said that it was of opinion that the fact of a few vessels having managed to run a blockade did not prevent it from being an effective blockade according to international law.

There are various rules in regard to blockade that have been adopted by common consent for convenience. A ship, *for instance*, is not liable to capture if, on arriving at the scene of blockade, her papers show that she began her voyage in ignorance of it, and was directed to make inquiry, and to proceed, if necessary, to an alternative destination. A vessel, further, for the sake of humanity, is allowed, if in danger or distress, to enter a blockaded port. If a neutral ship be in port when a blockade begins, she is given fifteen days for clearing. Mail steamers, on condition that no contraband of war is carried, are allowed in and out of a blockaded port. In the United States war with Mexico, British mail boats ran in and out of Vera Cruz. Neutral men-of-war are by consent and custom, but not by right, allowed ingress and egress. See H. Wheaton's *Internat. Law* (new ed. 1895); W. E. Hall's *Internat. Law* (1880); Freeman Snow's *Lectures at the Naval War Coll.* (1895).

Block - books, books printed from engraved wooden blocks, one block generally serving for an entire page. A large number of these were produced in Central Europe, chiefly in Germany, also in Holland, during the years that immediately preceded (say 1435 onwards) the invention of typography, or printing from small movable types. Some of them consisted wholly of pictures; others contained explanatory text. It is not known with certainty whether a rude kind of press was used, or whether they were produced by rubbing the back of the paper as it lay on the block. Only one side of the paper was printed on, two blank sides being afterwards pasted together.

Blockhouse, originally a detached fort blocking or covering the access to a landing, a narrow channel, a mountain pass, a bridge, or other strategical point. It may be constructed of timber, stone, or metal, and is loopholed and embrasured for rifle-firing. The most recent use of the blockhouse was in the war (1899-1902) with the Boers in S. Africa, where the system was employed by Lord Kitchener to protect the railways and British lines of communication.

Blocking Course, in masonry, a course of stones laid above a projecting cornice, in order that its weight may prevent the latter from falling, where the centre of gravity of the cornice is rather far forward.

Blocksberg. See Brocken.

Block System. See Railway.

Bloemfontein, cap. of Orange River Colony, British S. Africa, 749 m. by rail N.E. of Cape Town and 450 m. N. by E. of Port Elizabeth; healthily situated at an elevation of 4,518 ft., on an extensive plain, which gives it some repute as a health centre. It contains the council chamber of the former republican government, the residence of the former presidents, and a museum. It was occupied by Lord Roberts (March 13, 1900). Pop. (1890) 2,077 whites and 1,300 natives; (1904) 15,421 whites and 18,468 natives.

Blois, anc. tn. and cap. of dep. Loir-et-Cher, on r. bk. of Loire, 30 m. by rail S.W. of Orleans. The cathedral (Late Gothic) was rebuilt in 1678. The oldest part of the castle (Tour des Oubliettes) dates from the 13th century. Joan of Arc raised her standard here in 1429. The town manufactures vinegar, chocolate, earthenware, shoes, and bricks, and has some trade in wine, corn, and timber. Pop. (1901) 23,789.

Blok, Petrus Johannes (1855), Dutch historian, born at Helder; professor of history at Groningen (1884) and Leyden (1894); has written *Geschiedenis von het Nederlandsche Volk* (5 vols. 1892-1901; Eng. trans. by Miss Putnam, 1898, etc.), and books on the history of Dutch towns (1883 and 1884).

Blomefield, Francis (1705-52), topographer of Norfolk, England, born at Fersfield. The work of his life, the *History of Norfolk*, is a mine of information on the county. The third volume he did not live to finish. Continued by C. Parkin, the work appeared in 5 vols. (1739-75), and in 11 vols. (1805-10).

Blomfield, Charles James, (1786-1857), bishop of London, was born at Bury St. Edmunds. He had a brilliant career at Trinity College, Cambridge, of which he was elected a fellow. Between 1810 and 1815 he published editions of several of the plays of Æschylus, an edition of Callimachus, and (in conjunction with Dr. Monk) the *Posthumous Tracts of Porson* (1812) and the *Adversaria Porsoni* (1814). Blomfield became rector of St. Botolph's, Bishopsgate (London), in 1819, bishop of Chester in 1824, and then bishop of London (1828-56). During his London episcopate more than two hundred churches were built, and he was also mainly instrumental in establishing the Colonial Bishoprics Fund. See *Memoirs of Bishop Blomfield*, by the Rev. A. Blomfield (1863).

Blommaert, Philip (1808-71), Flemish author, born at Ghent. One of the chief revivers of the Flemish idiom, he edited its poetry of the 12th to the 14th century, including *Theophilus* (1836; new ed. 1858), which bears some resemblance to *Faust*, and *Oud-vlaemsche Gedichten* (1838-51). He also translated the *Nibelungenlied* into Flemish. *Aleoude Geschiedenis der Belgen* (1849) is marked by anti-French sentiment.

Blommer, Nils Jacob Olsson (1816-53), Swedish painter of landscape and prose myths. His effort was to represent what lies in the poetry of the people, all the mythical figures which belong neither to definite age nor to definite poets, but constitute rather the expression of national sentiment. Among his works are *The Faithful Sister*, *The Youth and the Elves*, *Neckan's Sport*.

Blommers, B. J., a living Dutch painter of interiors, landscapes, peasant and fisher life. In choice of subject he resembles Israels, except that he depicts the joy of life and not its tragedy. His *Girl Knitting* and *Shrimpers* are in the Amsterdam National Museum; another good specimen of his skill is *Mother's Joy.* Many of his pictures are in private collections in Glasgow, Edinburgh, and London. See Rooses, *Dutch Painters of the 19th Century* (1898-1901).

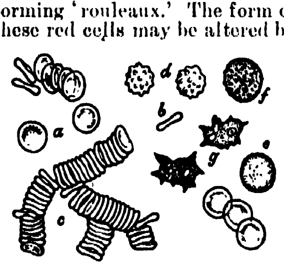
Blonde, a British third-class cruiser (1,580 tons) launched in 1889. The name was introduced into the navy to commemorate Elliot's capture of the French *Blonde*, with two others, on Feb. 28, 1760. The ship-name has since been associated with the capture of Charleston (1780), the capture of Martinique (1794), Egypt (1801), the destruction of the *Loire* and *Seine* (1809), the capture of Guadeloupe (1810), and the war with China (1839-42).

Blondel, famous *trouvère* of the 12th century, a native of Nesle in Picardy; was the friend of his fellow-minstrel, Richard Cœur de Lion, king of England. Richard, returning from the Holy Land, was captured by Leopold, Duke of Austria, and thrown into the dungeon of Dürrenstein, where he was discovered by Blondel, whose song was answered by Richard from the tower. Speeding to England, Blondel arranged for the payment of the ransom which set Richard free. The earliest trace of this legend occurs in the *Chronicle of Rheims* (13th century); no mention of it is found in Blondel's (Blondain's) acknowledged poems (vol. xix. of Tarbé's ed. *Collection des Poètes Champenois*, Rheims, 1862).

Blondin, Charles (1824-97), acrobat and tight-rope walker, whose real name was Jean François Gravelet, was born at St. Omer; trained at Lyons; engaged in a tour through the United States; crossed Niagara on a tight rope in five minutes, June 1859; and settled in England during the last thirty years of his life. In 1862 he took an engagement at the Crystal Palace, and performed at a height of 170 ft. from the ground. He considered his most difficult feat was walking from the mainmast to the mizzen on the P. & O. steamer *Poonah* while on a voyage to Australia. After spending several years in retirement he reappeared in public, and died at Ealing.

Blood, the red fluid which circulates through the heart, arteries, capillaries, and veins, supplying nutrition to all parts of the body, and conveying waste substances from the tissues to those organs by which they are excreted.

Human blood is bright red in the arteries, dark in the veins, of an average sp. gr. of 1·055, of a salt taste, faint odour, an alkaline reaction, and a temp. of 100° F. in the interior of the body, but lower in the extremities and on the surface. It holds in suspension large numbers of cells or corpuscles. The fluid itself is called the *plasma* or *liquor sanguinis*. The corpuscles are of two kinds red and white. In a cubic millimetre of normal human blood there are five million red and ten thousand white corpuscles. The red give the colour to normal blood; they contain a pigment, hæmoglobin, a complex proteid substance containing about 0·4 per cent. of iron. The red corpuscles are round discs $\frac{1}{3200}$ of an inch in diameter and $\frac{1}{12000}$ of an inch thick, and are of a light yellowish tint when seen under the microscope. When freshly-drawn blood is examined under the microscope, the red corpuscles are seen to run together, forming 'rouleaux.' The form of these red cells may be altered by various diseases—*e.g.* pernicious anæmia; and another alteration due to disease is the appearance of nucleated forms of different size. The number of the red cells may also vary: the term 'polycythæmia' is applied to those conditions in which the number of red cells is higher than normal, as contrasted with oligocythæmia, which means a decrease in number. The former condition arises when an animal is taken from a low to a high altitude; the latter is present in all forms of anæmia. The white blood corpuscles, or leucocytes, though much less numerous than the red ones, have important functions. They are derived from lymph corpuscles, the cells of lymphatic glands, spleen, and pancreas; some of them (phagocytes) devour bacteria, dead or degenerate tissue, the products of inflammation, etc., and so have been called 'blood scavengers.' But they not only destroy what is effete; their normal secretions, especially those of the granular forms (for there are several kinds of leucocytes), have been shown to be essential to the economy of the body. Other solid elements in the blood are 'blood plates,' round bodies less than half the diameter of red corpuscles; they do not, as a rule, contain hæmoglobin, but are rich in phosphates and glycogen, and are supposed to aid in coagulation. Granular bodies also are found in blood: they are small, round, and highly refractive; seem to be derived from leucocytes, degenerating red cells and blood plates; and form precipitates in the blood plasma.



Blood Corpuscles.

a, Red corpuscle; *b*, the same in profile; *c*, red corpuscles in rouleaux; *d*, crenate red corpuscles; *e*, finely granular colourless corpuscle; *f*, coarsely granular; *g*, amœboid forms.

Chemical Composition. In the red cells the main constituents are hæmoglobin (a globulin which coagulates at 167° F.), lecithin, cholesterin, and salts of potassium, sodium, iron, calcium, and magnesium. The most important salts are the chlorides and phosphates. There is about 70 per cent. of water. The hæmoglobin, which takes up oxygen in the lungs and carries it to all the tissues, is by far the most important constituent. The leucocytes are rich in a proteid, 'nucleo-histin;' and the large proportionate quantity of phosphorus in the cells depends mainly on this substance and on lecithin. The number of leucocytes increases after a meal, and is proportionately larger in the pregnant, the newly-born, and in those suffering from certain diseases. (See LEUCOCYTHÆMIA.)

Plasma and Serum. While blood corpuscles and plasma form normal blood, clotted blood consists of clot and serum. The plasma is alkaline, yellowish in tint, of sp. gr. 1·026 1·029; 100 parts of plasma contain water 90·3, and solids 9·7. The characteristic proteids of serum are serum globulin, serum albumin, and fibrin ferment; those of the plasma are fibrinogen, serum globulin, and serum albumin. The gases of plasma and serum are small quantities of oxygen, nitrogen, and carbonic acid gas.

The *coagulation* of blood may be observed in blood which has been drawn into an open vessel. In two or three minutes the surface of the fluid becomes semi-solid or jelly-like, and this change extends in eight or nine minutes throughout the mass. It is supposed that when blood is in the body it contains a globulin 'fibrinogen,' and that when it is shed the fibrinogen molecule is split up into a globulin which remains in solution, and 'fibrin ferment' which does not exist in healthy blood, but is a product of the disintegration of the white corpuscles and blood plates produced when the blood leaves the vessels or comes in contact with foreign matter. Methods have been devised for estimating the total quantity of blood, the volume of the corpuscles and plasma, the specific gravity, and the alkalinity. The quantity of hæmoglobin is estimated by colour tests, and the number of red corpuscles within a given volume is counted under the microscope in the hæmocytometer. The bacteriological examination of blood has yielded valuable results, as, for example, in 'Widal's reaction,' which is valuable in the diagnosis of typhoid fever.

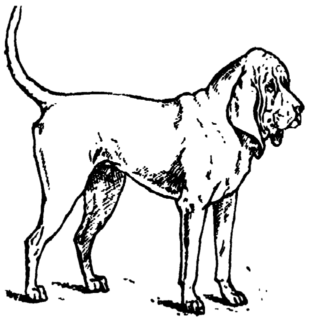
Blood, AVENGER OF (Heb. *goël*), a title given to one who pursued a murderer or manslayer to avenge the death of his kinsman. By the Mosaic law (Num. 35) the avenger of blood was authorized to slay a fugitive murderer as soon as overtaken; but he was not permitted to harm the perpetrator of an accidental manslaughter, unless the latter quitted his city of refuge before the death of the contemporary high priest. These regulations clearly presuppose that the avenger of blood was personally actuated by a spirit of revenge, the slain person being presumably of his kindred. The Koran sanctions blood vengeance, and permits pecuniary commutation for murder. See W. Robertson Smith's *Religion of the Semites* (1894), p. 33 *f*.

Blood, THOMAS (*c.* 1618-80), English adventurer, usually styled Colonel Blood. For his military services on the parliamentary side he was rewarded with Irish estates, which he lost at the restoration, but received again from Charles II. His most notorious exploits were the plot to surprise Dublin Castle and seize the lord-lieutenant, in 1663; the rescue of his friend Captain Mason from a guard of eight troopers near Doncaster; the attempt to abduct and hang the Duke of Ormonde, in 1670; and the theft of the crown jewels in 1671, for which he was imprisoned, though shortly released by the king, who heaped upon him proofs of royal favour.

Blood Flowers are species of *Hæmanthus*, order Amaryllidaceæ, from S. Africa. The flowers vary from white to crimson, and most of them have conspicuous and showy bracts. About forty species are used as greenhouse and sometimes as border plants in Britain. The juice of *H. toxicaria* is used by natives for poisoning their arrows.

Bloodhound, one of the oldest breeds of British dogs, though the present type is very different from the animal used as a dog of war in the 15th and 16th centuries. The art of the breeder has emphasized those features which give dignity and nobility of appearance; and the modern bloodhound, with its peculiarly pointed or dome-shaped skull, its crimson 'haws,' its many wrinkles, its solemn aspect, and its long, pendulous leathers or ears, perhaps carries characteristics to excess. Although popularly associated by name and reputation with fierceness to its human quarry, the bloodhound is a singularly docile, affectionate, and intelligent beast, and an admirable protector and companion to child or adult. A savage bloodhound is rare. Although the old vocation of the dog is gone, modern bloodhound trials have proved that, over ground less frequently trodden than a pavement, the animal retains its acute scent for human blood. It is equally ready to follow any of the chemical preparations used for hunting by 'drag.'

The descent of the English bloodhound is traced to the famous hounds of St. Hubert; but while these were black or white, the modern bloodhound is prejudiced by any admixture of white, except perhaps on the tip of the 'stern' or tail. The Cuban bloodhound, formerly used for hunting runaway slaves, is probably a collateral race from a Spanish stock, but lacks the superb qualities of the English type. There have been many celebrated breeders who have devoted their energies to keeping the strain pure, among whom may be noticed (in past years) Lords Yarborough, Fitzwilliam, and Faversham, the Hon. Grantley Berkeley, Mr. Jennings of Pickering (owner of the celebrated 'Druid'), Mr. Cowen of Blagdon-on-Tyne, and Mr. Holford of Ware (owner of 'Regent,' another magnificent hound). But in fostering 'type,' close breeding has been resorted to, with the usual result of defective constitution, and a large percentage of deaths among whelps.



Bloodhound.

The following are the points of the bloodhound as laid down by Mr. Edwin Brough, one of the leading breeders:—'Skull long, narrow, and very much peaked; muzzle deep and square; ears set on very low, long, thin, and hanging in graceful folds close to the face; deep-set eyes, with triangular lids, showing the red haw; flews long, thin, and pendulous, the upper lip overhanging the lower one; neck long, with profuse dewlap; skin of face very loose and wrinkled; coat close; skin thin; shoulders deep and sloping; brisket well let down; loins broad and muscular; powerful thighs and second thighs; good legs; round feet; hocks well bent; tapering, lashing stern. Colours, black and tan, red and tawn, tawny.' To this may be added a graceful carriage, and a very grand and sonorous voice, although not often heard when following the trail. The eye should be of a dark hazel colour, and full of aristocratic expression. The average weight of a dog is 90 lbs.; of a bitch, 75 lbs.; and the heights 26 and 24 inches respectively.

Blood-poisoning. See SEPTICÆMIA.

Blood-rain, a red rain which often occurs in Italy and S. Europe. The colour is traced to microscopic dust, of a brick-red colour, borne high into the air by winds from the African desert.

Bloodroot (*Sanguinaria canadensis*), a N. American plant of the poppy order. Its rhizome and roots have a red juice. It is grown as a hardy perennial in Britain, producing glaucous leaves and conspicuous white flowers with masses of yellow stamens. The plant is about six inches high, and makes an effective show. The name is also applied to species of the order Hæmodoraceæ, which is related to the Amaryllids. The plants are found in America, Australia, and S. Africa. Some Australian species have a red juice, and their roots are eaten by the natives. Another bloodroot is *Geum canadense*, order Rosaceæ, of N. America.

Blood-stains. In medico-legal investigations it is often of the utmost importance to determine whether stains are due to blood. The investigation is often carried on under difficulties: the stains may be small, old, or on foul linen, and a simple test should first be tried. Touch the spot with ammonia: if it turns a greenish tint, it is not blood, but probably a vegetable stain; if it does not alter, then various other tests may be tried. (1.) Take a small fragment of the stained fabric, place it on a colour-slab; add to it one or two drops of a freshly-prepared solution of guaiacum in alcohol, mix, then add a drop of ozonic ether. If blood is present, a blue colour results; if not, no colour change takes place. This test is most trustworthy when it yields a negative reaction; for other substances besides blood—such as gluten, raw potato, milk, and bile—give a blue colour with guaiacum. (2.) Cut out a piece of the stained fabric, and saturate it with glacial acetic acid, to which add a crystal of table salt if the stain is old. Press the fluid from the piece, evaporate it, and examine it microscopically when cool. If it is blood, the resulting crystals will be a yellow brown or claret colour, and yield a blue reaction with guaiacum. They are hydrochlorate of hæmatin, and usually occur in the form of rhombic plates. (3.) But by far the best test is the spectroscopic, and for this a small quantity of blood is sufficient. The spectrum of oxyhæmoglobin is characterized by the presence of two absorption bands between the lines D and E. But often the blood will have passed, by exposure to the air, from the condition of oxyhæmoglobin to that of methæmoglobin before the stain is examined; and the spectrum of methæmoglobin is like that of oxyhæmoglobin, with the addition of a thin band in the red nearer the C line than the D. The microscopic examination of the red corpuscles is useful in the case of fresh stains; but all the mammalia, with the exception of the camel, have blood corpuscles like those of man, and the difference in size is so slight that it is impossible to discriminate one from the other. The corpuscles of birds, fishes, and reptiles are more or less oval; those of the camel are large, oval, and nucleated.

Bloodstone, a name given to a variety of chalcedony or plasma, distinguished by the presence on a dark-green ground of blood-red spots, apparently due to red oxide of iron. It has been much used for rings and brooches, those varieties being most valued in which the red spots are bright, well defined, not too irregularly scattered, and contrast well with the dark-green colour of the body of the stone. It is found in Iceland, the Hebrides, and in larger quantities in India and Australia. Heliotrope is another name applied to bloodstone. See Streeter's *Precious Stones and Gems* (1898).

Bloodworms are the aquatic larvæ of gnats, belonging to the genus Chironomus. They are long, slender, worm-like creatures, which contain the red blood pigment hæmoglobin, and do not at first possess the ordinary tracheal system of insects. They occur in stagnant water.

Bloomer Costume. This form of dress was introduced into America in 1849 by Mrs. Bloomer of New York. It consists of an ordinary bodice, and a skirt falling just below the knees, over full trousers gathered at the ankles. The fashion was adopted by a few women in the west of London in 1851, but was ridiculed and soon discarded. It led the way, however, to the modern use of knickerbockers for cycling and climbing.

Bloomfield, tn., Essex co., New Jersey, U.S.A., 12 m. N.W. of New York, on Erie and Delaware Railroad and Morris Canal. It is the seat of a Presbyterian theological seminary. Pop. (1900) 9,668.

Bloomfield, Robert (1766-1823), English poet, born in Suffolk, was first an agricultural labourer, and then a shoemaker in London. During a short residence in the country in 1786 he conceived the idea of his poem *The Farmer's Boy*, written under melancholy circumstances in a London garret, and published in 1800. It is an estimable though much overpraised work, and was so successful that close on 26,000 copies were sold in three years. He died in poverty and mental darkness. A collected edition of his works, with Life by Joseph Weston, appeared in 1824.

Bloomington. (1.) City, Illinois, U.S.A., the co. seat of M'Lean co.; situated in the central part of the state, on four railways; has many manufactures and industries. It is the seat of Illinois Wesleyan University (1852) and a Roman Catholic college. Pop. (1900) 23,286. (2.) Post vil., Indiana, U.S.A., cap. of Monroe co.; is the seat of Indiana University, founded in 1828. Pop. (1900) 6,460.

Bloomsbury, part of eccles. par. of St. Giles-in-the-Fields and St. George, London, England.

Blore, Edward (1787-1879), English architect, son of Thomas Blore (1764-1818), Derby, whose *History of Rutland* (1811), as well as Britton's *English Cathedrals* (1811-15), he illustrated. He did much to revive the study of Gothic architecture. Among numerous buildings designed by him the chief was Abbotsford. He was the author of *Monumental Remains of Noble and Eminent Persons* (1824).

Blore with Swinscoe, par. and small vil., on the Dove R., N. Staffordshire, England, 4 m. N.W. of Ashborne. Ac. 1,886. On the heath was fought the second battle of the wars of the Roses in 1459.

Blouet. See Max O'Rell.

Blount, Charles, Earl of Devonshire and eighth Baron Mountjoy (1563-1606), served in Netherlands, in pursuit of the Armada, and in Brittany (1586-93), and was lieutenant of land forces in Essex's expedition to the Azores (1597). He was implicated in Essex's conspiracy, but escaped punishment. When lord-deputy of Ireland (1601) he put down Tyrone's rebellion. M.P. for Beeralston (1584, 1586, and 1593); K.G. (1597); created Earl of Devonshire (1603).

Blount, Charles (1654-93), English deist, was a disciple of Hobbes, and the author of several freethinking works. His *Anima Mundi* (1679) is a history of opinions concerning immortality. Priestcraft is attacked in *Diana of the Ephesians* (1680), and in the better-known translation, with notes, of *The Two First Books of Apollonius Tyaneus* (1680). Blount committed suicide, in despair of marrying his deceased wife's sister.

Blount, Thomas (1618-79), English miscellaneous writer, born at Bordesley; was educated for the law, but, being a Roman Catholic, did not practise. He was the author of the *Academie of Eloquence* (1654); *Boscobel*, in two parts (1660 and 1681); *Law Dict.* (1670); *Ancient Tenures and Jocular Customs of some Manors* (1679; new ed. 1815).

Blow, John (1648-1708), English musical composer, became organist of Westminster Abbey in 1669, and was successively master of the children at the Chapel Royal (1674) and St. Paul's Cathedral. In organ-playing his contemporaries reckoned him to be unequalled. He was a prolific composer of ecclesiastical music. He wrote incidental music for several occasions, notably the anthems, *I was glad* (for the opening of St. Paul's Cathedral), and *Behold, how good and joyful* (for the union with Scotland). Several of his pieces have been republished in Pauer's *Dict. of Pianists and Composers* (1877).

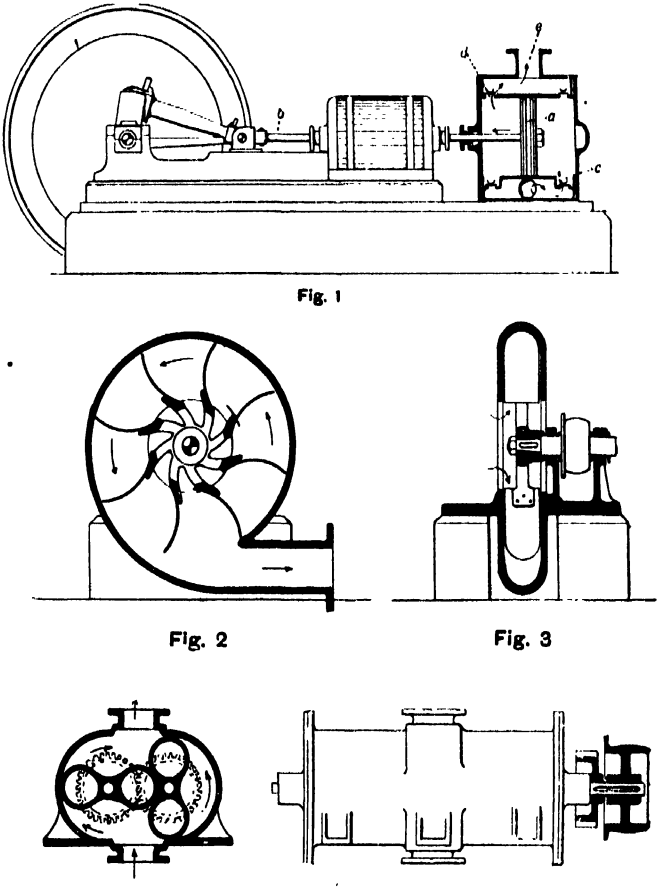


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Blowing Machines.

Fig. 1. Blowing cylinder—*a*, piston; *b*, piston rod of steam-engine; *c*, air inlet valve; *d*, outlet valve; *e*, blast main. Fig. 2. Centrifugal fan, side elevation (section); Fig. 3, end elevation (section). Fig. 4. Roots's rotary blower (section); Fig. 5, elevation.

Blow-fly. See Blue-bottle.

Blowing Machines, mechanical contrivances for the production of a current of compressed air. Their use is as varied as their form, but they are chiefly employed to produce the blast for metallurgical and forced draught for boiler furnaces, to displace vitiated air in close and foul places, to supply warmed, cooled, or purified air to public buildings, and to furnish a drying current of air to lumber, grain, fabrics, and other articles, or to remove steam, dust, and refuse from factories. The most elementary blowing machine is the common bellows of domestic use, which was also used from time immemorial for metallurgy, until the blowing cylinder with reciprocating piston was devised. Blowing cylinders worked by direct-acting steam-engines are now in general use to produce a blast of from two to five pounds pressure per square inch, according as the fuel is tender or hard; in American anthracite furnaces pressures up to ten pounds are employed. For low pressures and large volumes of air, fans and rotary blowers are preferred.

A modern blowing cylinder (Fig. 1) is fitted with a piston usually coupled direct to the reciprocating piston of the steam-engine. Air is drawn into one end of the cylinder through a flap-valve in the cylinder cover while the piston makes its out-stroke, and at the same time the air at the other side of the piston, drawn in at the previous in-stroke, is expelled under pressure through a flap-valve at the other end of the cylinder into the blast main, to be passed through the hot blast stoves before reaching the blast furnace.

Centrifugal fans (Figs. 2, 3) are employed either as compressing machines drawing their air supply from the atmosphere, or as exhaust fans displacing air for ventilating purposes. The air enters through apertures on one or both sides of the casing in the axis of the fan; thence it is driven towards the periphery by means of curved arms fitted on a rotating hub, and discharged through an opening in the casing. When pressures exceeding six inches of water are required, Roots's rotary blower (Figs. 4, 5) may be employed. It consists of a casing in which two 'rollers,' shaped like the figure 8, are centred on parallel axes, and are driven by a pair of equal spur-wheels in opposite directions at about 300 revolutions per minute. The rollers and casing have very little clearance, and the air is really scraped out of the casing on one side and delivered on the other.

Blowitz, HENRI GEORGES STEPHAN ADOLPHE OPPER DE (1825-1903), who won a European reputation as Paris correspondent of the *Times* during a period of thirty years, was born at the château of Blowsky, in Bohemia, and baptized a Catholic. At the age of twenty he was introduced at Paris to M. de Falloux, minister of public instruction. Shortly afterwards Blowitz received the offer of a professorship of modern languages in Angers. He subsequently occupied a similar post in Marseilles. He shortly afterwards retired from the teaching profession and took to politics. On the establishment of the republic in 1870 he obtained letters of naturalization. He supplied Thiers with information which enabled him to crush the commune in the south of France. As a reward he was nominated for the post of consul at Riga, but was appointed chief correspondent of the *Times* in 1873. The thirty years which intervened between this date and his retirement were crowded with brilliant journalistic achievements. On Dec. 31, 1873, he telegraphed particulars of the *coup d'état* in Spain, which he had obtained by actually interviewing in Paris the newly-proclaimed king, Alfonso XII. Two years later he exposed the designs of the military party in Germany for a fresh attack on France, and war was averted. He obtained a copy of the treaty agreed to at the Berlin Congress in 1878, and telegraphed its preamble and sixty-four articles to the *Times* before it was actually signed. The name of the plenipotentiary who gave him the treaty has never been divulged. It was Blowitz who first announced that the Russians were going to Merv. The news was contradicted by the Russian government, but the prophecy was realized within six months. During his connection with the *Times* he interviewed Bismarck, King Humbert, Pope Leo XIII., the Sultan of Turkey, and the Shah of Persia, among many notabilities. His *Memoirs* were published in 1903.

Blowpipe, an instrument used by glass-blowers, in analytical chemistry, and in the soldering of metals, for directing and increasing the rapidity of combustion of a flame. In its simplest form it consists of a tapered metal tube fitted with a mouthpiece; from the side projects a narrow tube provided with a nozzle of brass or platinum. By holding the point of the side tube into a candle or gas flame, and blowing a gentle current of air from the mouth, the flame is deflected, and an intensely hot, pointed jet is obtained. Larger blowpipes are made in various patterns, the air being supplied from a foot-bellows, and the supply of gas and air regulated by taps. See C. F. Plattner's *Blowpipe Analysis* (1875); W. A. Shenstone's *Methods of Glass-blowing* (2nd ed. 1888).

Bloxwich, eccles. par. and vil., Staffordshire, England, 3 m. N.W. of Walsall, on L. & N.W.R. In the vicinity are coal and ironstone mines and blast-furnaces. Pop. of par. (1901) 17,481.

Blücher, GEBHARD LEBERECHT VON (1742-1819), field-marshal of Prussia, was born at Rostock, and entered first the Swedish service, then the Prussian (1760). In 1772 he left the army and farmed his own lands until the accession of Frederick-William II. (1787). After being present in many actions (*e.g.* Kaiserslautern) against the French, he commanded the cavalry at Auerstädt in 1806, and was compelled to surrender after the fall of Lübeck (1806), but was soon after exchanged for the French general Victor. In 1813 Blücher received the chief command in Silesia, operating against the French at the battles of Lützen, Bautzen, and Haynau. He defeated Marshal Macdonald at the Katzbach in Aug. 1813, Marmont at Möckern (Oct. 16), and three days later made his victorious entry into Leipzig, and was raised to the rank of field-marshal. In Jan. 1814 he crossed the Rhine, and won the battle of La Rothière, but was soon afterwards defeated by Napoleon. This reverse, however, was quickly wiped out by his victory over Napoleon at Laon on Mar. 9; and after again inflicting a severe defeat on the French at Montmartre, he marched in triumph into Paris. After Napoleon's return from Elba in 1815, Blücher was appointed commander-in-chief of the Prussian army. At Ligny, on June 16, he was defeated after a stubborn action; but he rallied his scattered troops, and moved to the assistance of Wellington at Waterloo. This impending flank attack on the French contributed greatly to the completeness of Wellington's victory, and Blücher was in time to participate in the pursuit. On the second taking of Paris, Wellington had great difficulty in preventing Blücher from sacking the capital, which the latter held to be a justifiable retaliation for the sacking of other capitals by the French. He received the order of the Iron Cross (established 1813) from Frederick-William III. Rauch's noble statue of the veteran was erected (1820) at Breslau. Blücher's intrepidity and warlike fervour gained him the appellation of 'Marshal Vorwärts' (Go ahead), but he was not a great military strategist or tactician. He was characterized by patriotism, loyalty, and integrity, and by uncompromising hostility to Napoleon. Although rough in manner, he was idolized by his troops. He died at his estate in Silesia. See *Lives*, by Förster (1821; new ed. 1887), Scherr (1862), Varnhagen von Ense (in vol. iii. of *Biographische Denkmale*, 1827); also the various histories of the Waterloo campaign.

Blue. The blue pigments and dyes in most general use are ultramarine, cobalt blue, indigo, and Prussian blue, in addition to the large number of compounds made from coal-tar products. Laundry blue is made of ultramarine, 60 parts; bicarbonate of soda, 40 parts; glucose, 12 parts. Grind the two first together, mix in the glucose, and press in moulds. Liquid laundry blue may be made as follows:—Indigo or Prussian blue, 8 lbs.; oxalic acid, 1 lb.; water, 32 gallons.

Bluebeard, hero of the fairy tale, and type of savage husbands. The English version is a rendering of Perrault's *Barbe-Bleue* (in his *Contes*, 1697). Bluebeard is the subject of an *opéra bouffe* by Offenbach (1866).

Bluebell, a name applied to two plants—the wild hyacinth (*Scilla nutans*), which flowers in woods in spring; and the harebell (*Campanula rotundifolia*), which flowers during summer in pastures and on hills. The latter is the 'bluebell of Scotland.'

Bluebird (*Sialia Wilsoni*), a common N. American bird belonging to the thrush family. In the New England States it is known as the blue robin. The name is also applied to the Indian *Irena puella*, a member of the family Pycnonotidæ. See John Burroughs's *Wake Robin* (1871).

Blue Books, official reports of the British Parliament and the Privy Council, usually bound in blue paper covers, containing the votes and proceedings of the house, bills at their successive stages, annual estimates for the public service, accounts of the expenditure of the previous year's votes, documents tabled by the ministry voluntarily or on demand of the house, reports of government commissions, annual reports of governors of colonies and consuls, etc. One session's blue books will fill from fifty to sixty folio volumes. The printing of the proceedings of the house dates from 1681, and the selling of its blue books from 1835. In imitation of the blue book, Germany has established its gray or white book, first communicated (1884) to the Imperial Parliament. In France, the corresponding colour is yellow; in Spain and Austria, red; in Italy, green; and in the United States of America, both blue and red.

Blue-bottle, or BLOW-FLY (*Calliphora vomitoria*), an insect nearly related to the common house fly, but differing in its larger size, its bright blue abdomen, and its deep humming note. The eggs are laid in meat, especially if putrefaction has commenced—the flies being strongly attracted by decomposing matter of any kind—and hatch into maggots, which pass through the life-history usual for flies. In certain parts of England, especially the fens round the Wash, they are a source of constant trouble to the owners of sheep during the warm months, the maggots frequently penetrating the skin.

Blue-coat School. See CHRIST'S HOSPITAL.

Blue-eye, a name given to an Australian bird, *Entomyza cyanotis*, one of the honey-eaters.

Bluefields, or BLEWFIELDS, riv. and tn., Nicaragua, Central America. The river has a course of about 100 m., and is navigable for 60 m. The harbour of Bluefields is one of the finest in Central America. Pop. about 5,000.

Blue-fish (*Temnodon saltator*), also called 'skip-jack,' is a widely-distributed fish belonging to the family of the horse-mackerels. It is especially common on the coasts of N. America, where it is much used as food. It may attain a length of three feet, but is usually less, and is a most rapacious fish.

Blue-gowns, or KING'S BEDESMEN, public almsmen in Scotland to whom the kings distributed bounty, in return for which they were expected to pray for the welfare of king and state. The appointment of blue-gowns ceased in 1833, and the last allowance to a blue-gown was made in 1863. See Introduction to Scott's *Antiquary*.

Blue Grass, JUNE GRASS, or SPEAR GRASS (*Poa pratensis*), a valuable permanent pasture grass, known in Britain as smooth meadow grass, and in N. America as the 'blue grass of Kentucky.' The blue grass region is the scene of most of the novels of Mr. James Lane Allen. A similar species, Texas blue grass (*P. arachnifera*) takes its place in the southern states.

Blue Island, a suburb of Chicago.

Blue John Mine, chambered cave, N. Derbyshire, England, 1½ m. W. of Castleton, producing the nodular purple fluorspar known as Blue John.

Blue Mountains. (**1.**) Well-wooded (chiefly with eucalyptus) range of mountains in New South Wales, extending from the Warragong Mts. (or Australian Alps) on the S.W. to the Liverpool Range on the N., approaching to within 40 m. of the coast. In places the spurs run down to the shore. Average alt. 3,000 ft. (**2.**) Mountain group in Oregon, U.S.A., trending nearly N. and S., in the E. part of the state; alt. from 5,000 to 9,000 ft. It is chiefly composed of lava, with granite in the higher portions. (**3.**) Mountain range in E. of Jamaica, running from E. to W.,

Blue Nile. See NILE.

Blue Peter, in the British navy, the blue flag with white square in the centre, denoting the letter O in the alphabetical signal code; hoisted to show that a ship is about to put to sea.

Blue Pill, or *Pilula hydrargyri* of the British Pharmacopœia, contains free mercury in the proportion of one part in three, with liquorice and confection of roses. It is a common purgative, acting probably by irritation of the intestinal mucous membrane, and resulting in peristalsis and a watery exudation. It hastens the evacuation of bile, but does not increase the amount secreted by the liver. Its action is commonly aided by the after-use of some saline draught.

Blue Ridge, S.E. ridge of the Appalachian Mts.

Blue Shark (*Carcharias glaucus*), a common shark, which sometimes reaches a length of 25 ft., though from 12 to 15 ft. is the usual size. Most abundant in tropical seas, its range extends northwards to the south coast of England.

Bluestocking, a term applied contemptuously to a female pedant. It originated in connection with certain reunions held in London about 1780 by Johnson's friend, Mrs. Montagu, and other ladies. Hannah More addressed to them her poem of *Bas-Bleu, or Conversation* (2nd ed. 1787).

Blue Suns. After the great eruption of Krakatoa on Aug. 27, 1883, blue, green, silvery, and coppery suns were seen at many places in the tropics, the phenomenon being attributed to a dust haze which proceeded from the neighbourhood of the volcano. Some maintain that the appearances were merely the effect of contrast colours, while others refer them to the transmission or the diffraction of light. Professor Kiessling produced experimentally transmission tints varying from brownish red to gray-blue, obtaining the blue sun both with a cloud of chloride of ammonium and with aqueous vapour mixed with ordinary dust. See *The Eruption of Krakatoa, and subsequent Phenomena*, pp. 199 218.

Bluethroat (*Cyanecula suecica*), a beautiful bird allied to the redstart, which is an occasional visitor to Britain. It is also called the 'Swedish nightingale' and the 'bluebreast;' while to epicures it is one of the birds known as beccafico or beefin. It breeds in N. Europe, Siberia, Alaska, etc., and winters in Abyssinia and India.

Blum, HANS (1841), German jurist and historian, born at Leipzig. He was a member of the North German Parliament from 1867 70, and has written several works on jurisprudence and on the contemporary history of Germany, as *Auf dem Wege zur Deutschen Einheit* (2 vols. 1893), *Das Deutsche Reich zur Zeit Bismarcks* (1893), *Fürst Bismarck und seine Zeit* (6 vols. 1894-5), *Persönliche Erinnerungen an den Fürsten Bismarck* (2nd ed. 1900).

Blum, ROBERT (1807-48), German politician, born at Cologne. He helped to found (1840) at Leipzig the *Schiller Society*, and (1847) a publishing house from which he issued his *Staatslexikon*. Democratic leader in the revolution of 1848, he represented Leipzig in the Frankfort Parliament. Sent by the Left with a congratulatory address to the insurgents of Vienna, he led them at the barricades, but was taken prisoner and shot (Nov. 9) for having assumed arms against the imperial troops. The news excited the liveliest indignation throughout Germany, where £6,000 was raised for his widow and children. See his *Life*, by H. Blum (1878).

Blumenbach, JOHANN FRIEDRICH (1752-1840), German naturalist, born at Gotha. Appointed (1776) professor at Göttingen, he there lectured for nearly sixty years on natural history, anatomy, and medicine. In 1785, before Cuvier, he discerned that the true basis of zoological study is comparative anatomy, a science which he elaborated in *Handbuch d. vergleichenden Anatomie u. Physiologie* (1804; new ed. 1824). Devoting himself particularly to the history of man, he advocated the unity of the race, and made a collection of human skulls, supplying data for his *Collectio Craniorum Diversarum Gentium* (1790-1828). Original observations are also embodied in his *Ueber den Bildungstrieb* (1781), *Institutiones Physiologicæ* (1787; new ed. 1821), *De Generis Humani Varietate Nativa* (1795), etc.

Blumenthal, JACQUES, musical composer, was born at Hamburg (1829), and educated in Vienna and Paris, but is now a naturalized British subject, having lived in England since 1848. He is best known as a song-writer, his *Message*, *Requital*, *My Queen*, etc., having had considerable popularity.

Blumenthal, LEONHARD, COUNT VON (1810-1900), Prussian general. Appointed on the general staff in 1849, he distinguished himself in Schleswig-Holstein in the same year; took part as chief of the staff in the campaign against Denmark (1864); served as chief of the staff to the Crown Prince of Prussia in the Austrian campaign of 1866; and in the war with France (1870-1) he again acted as chief of the staff to the Crown Prince Frederick, and took part in the surrender at Sedan and in the siege of Paris. Created a field-marshal by the Emperor Frederick in 1888. He was one of the ablest strategists in the German army.

Blumenthal, OSKAR (1852), founder and manager of the Lessing Theatre (1888-97) in Berlin, and author of a number of light and popular comedies, such as *Der Probepfeil* (1882), *Die Grosse Glocke* (1887), *Im weissen Rössel* (1898). He has also written light satirical works, as *Allerhand Ungezogenheiten* (1874; 5th ed. 1877), *Gemischte Gesellschaft* (1877), and *Aus heiterm Himmel* (1882).

Blunderbuss, a short gun, unrifled, and with a large bore, widening towards the muzzle, firing many balls or slugs, which scatter when fired, and can do execution within a limited range without exact aim being taken. The blunderbuss has long been obsolete.

Blunt, JOHN HENRY (1823-84), English writer of theological and ecclesiastical books. Taking orders in 1852, he was presented with the crown living of Beverstone, in Gloucestershire, in 1873. He published *Annotated Book of Common Prayer* (1866), *Hist. of the Reformation* (1868), *Dict. of Theology* (1870), *Dict. of Sects and Heresies* (1874), and *Cyclopedia of Religion* (1884).

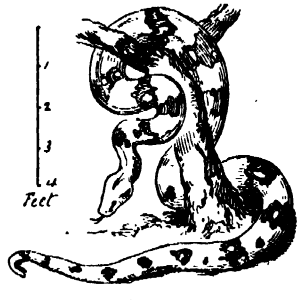
Blunt, JOHN JAMES (1794-1855), professor of divinity in Cambridge from 1839, is best known by his *Sermons*, and by his apologetic works, reissued as *Undesigned Coincidences in the Writings both of the Old and the New Testament* (1847). His *Hist. of the Christian Church during the First Three Centuries* (1856), and his lectures *On the Right Use of the Early Fathers*, were published after his death.

Blunt, WILFRID SCAWEN (1840), English poet, born at Petworth House, Sussex; served in the British diplomatic service from 1858 to 1870. Blunt upheld the cause of Arabi Pasha in Egypt in 1882, and in 1887-8 took part in the anti-coercion movement in Ireland, for which he suffered imprisonment. He is a poet of a high order, except when political questions are the subject. His works include *Love Sonnets of Proteus* (1880); *The Future of Islam* (1882); *The Wind and the Whirlwind* (1883); *Ideas about India* (1885); *In Vinculis* (1889); *A New Pilgrimage* (1889); *Esther* (1892); *Griselda* (1893); *Satan Absolved* (1899). A useful selection of his *Poems* was made by W. E. Henley and G. Wyndham in 1898.

Bluntschli, JOHANN KASPAR (1808-81), Swiss jurist, born at Zürich. Professor at Zürich (1833), he published (1838-9) *Staats- und Rechts- geschichte der Stadt u. Landschaft Zürich*, the tenor of which conforms with the principles of the historic school. In 1848 he was called to a law chair at Munich. His *Allgemeines Staatsrecht* (1852; 5th ed. 1875-6), translated into English (1885; 2nd ed. 1892) and French (1877), established his authority as a jurist. From 1861 professor at Heidelberg, and at the front of liberal movements, he cooperated in the foundation of the German House of Representatives (1862), and induced (1865) the upper house to voluntarily submit to reform. No less zealous for religious freedom, he was one of the most active members of the German Protestant Union. Bluntschli wrote several other books on German and Swiss law, politics, and history (*e.g. Geschichte der Republik Zürich*, 1847-56). His *Selbstbiographie* (3 vols.) appeared in 1884.

Blushing is a reflex dilatation of the blood-vessels of the face and neck, due to vasomotor paralysis through the cervical sympathetic nerve, acted upon by the higher cerebral nerve centres, their action being initiated by the emotions of shame, bashfulness, timidity, and the like. The process is not fully understood.

Blyth, SOUTH, seapt., mrkt. tn., and eccles. par., 9 m. S.E. of Morpeth, Northumberland, England; engaged in coal export trade. Pop. (1901) 5,472.



Boa Constrictor.

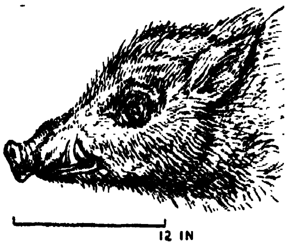
Boa, a genus of very large snakes, confined to tropical America, and without poison fangs. Their great size (10 to 20 ft.) and strength enable them to crush their prey to death by coiling the pliant body round the victim. The habit has long been rendered familiar by descriptions of the boa constrictor. The process of digestion is long and laborious, and is aided by a copious discharge of saliva. Together with the anacondas (*Eunectes*) and the pythons, the boas are included in the family Pythonidæ. The anaconda is an aquatic boa, said to reach 30 ft. in length.

Boabdil, more correctly ABU ABDALLAH, last Moorish king of Granada. Rebelling against his father (1481), and then warring against his uncle, he so reduced the strength of the Moors that he had to surrender Granada to Ferdinand of Aragon (1492). Crossing (1493) to Africa, he fell fighting in the service of the king of Fez.

Boadicea, queen of the Iceni in Britain, who inhabited Suffolk and Norfolk. The outrages of the Romans (60 A.D.)—two of her own daughters having been ravished—caused her to head an insurrection during the absence of Suetonius Paulinus, the Roman governor, in Anglesey. She succeeded so far as to capture the towns of Camulodunum (Colchester) and Londinium, killing 70,000 Romans and their allies. But Suetonius, on his return, defeated the Britons with great slaughter, and the queen put an end to her life (62 A.D.). This victory secured the Roman dominion in Britain. See Tennyson's *Boadicea*, and Cowper's ode with the same title.

Boanerges, a name given by Jesus, in Mark 3:17, to the disciples James and John, the sons of Zebedee, and interpreted by the sacred writer as 'sons of thunder;' hence sometimes applied to a man of strong and vehement character.

Boar, or WILD BOAR (*Sus scrofa*), a mammal once common in the British Isles, and still found in many parts of Europe, Asia Minor, India, and N. Africa. It is believed to be the original of the domestic pig, from which it differs in certain minor points. The body is covered with long, stiff bristles, beneath which there is a softer curling undercoat, which is uniform in tint in the adult, while the young are striped. In the swamps which it usually haunts the boar is prevented from sinking in the mire by the broad spreading feet; on dry land it uses only the two median toes in walking, the lateral ones being too short to reach the ground. As is indicated by the generalized character of the teeth, the boar is practically omnivorous, though it depends largely upon roots, bulbs, and tubers, which are dug up by the sensitive snout with the help of the tusks. In the male the canines or dog-teeth are greatly developed, and make the animal a dangerous adversary when at bay. Zoologically the boar is of great interest, as being one of the most generalized of living even-toed ungulates, and as retaining the marshy habitat of the ancestral ungulates. Its unspecialized nature is shown especially in the number (44) and structure of the teeth, in the number (4) of the complete toes and the structure of the limbs, and in the simple nature of the stomach (contrast sheep and cow). See also PIG.



Head of Wild Boar.

Board of Trade Unit, or B.O.T., is the commercial unit of electrical supply, and equals 1,000 watt-hours. It is equal to 1·34 h.p. working for one hour, as 746 watts = 1 h.p. The number of B.O.T.'s received in an hour is the product of the volts and ampères divided by 1,000.

Boards of Agriculture, Education, Trade, Works, etc. See AGRICULTURE, EDUCATION, TRADE, WORKS, etc.

Boar-fish, a name applied to two distinct fish—(1) to an Australian food-fish (*Histiopterus recurvirostris*) belonging to the perch family, and (2) to the Mediterranean *Capros aper*, one of the horse-mackerels, which occasionally appears off the British coast.

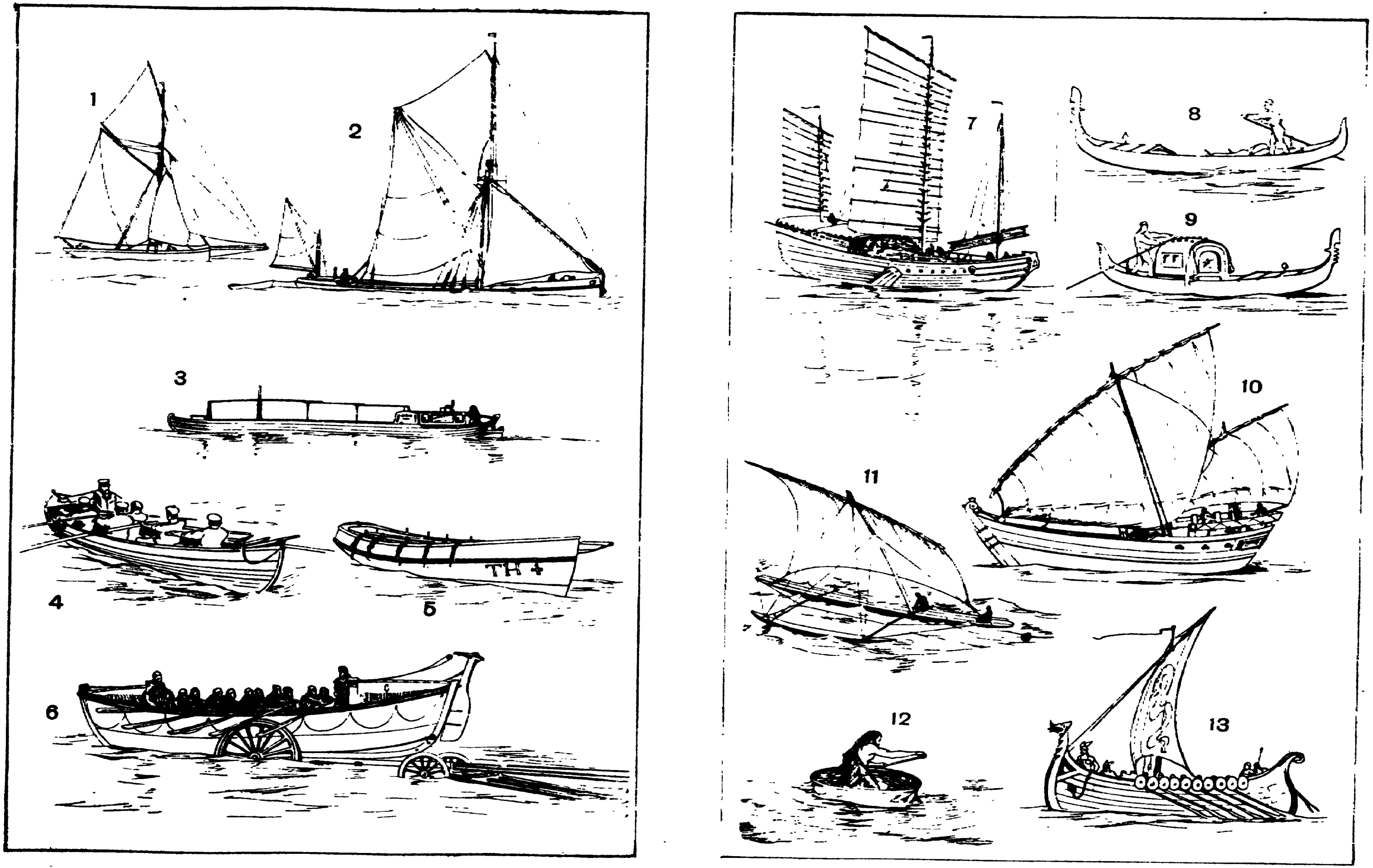
Boat, a term now indiscriminately used for sea and river vessels of all kinds, but more properly applied to a vessel that can be hauled up on or launched from a beach. It may be propelled by oars, sails, steam, or other motive power. From the earliest ages men have used buoyant contrivances to float them across streams and lakes. The primitive log or number of logs lashed together to form a raft, or bundles of brushwood or reeds used for the same purpose, early developed into the parent of modern boats, the dug-out, which has been found in association with Stone Age remains and in Swiss lake dwellings. Bark canoes and wickerwork frames covered with skins, such as the coracle of the ancient Britons, are a further development. The catamaran clearly exhibits its connection with the raft, so modified as to afford less resistance to the water. The art of boat-building began when men first lashed together pieces of wood with thongs, sinews, or fibres into a serviceable shape. For modern methods of boat-building see SHIP-BUILDING. Every kind of primitive boat may still be seen in use somewhere or other in the world. The coracle, for example, is still found on certain Welsh streams. Modern boats are of many kinds, according to the purposes for which they are intended and the character of the waters on which they are to sail. They are usually classed for racing purposes as open, half-decked, and decked boats. The canoe, punt, skiff, gondola, dingy, and outrigger are used on smooth water for pleasure and racing. The boats used by watermen vary greatly, according to the locality. On the Thames the wherry or skiff is used; on the north-east coast of England the coble, which is furnished with a dipping lug-sail. Larger and more powerfully built boats are used by fishermen. The ordinary canal boat, the Thames barge, and the Norfolk wherry are used for freight; the former is usually towed, the two latter have sails. Whale boats are sharp at both ends, and are steered with an oar. Lifeboats are provided with air chambers, which render them self-righting or self-bailing, or both combined. The following boats are used in the royal navy for rowing and sailing: barge, pinnace, cutter, lifeboat cutter, galley, gig, jolly-boat, and dingy. Steam launches, pinnaces, and cutters are also employed. The Board of Trade requires every sea-going ship to carry a specified number of boats, according to the tonnage. Sea-going ships carrying passengers must carry a lifeboat, and have sufficient boat accommodation for all the passengers carried. See also YACHT, SUBMARINES, and separate articles on the types mentioned above.

Boatbill, or BOATBILLED HERON (*Cancroma cochlearia*), is a S. American night-heron, remarkable for its broad head ending in the peculiar flattened bill to which it owes its name. The birds occur especially in the woods bordering the rivers of Brazil, and feed upon worms and other aquatic organisms. See HERON.

Boat-fly, or WATER-BOATMAN (*Notonecta*), an insect belonging to the same group as the bug (Hemiptera-Heteroptera), but living entirely in the water. It is peculiar in that it always swims back downwards, and is exceedingly common in ponds, where it may be seen rising to the surface to breathe.

Boat Race. See ROWING.

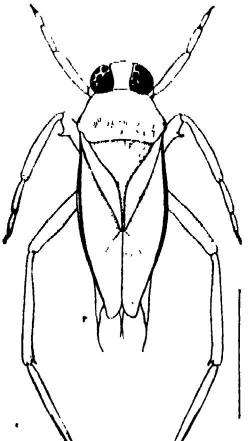
Boatswain, a warrant-officer in the Royal Navy. The term is derived from 'boat's swain,' or husband. According to Sir Harris Nicolas's account of the 'buscarles,' every ship was anciently in charge of a 'batsuen,' who commanded her crew in action, and acted at all times as master-pilot or steersman. The office of boatswain, although long in use, received recognition for the first time when the navy was increased



Types of Boats belonging to various Times and Places.

1. Cutter. 2. Thames barge. 3. Canal barge. 4. Whale boat. 5. East coast coble. 6. Lifeboat. 7. Chinese junk. 8, 9. Venetian gondolas. 10. Slave dhow. 11. Catamaran. 12. Ancient British coracle. 13. Early Danish boat.

in the 16th century. The duties attached to the office were to take charge of the boats, sails, rigging, colours, anchors, cables, and cordage, and also to summon the crew to their duty, and to assist in the necessary business of the ship. He has always used for this purpose a whistle, which is to some extent his token of office. Boatswains were anciently appointed by warrant from the Navy Board. At the present day the qualification necessary for a boatswain is that he must have been seven years at sea, and have served one complete year as a petty officer, and be between the ages of twenty-one and thirty-five. Chief boatswains are promoted from boatswains as the Admiralty may see fit. For exemplary conduct, or for distinction by acts of gallantry, these selected boatswains receive, after examination, a commission, on obtaining which they are given a gratuity of £100 for outfit. See *The King's Regulations and Admiralty Instructions.*



Boat-fly, or Water boatman.

Boavista, or BUENAVISTA, the second largest of the Cape Verde Islands, with three ports—Porto Sal Rey on the W., Porto do Norte on the N.E., and Porto Curralinho on the S.E. Pop. 5,000.

Boaz, the name of one of the two brazen pillars at the porch of Solomon's temple, Jerusalem (1 Kings 7:21); the other was called Jachin.

Boaz, a man of Bethlehem, married Ruth, a Moabitess, and their son Obed was the grandfather of David. See Ruth; 1 Chron. 2:12-15; Matt. 1:5.

Bobbili, tn. in the Bobbili Estate (area, 1 sq. m.), Vizagapatam dist., Madras, India. The town is one of the most ancient in the presidency. Pop. (1901) 17,387.

Bobbins, wooden rollers with axial perforation by which to place them on a spindle, and flanged at each end. It is on bobbins that yarn is wound. In throstle-spinning the bobbins receive the threads of wool, cotton, etc., from the drawing rollers. The largest bobbins are used for the slubbing frames, where, from the lap shape in which it comes from the carder, the cotton passes into a loose strand. The most familiar form of bobbin is the pirn or spool of sewing-thread. Metal bobbins are used for lace-making. Paper tubes are now largely taking the place of bobbins.

Bobbio, tn. and episc. see, prov. Pavia, Italy, on the Trebbia, 26 m. S.W. of Piacenza. Near it, in 612, St. Columbanus founded an abbey, which possessed a famous collection of historical MSS., now for the most part in the Vatican. There is an old cathedral. Pop. (1901) 4,876.

Bober, riv., Silesia, Germany, rises on the Bohemian frontier in the Riesengebirge, and flows in a N.W. direction past Bunzlau and Sagan, joining the Oder at Krossen after a course of 150 m.

Böblingen, tn., Würtemberg, Germany, in the Neckar circle, 16 m. by rail S.W. of Stuttgart; manufactures sugar and chemicals, and cultivates hops. Here, in 1525, Truchsess von Waldburg defeated the insurgent peasants with heavy loss. Pop. (1900) 5,303.

Bobolink, or RICE-BUNTING (*Dolichonyx oryzivorus*), a N. American bird, famous for its song, powers of flight, and especially for the flavour of its flesh. It is related both to the buntings and to the family Icteridæ.

Bobrinets, tn. of Kherson gov., 120 m. N. of Kherson city, on the Bobrinets, affluent of the Bûg. Tobacco manufacture. Pop. (1897) 14,352.

Bobruisk, tn., Minsk gov., cap. of a dist., with strong fortress (besieged by the French in 1812), on Berezina, 103 m. by rail S.E. of Minsk. Pop. (1897) 35,177.

Boca del Drago, TIGRE, TORO. See CHIRIQUI.

Bocage, MANOEL MARIA BARBOSA DU (1765-1805), Portuguese poet, born at Setubal; entered first the navy, where he remained until 1790, and after that devoted himself to literature. Bocage is, after Camoens, the most popular poet. He has written in every genre of poetry, but excels in sonnets, some of his being among the best in the Portuguese language. His liberal ideas, however, brought him several times into trouble with the Inquisition. His works appeared under the title *Rimas* (5 vols. 1806-14); later, under the title *Obras Poeticas* (7 vols. 1875, 1876). See Braga's *Bocage, sua Vida e Epoca Litteraria* (1877).

Boccaccio, GIOVANNI (1313-75), great Italian writer and humanist, was born at Paris, the natural son of a Florentine merchant. In 1334 (or 1338) he fell in love with Maria d'Aquino, a natural daughter of King Robert of Naples. This passion directly or indirectly inspired the poet to the composition of a number of works the *Rime*, *Filocolo*, *Filostrato*, *Teseide*, *Amorosa Visione*, and *Fiammetta*. In 1340 he was recalled to Florence by his father. From 1345 to 1347 he dwelt in the Romagna, till, in 1349, his father's death compelled him again to return to Florence. In 1350 he entertained as his guest Petrarch, with whom he formed a close friendship. In 1359 Petrarch endeavoured to work on Boccaccio's religious feelings, and three years later a priest, Gioacchino Ciani, effected a complete change in his moral views and conduct. In 1363 he withdrew to Certaldo (near Florence), where he passed the remainder of his life, except for embassies to Avignon (1365) and to Rome (1367), a visit to Petrarch (1368), and the Dante lectures which he delivered at Florence.

Bobolink.

The list of his works in verse is headed by the *Rime*, mostly composed between 1334 and 1348 (a good ed. by Baldelli, Leghorn, 1802). The *Amorosa Visione* (c. 1342; 1st ed. Milan, 1521) is outwardly, in metre and framework, imitated from the *Commedia*. In *Filostrato* (c. 1338; 1st ed. Venice, 1480), in the *Teseide* (c. 1341; 1st ed. Ferrara, 1475), and in the *Ninfale Fiesolano* (date uncertain; 1st ed. Venice, 1477; a good reprint in Torraca's *Poemetti Mitologici dei Sec.* xiv., xv., xvi., Leghorn, 1888), Boccaccio employed, for the first time in narrative poetry, the octave stanza, which was afterwards so prominent in Italian literature.

The series of prose works opens with the prolix *Filocolo* (1338 40; 1st ed. Florence, 1472; Eng. trans. by H. G., London, 1567). This was succeeded by the *Ameto* (1341 2; 1st ed. Rome, 1478); *Fiammetta* (before 1343; 1st ed. Padua, 1472), the heroine of which stands for Maria d'Aquino, and the hero, Pamfilo, for Boccaccio himself; the *Corbaccio*, or *Laberinto d'Amore* (1354; 1st ed.

Florence, 1487); and the *Vita di Dante* (*c.* 1364; best ed. that of Macrì-Leone, Florence, 1888; Eng. versions by Wicksteed, Hull, 1888, and Carpenter, New York, 1900: the former is restricted to the purely biographical sections), a sequel to which was his *Commento sopra la Commedia* (1373 5; ed. by Ciccarelli, Naples, 1723; better by Milanesi, Florence, 1863). The best collective edition of the minor works is still Moutier's *Opere Volgari di G. B. Corrette su i Testi a Penna* (Florence, 1827-31, vols. v.-xvii.).

Boccaccio.

The *Decamerone*, the book on which rests Boccaccio's chief claim to immortality, was composed for the most part between the years 1348 and 1353. The framework of the tales describes how, while the plague is raging at Florence in 1348, seven maidens and three youths of noble birth repair to a villa near the city, and, to while away the time, tell each a tale on ten successive days, making one hundred stories in all. The tales go back to the most various sources—Eastern, classical, and French stories, contemporary events, anecdotes, and scandals. (See Landau, *Die Quellen des Dekameron*, 2nd ed. Stuttgart, 1884.) Though the majority of the themes are undoubtedly immoral, Boccaccio's treatment is never obscene. His tales mark an enormous improvement on those that had gone before. The *novella* becomes in his hands a vehicle for dramatic development and psychological analysis; and many are the great writers who have borrowed from him—Chaucer, Shakespeare, Dryden, Lope de Vega, Molière, La Fontaine, Musset, Hans Sachs, and Lessing, to name but a few. The first edition is that of Venice (1470), and specially important among the early ones is that of Giunti (Florence, 1573). Good modern editions are those of P. Dal Rio (Florence, 1841-4) and P. Fanfani (*ib.* 1857). Hitherto the MS. Mannetti (1384) of the Laurenziana (diplomatic reprint, Lucca, 1761) was considered the best; now the claims of the Berlin Hamilton MS. are being advanced. (See the treatise by Tobler, 1887, and by Hecker, 1892.) English versions: Anonymous, 1620 (vol. i. only); anonymous, 1702; Dryden's *Fables* (a small selection in verse), 1713; Balguy, 1741; Dubois, 1804; Kelly, 1855; Wright, 1874; Payne, 1886; unexpurgated trans. (1874).

His Latin works consist of:—(*a*) *De Genealogiis Deorum Gentilium* (1350-60; 1st ed. Venice, 1472; Ital. trans. Venice, 1547). (*b*) *De Claris Mulieribus* (1352-62; 1st ed. Ulm, 1473; by Albanzani, 3rd ed. Bologna, 1875). (*c*) *De Casibus Virorum* (*c.* 1363; Italian version, Venice, 1545; English paraphrase by Lydgate, *Falls of Princes*, 1st ed. 1494). (*d*) *De Montibus, Silvis, Fontibus, Lacubus, Fluminibus, Stagnis et Paludibus, et de Nominibus Maris* (1st ed. Venice, 1472; Italian version, Venice, 1520). The few Latin letters are distinguished in neither form nor matter (edited, together with some Italian ones, by Corrazzini, Florence, 1877). More interesting, as throwing light on contemporary events, are the eclogues of the *Bucolicon* (Florence, 1504).

For a full account of all the editions, see *Serie delle Edizioni delle Opere di G. B.* (Bologna, 1875). Biographers, Manni (1742) and Baldelli (1806). Landau (Stuttgart, 1877; Italian version by Traversi, much enlarged, Naples, 1881) and Veselovsky (St. Petersburg, 1893-4) deserve careful study. See, too, J. A. Symonds, *Boccaccio as Man and Author* (London, 1895); and W. P. Ker, *Boccaccio* (Oxford, 1900).

Boccage, Marie Anne Fiquet du (1710-1802), French poetess, born at Rouen. Emulating Milton, she wrote *Paradis Terrestre* (1748); the poem *Columbiade* (1756), which brought her into notice; and *Letters concerning England* (1770). She was highly praised by Voltaire.

Boccalini, Trajano (1556-1613), Italian satirist, born at Loreto; became governor of several cities under the papal see (1608-11). In 1612-13 appeared his *Ragguagli di Parnaso*, a work full of brilliant satire against contemporary politics and literature. An unfinished sequel, *La Pietra del Paragone Politico*, was completed by Girolamo Briani (1615). An English version of these works, *Advertisements from Parnassus, together with the Politick Touchstone*, by Henry, Earl of Monmouth (London, 1656), reached the 3rd edition in 1674. Boccalini's *Commentarii sopra Cornelio Tacito* (Geneva, 1669) is couched in the same vein as the *Ragguagli*. See G. Mestica, *T. B. e la Letteratura Critica e Politica del Seicento* (Florence, 1878); G. Silingardi, *La Vita, i Tempi e le Opere di T. B.* (Modena, 1883).

Bocca Tigris, or Bogue Forts, at mouth of Canton R., China; taken by British in 1841, and again in 1856.

Boccherini, Luigi (1743-1805), Italian musical composer and 'cellist, born at Lucca; studied at Rome, and spent the greater part of his life (from 1768) at Madrid as court composer. His instrumental works—mostly quintets, quartets, and trios—number 366; but of these 74 are unpublished. Of his vocal works, only the *Stabat Mater* is published. His best works are still much appreciated for their originality, dignity of style, and melodiousness. See *Life*, in German, by Schletterer.

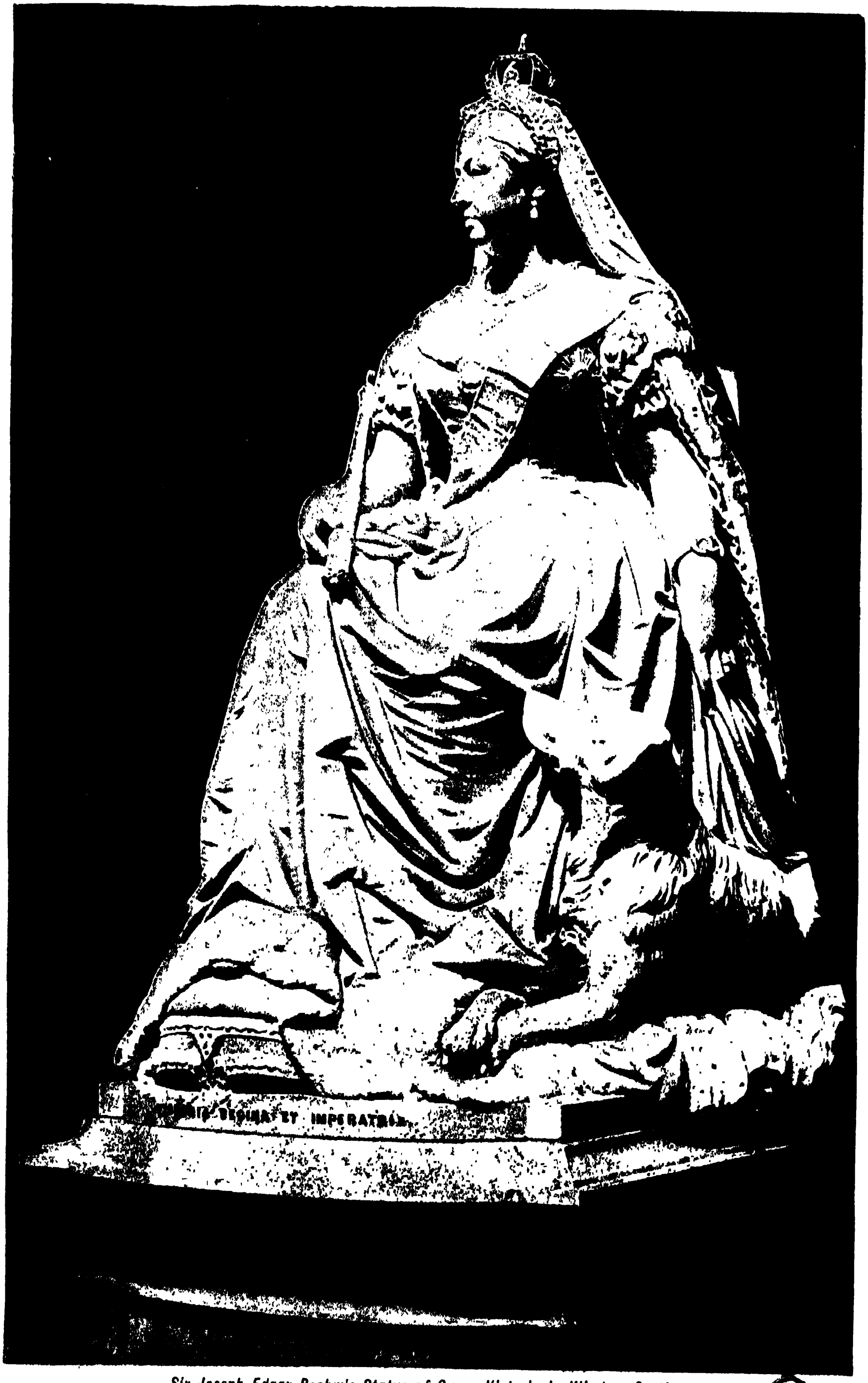
Bocchus, king of Mauritania in Africa, father-in-law of Jugurtha, with whom he fought for a time against the Romans, but, changing sides, betrayed him to Sulla in 106 B.C. See Mommsen's *Hist. of Rome.*

Bochart, Samuel (1599-1667), born at Rouen. As pastor in Caen, he publicly defended (1629) Protestantism in a public discussion with Véron, a Jesuit. His immense learning was exhibited in his *Geographia Sacra* (1646; later editions in 1651, 1674, 1681), on early Scripture history. After a brief visit (1652) to Stockholm, he published (1663) his greatest work, *Hierozoicon* (1675, 1793-6), mainly on the natural history of Scripture, but also on fabulous animals in other literatures. See Haag's *La France Protestante*, vol. ii. (1846 59); *History of Rationalism*, by Hurst (9th ed. 1882); and *German Rationalism* (trans. 1865), by Hagenbach.

Bochmann, Gregor von (1850), Russian painter; born at Nehat in Esthonia, Russia, and settled since 1868 at Düsseldorf, though he has made repeated journeys to Esthonia, Holland, Belgium, etc., for the subjects of his paintings. Among his best-known works are *A Church in Esthonia* (1874); *Potato Harvest in Esthonia* (1876); *Dockyards in Holland* (1878), now in the National Gallery at Berlin; *The Fish Market at Reval*; and *On a Country Road.*

Bochnia, tn., Galicia, Austria, 24 m. by rail S.E. of Cracow; salt mines. Pop. (1900) 10,049.

Bochold, vil., prov. Rhineland, dist. Düsseldorf, Prussia, 3 m. N.W. of Essen. Pop. (1900) 20,000.



Sir Joseph Edgar Boehm's Statue of Queen Victoria in Windsor Castle.

(Photo by G. W. Wilson & Co.)

Bocholt, tn., prov. Westphalia, dist. Münster, Prussia, 13 m. by rail N. of Wesel, with cotton industries. Pop. (1900) 21,278.

Bochum, tn., prov. Westphalia, Prussia, 10 m. E.N.E. of Essen by rail; one of the chief centres of the Westphalian iron, steel, and coal industries, with coal mines, tin-smelting, brickworks, etc. Pop. (1900) 65,551.

Bockenheim, an industrial suburb of Frankfort-on-the-Main.

Böcking, EDUARD (1802-70), German lawyer, born at Trarbach, on the Mosel; in 1835 became professor of jurisprudence at Bonn. He published valuable editions of classic works of law, as *Notitia Dignitatum* (5 vols. 1839-50); *Institutionen, or Pandekten des Römischen Privatrechts* (2 vols., 2nd ed., 1853 and 1855). He also edited the complete works of Ulrich von Hutten (5 vols. 1859-62).

Böcklin, ARNOLD (1827-1901), Swiss painter, a native of Basel. After studying (1845-50) in Düsseldorf, Antwerp, Brussels, and Paris, he settled in Rome, but in 1856 moved to Munich. Here he found a much-needed patron in Baron von Schack. Then he acted as art teacher at Weimar (1860-63), painted in Basel (1866-71), in Munich again (1871-4), and lived at Florence (1874-85), Zürich (1885-92) and Fiesole (1892-1901). One of the most notable painters of modern Teutonic art, he makes the figures and the backgrounds of the old (classic) myths live again before our eyes. He has besides a decided leaning to the weird and the grotesque. Among his more remarkable works are *Pan amongst the Reeds, Pirates Plundering a Castle, Island of the Dead* (1883), *Panic Terror, The Sport of the Waves, The Stillness of the Sea, Tritons and Nereids, The Island of the Blessed, Battle of the Centaurs, Petrarch*, and *The Plague* (these three at Basel), and *Sea Surges* and *A Recluse Playing the Violin* (at Berlin). See *Life* by Schmid in the portfolio of Böcklin's works (4 vols. 1892-1901); also monographs, in German, by Meissner (1898), Schick (1902), Mendelssohn (1901), and Floerke (1902).

Bocland ('book-land'), an Anglo-Saxon tenure (called also CHARTER-LAND, or 'deed-land') of land severed from the *folcland*, or 'public land,' conveyed by *boc* (written 'charter') to a private owner, and held by a short and simple deed under certain rents and free services. As a written charter it was distinguished from the *ethel*, or inheritance of original allotment. From the bocland tenure are derived most of the freeholds holding of particular manors, and owing them suit and service.

Bocskay, STEPHEN (1555-1606), prince of Transylvania from 1604 to 1606. In 1604 the brutal conduct of Basta in Transylvania, and the attempts of Rudolf II. of Austria to destroy religious liberty in Hungary, led to an insurrection in Transylvania and in Hungary, the leader of which was Bocskay, who was proclaimed prince of Transylvania.

Bod, the most westerly of the feudatory states of Orissa, India.

Bode, JOHANN ELERT (1747-1826), German astronomer, born at Hamburg. Director of the observatory in Berlin (1786-1825), he founded the *Astronomische Jahrbücher* (1776). His *Uranographia* (1801; new ed. 1819) comprises some 12,000 stars more than the earlier maps. His *Représentation des Astres* (1782), in 34 sheets, contains all the stars visible to the naked eye above the horizon from Berlin, as also the most important telescopic stars. An empirical formula denoting the relative distances of the planets is called 'Bode's Law.' Place a row of fours under the names of the planets ranged in a line according to their distances. Then under this row 0, 3, 6, 12, and so on. Add the two columns: the result shows the relative distances of the planets. The real relative distances, the earth's distance being reckoned as 10, are:

3·9 7·2 10 15 27·5
52 95 192 300

Bode also wrote *Anleitung zur Kenntniss des gestirnten Himmels* (1768; 11th ed. 1858) and other books.

Bodegas, or BABAHOYO, cap. of prov. Rios, Ecuador, S. America; trading centre between Quito and Guayaquil, and about 50 m. N.W. of the latter; accessible to large steamers by the river Guayas. Pop. 8,000.

Bodenbach, tn., Bohemia, Austria, on the Elbe, 81 m. by rail N.W. of Prague. It has a chalybeate spring. The industries are brewing, cotton-spinning, and the manufacture of sweetmeats. Pop. (1900) 10,782.

Bodensee. See CONSTANCE, L.

Bodenstedt, FRIEDRICH MARTIN VON (1819-92), German poet and dramatist; taught in Russia (1841-7), and became (1854) professor of Slavonic languages and (1858) of Old English literature at Munich. From 1867-73 he was connected with the famous Court Theatre at Meiningen, and from 1879-82 he was in the United States. He was a prolific original writer, and also translated from Shakespeare, Hafiz, Omar Khayyam, Pushkin, Lermontov, Turgeniev. With Paul Heyse, Wilbrandt, Herwegh, Gildemeister, and others, he issued a German translation of Shakespeare's plays (9 vols. 1866-72) and sonnets (1862), and wrote useful books on Shakespeare's contemporaries (1862), female characters (1875), and so forth. He also wrote on Russian subjects; published original plays, such as *Kaiser Paul* (1876); various volumes of verse, including *Epische Dichtungen* (1863), and tales. See his *Ausgewählte Dichtungen* (1864) and *Gesammelten Schriften* (12 vols. 1865-69). From a certain easy philosophy, exemplified in his popular *Lieder des Mirza Schaffy* (1851; 145th ed. 1893; Eng. trans. 1880), Bodenstedt has been called *Der Horaz der deutschen Bourgeoisie.* The man and his works are best seen in his egoistic *Erinnerungen aus meinem Leben* (1892), and in an interesting series of letters edited by G. Schenck (1893).

Bodichon, MADAME (1827-90), an eager advocate of women's rights; was the eldest daughter (Barbara Leigh) of Benjamin Smith, for many years M.P. for Norwich. In 1857 she married Eugène Bodichon, M.D., and lived for some time in Algeria. She began in 1855 the agitation which resulted in the passing of the Married Women's Property Act, and contributed to the foundation of Girton College, Cambridge.

Bodin, JEAN (1530-96), French political philosopher; born in Angers, and studied at Toulouse. In 1561 he went to Paris as an advocate, and in 1566 he published a treatise on the method of studying history, which evoked the wrath of the great jurist Cujas. In spite of his Protestantism, Bodin began to rise in the official world. Though he had opposed Charles IX., and narrowly escaped the massacre of St. Bartholomew (1572), he was made *avocat du roi* at Laon. In 1580 he published his treatise on political philosophy, *La République* (Latin trans. 1586; English, 1606), in which he builds upon the family as the basis of settled government, the supreme embodiment of which is the sovereign. The Catholic League, however, became so strong that in 1589 Bodin felt compelled to join its ranks. By this time he was *procureur général*, and a marked man. In 1593, after the victories of Henry IV., Bodin once more ventured to break openly with the League. His *Heptaplomeres* (first published 1857) is a plea for religious toleration; though in his chief work, and in *Démonomanie* (1580), he shows himself a believer in the superstitions of his age. See Boudrillart's *Bodin et son Temps* (1853), and Sir F. Pollock's *Science of Politics* (new ed. 1902).

Bodinayakanur, chief tn. of state of same name, Madura dist., Madras, India. Pop. (1901) 22,209.

Bodle, a Scottish copper coin worth two pennies Scots, or one-sixth of an English penny, issued in the reign of Charles II., and said to have been named from Bothwell, the master of the mint.

Bodleian Library, Oxford, named after Sir Thomas Bodley, who, after the complete destruction (before 1556) of the university library of Oxford, dating from 1409, restored it (1598) by a gift of books collected by himself at a cost of £10,000. The library was opened (1603) with upwards of 2,000 vols. Later contributors include the Earl of Pembroke, with 250 vols. of Greek MSS.; Kenelm Digby, 238 MSS.; Archbishop Laud, 1,300 MSS. in more than twenty languages; and Robert Burton. Of John Selden's library the Bodleian received over 8,000 vols. General Fairfax enriched it with many MSS., including Dodsworth's 160 vols. in English history. Bishop Rawlinson's bequest (1755) included some 1,900 printed books and over 4,800 MSS. Nineteenth century donations comprise Richard Gough's collection (1809), numbering 3,700 vols. on Saxon and Northern literature; Edward Malone's collection of English drama and early poetry; Francis Douce's collection (1834); and Robert Mason's bequest (1841) of £36,000, the interest to be expended on books. The library now has nearly half a million volumes. It is entitled to a copy of every book printed in the United Kingdom. The first catalogue of its printed books was published in 1605, by its first librarian; the last in 1843, in 3 vols., by its eleventh librarian.

Bodley, JOHN EDWARD COURTENAY (1853), a student of European politics, was called to the English bar in 1874. He was private secretary to Sir Charles Dilke, president of the Local Government Board in 1882-5. Since 1890 he has lived in France. See his *France* (vol. i., *The Revolution and Modern France;* vol. ii., *The Parliamentary System*, 1898); *L'Anglomanie et les Traditions Françaises* (1899); a French version of his own *France* (1901); *The Coronation of Edward VII.*, by command of the King (1903).

Bodley, SIR THOMAS (1545-1613), English diplomatist and scholar. In 1585 he began his diplomatic career with a mission to Denmark. In 1589 he became the queen's representative in the United Provinces, where he acted as a member of the council of state until 1596. The rest of his life was devoted to the foundation and development of the Bodleian Library at Oxford. See his own autobiographical *Reliquiæ Bodleianæ* (1703); Wood's *Athenæ Oxon.* (1813-20); Macray's *Annals of the Bodleian Library* (1868).

Bodmer, JOHANN JAKOB (1698-1783), one of the chief pioneers in the regeneration of German literature in the 18th century; was a native of Zürich, where (1725-75) he was professor of Swiss history. With Breitinger and others he founded a weekly critical periodical (1721-3), *Die Diskurse der Maler*, the object of which was to emancipate literature from the trammels of pedantic rule. The new 'Swiss' school won its way slowly, until its principles were adopted by Lessing and others. Bodmer also drew attention to the old German epics, particularly the *Nibelungenlied*, of which he edited part in 1757. For Life and bibliography, see J. Baechtold's *Geschichte der Deutschen Literatur in der Schweiz* (1887-92).

Bodmin, par., munic. bor., and co. tn. of Cornwall, England, 26 m. N.W. of Plymouth, on G.W.R. With Liskeard it returns one member to Parliament. The chief manufactures are boots and serges. Pop. (1901) 5,353.

Bodo, scapt., Nordland, Norway, on the Salten Fjord. Pop. (1900) 4,827.

Bodobriga. See BOPPARD.

Bodoni, GIAMBATTISTA (1740-1813), Italian printer. During his early manhood he worked (from 1758) in the printing-house of the Propaganda in Rome, and afterwards (1768) became superintendent of the Duke of Parma's press. In 1788 he published, under the title of *Manuale Tipografico*, a collection of 178 different types, increased in the 2nd ed. (1818) to 250. Between 1791 and 1813 he issued many beautiful editions of the classics, notably a *Homer* in 1808; but they are more distinguished for typographic beauty than for accuracy.

Bodtcher, LUDVIG (1793-1874), Danish poet; spent most of his earlier life in Italy with the Danish artists, including Thorwaldsen. It was largely through his efforts that the works of the great sculptor were acquired for Denmark. He returned to Copenhagen in 1835. He produced two small collections of poems, which are among the best in Danish literature. See *Digte*, with Life, by Arentzen (4th ed. 1878); and G. Brandes's *Danske Digtere* (1896).

Body-cavity, or CŒLOM, the space which in many animals lies between the body-wall and the alimentary canal. It is seen perhaps in its simplest form in annelid worms, such as the earthworm or the fisherman's lobworm, and there satisfies the following conditions: it is lined throughout by the cells of the middle layer (mesoblast) of embryology, communicates with the exterior by kidney tubules or nephridia, and gives rise to the genital products on its walls. Such a cavity is present, in theory at least, at some period of life in all animals except Cœlentera and Protozoa; higher animals are therefore sometimes called Cœlomata, in opposition to these two groups. But in many cœlomate animals—*e.g.* crustaceans and insects—the cœlom is obliterated at a very early stage, and in others—*e.g.* round worms—the space present between gut and body-wall fails to satisfy the conditions given above, and is therefore not a true cœlom.

Body's Island, long sandy isl. off coast of N. Carolina, U.S.A. The highest lighthouse (150 ft.) in the United States stands 2 m. from its S. extremity.

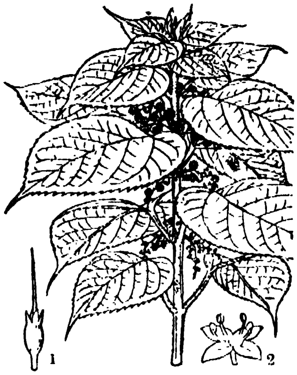
Boece, or BOETHIUS, HECTOR (*c.* 1465-1536), Scottish historian, was probably the son of Alexander Boyis, a burgess of Dundee. He studied in Paris, became a professor in the college of Montaigu in 1492, and made the acquaintance of Erasmus. He returned to Scotland about 1498, and became principal in 1505 of the University of Aberdeen. In 1522 he published the *Lives* of the bishops of Mortlach and Aberdeen (new ed. Bannatyne Club, 1875), at the press of Jodocus Badius in Paris; and in 1527 the *Historia Gentis Scotorum*, which was translated (1533) into Scottish prose at the request of James V., and into English for Holinshed's *Chronicles* in 1577.

Boeckh, PHILIPP AUGUST (1785-1867), classical philologist, born at Karlsruhe. Having since 1803 studied under Wolf, he became professor of philology in 1807 in Heidelberg, and in 1811 in Berlin, where he acted also from 1812 as director of the philological, and from 1820 of the pedagogical, seminary. His *Public Economy of Athens* (1817; enlarged 1840), of which there is an excellent translation by A. Lamb (1857), presents a complete and minute picture of classic Athens from every point of view. His edition of Pindar (1811-21) establishes the present basis of metre. His great work, *Corpus Inscriptionum Græcarum*, was continued by Franz, Curtius, Kirchhoff, and Röhl (1828-77). His minor writings appeared in 7 vols. (1858-74).

Boehm, SIR JOSEPH EDGAR (1834-90), British sculptor, born in Vienna, and studied in Italy, France, and in England, where he settled in 1862, and was elected A.R.A. (1878) and R.A. (1882). His chief works are: Statue of Queen Victoria (1869) in Windsor Castle, of Carlyle at Chelsea, and of Wellington at Hyde Park Corner; the Duke of Kent Monument in St. George's Chapel, and the Stanley Sarcophagus in Westminster Abbey. Boehm was appointed sculptor-in-ordinary to Queen Victoria (1881), and created baronet (1889).

Boehme, or **Boehm** (called also in England **Behmen**), **Jakob** (1575-1624), German philosopher and mystic, was born in a peasant home at Altseidenberg, near the town of Görlitz, where he spent his industrious, contemplative life. As a boy, when herding cattle, he conceived a profound mystic sense of God in nature, which seemed an intimate revelation; and through the time of his very rudimentary education in the village school, of his apprenticeship to a shoemaker at the neighbouring town, and of his journeyman wanderings, until he settled down as a master workman at the age of nineteen, this emotional temperament grew into a consuming passion for truth. Boehme's books were limited to the Bible, in which he was deeply versed, and to a few theosophical and alchemistic writings, such as those of Paracelsus; and the task before his illiterate genius was to shadow forth, in those obscure symbols, natural images, and poetic suggestions which were his only instruments, philosophical conceptions which were new to his age, and which later were not easily expressed by Hegel. 'There reigns in his writings a twilight, as in a Gothic dome.' For Boehme, God is the One from whom all creation proceeds by His self-differentiation into a negation of Himself. Spirit cannot be, except it distinguish that which is not itself from itself; and this inner difference, beginning in God, and reproducing itself in all consciousness, is the principle by which the whole world is evolved. This negation of self, by which self arises, is variously identified with evil; and, again, the doctrine of the Trinity is never far from Boehme's meaning when he writes of the divine self-distinction. His earliest work, *Aurora* (1612), was denounced from the pulpit, and he was forbidden by the magistrates of Görlitz to write any more. This injunction Boehme obeyed for some years, but finally broke through it. He was much harassed by pedant and official, but his quiet, humble spirit was undisturbed. Boehme has exercised a more powerful influence on minds concerned with experimental religion, and imaginations capable of spiritual desire, than on the direct development of academic philosophy. 'His best contributions,' says Dr. Stirling of Schelling, 'are those in analogy with Boehme.' But it is in writers such as William Law that we find the true line of descent; every page of Law's *Spirit of Love* shows his acknowledged debt to the German mystic. Boehme's collected works were published in Amsterdam in 1675, and again in 1730, and in Leipzig in 1831-46. They were translated into English shortly after his death.

Bœhmeria, a genus of plants of the order Urticaceæ, noted for the production of strong fibres, which are made into ropes and sailcloth. *Bœhmeria nivea* fibres produce Chinese grass-cloth, which resembles linen. The plant is also cultivated in India, S. United States, and Jamaica. The rhea fibre of Assam is derived from the same plant. Puyha fibre of Nepaul is got from *Bœhmeria puya*, and is used for making ropes and sailcloth.



Bœhmeria nivea.

1, Female flower; 2, male flower.

Bœotia, a district of ancient Greece, bounded on the E. by the Eubœan Sea; S. by Attica, Megaris, and the Corinthian Gulf. Its inhabitants were said to be slow and heavy-witted. In the earliest times Bœotia was occupied by a race called the Minyæ, whose chief city was Orchomenus. The Bœotian cities were united in a league, and the history of Bœotia turns chiefly on the attempts made by Thebes to dominate this league. It was only after the battle of Leuctra, in 371 B.C., that the Thebans gained their aim; in 364 they destroyed Orchomenus. The Bœotians bore the brunt of the Greek resistance to Philip at Chæronea in 338 B.C.; and in 335 Thebes revolted against Alexander, and was destroyed, and Orchomenus was rebuilt. Henceforward, Bœotian history is unimportant. See W. Rhys Roberts's *The Ancient Bœotians* (1895).

Boerhaave, Hermann (1668-1738), a Dutch physician, born at Voorhout, near Leyden. Lecturer (1701), he became (1709) professor of medicine and botany, and (1714-36) rector of the University of Leyden, filling also, from 1718, the chair of chemistry. He was a pioneer in clinical medical instruction. His *Institutiones Medicæ* (1708) had great influence. Of equal merit are his *Elementa Chemiæ* (1724). Boerhaave was the first to lecture in Holland on diseases of the eye. See Burton's *Account of Boerhaave's Life and Writings* (1743), and Johnson's *Life* (1834).

Boers (Du. *boer*, a 'peasant or husbandman;' connected with Ger. *bauer*, 'peasant'), the farmers in S. Africa of Dutch descent who founded Cape Colony in 1650.

Boer Wars. See South Africa.

Boëtius, or **Boëthius** (*c.* 470-524), 'the last of the Romans whom Cato or Tully could have acknowledged for their countrymen' (Gibbon). His full name was Anicius Manlius Severinus Boëtius. He became famous for his learning and knowledge of Greek philosophy, and was consul in 510, also chief of the senate. Theodoric, king of the Ostrogoths, made him one of his most powerful ministers. But his protests against the excesses committed by the Gothic officers, and especially his defence of Albinus, who with Symmachus was accused of seeking to liberate Rome, brought him into disfavour with Theodoric. He was accused of treason, sentenced to death untried, and imprisoned in the tower of Pavia, where he produced his great work, the *Consolation of Philosophy*. He was executed in 525. He wrote many works on arithmetic, geometry, logic, and music which are extant, and translated the principal works of Aristotle. These were the chief source for the knowledge which the middle ages had of Aristotle. A defence of the Christian faith is incorrectly assigned to him. His *Consolation of Philosophy* was translated by Alfred the Great (ed. Fox, 1864) and Chaucer (pub. 1480), and more recently by James (1897). It is a dialogue between the author and Philosophy, in prose and verse. Complete works, eds. of Basel (1570), Paris (1860); Peiper, *Consolatio* (1871); Friedlein, *De Institutione Arithmetica et Musica* (1867); Meister, *Commentaria in Aristotelem* (1877-80). See Gibbon's *Decline and Fall*; Bury's *Later Roman Empire* (1889); H. F. Stewart's *Boëthius* (1891).

END OF VOL. I.

THE RAMAKRISHNA MISSION INSTITUTE OF CULTURE
LIBRARY
CALCUTTA

ABDUL JABBER & SONS.
BOOK-BINDER
Date 7
19/1, 1, Purnoe Bagan Lane Cal-9

032/HAR

7451